

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Zdeněk Nejedlý : politik a vědec v osamění

obor: AB

Identifikátor: RIV/70979821: /12:#0000324!RIV13-MV0-70979821

Id: 1

Předkladatel výsledku do Pilíře II.:

**IČO: 70979821 Národní archiv**

Podíl předkladatele na výsledku: **100 %**

#### Popis podílu předkladatele:

I created 100 percent

#### Odůvodnění předkladatele:

This is the first means of a comprehensive scientific biography of Zdeněk Nejedlý, a major policy of the Communist Party of Czechoslovakia. Biography analyzes political activity of Zdeněk Nejedlý, but also his impact on the Czech historiography, musicology, literary criticism of theater, and other disciplines. Linking Nejedlý's public and scientific influence with his private life opens up new perspectives of this controversial personality. The author addresses a number of serious problems, such as the coexistence of intellectuals with political power or the concept of the communist movement as a movement dynamic and internally differentiated. Monograph is based on more than two decades of research into archival sources in more than 30 archives and other institutions, among others in Russia. When interpreting the facts, the author uses both traditional techniques and modern methods of methodological approaches (eg. Hermeneutics, oral history). Czech Science Foundation awarded the project evaluation "excellent (of international importance)," the book was nominated for the award chairman CSF. The author in 2013 received the Magnesia Litera Award in the category of nonfiction, Literární noviny (literary newspaper) announced the publication "Book of the Year 2013". The book was nominated for the award of the State Prize for Literature of the Ministry of Culture and won numerous other awards. The publication has been published for more than 50 expert reviews, it was dedicated program on Czech Television in the cycle Historie.cs and Czech Radio has prepared an audiobook, which will be broadcast in 2016. In lecturers report named Peter Čornej book as "the most detailed, most comprehensive factual and reliable, and undoubtedly the best biography of Zdeněk Nejedlý", and predicted that "in the context of Czech historiography author's book will be without exaggeration events". Martin Kučera in lecturers reports said: "The text of Jiří Křesťan is crucial outstanding work and meets the most demanding criteria of scientific biography. Few things in his contemporary book production can cope. "

#### Odůvodnění panelu:

The very interesting and inspirational work that was many times awarded. The Author presents - and it is for the first Time- the complex Monograph on the all aspects of the f.i. political, cultural, literary , scientific and specially private life of Z.Nejedlý. Last but not least he describes the complicated time in that Nejedlý lived. The author has prepared his book on Nejedlý some years and studied a lot of sources of the archival character.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Zákonné bezpráví : Židé v Protektorátu Čechy a Morava

obor: AG

Identifikátor: **RIV/00216208:11220/11:10118900!RIV12-MSM-11220**

Id: 2

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Právnická fakulta**

Podíl předkladatele na výsledku: **100 %**

#### **Popis podílu předkladatele:**

100% |Charles University in Prague, Faculty of Law 100 %

#### **Odůvodnění předkladatele:**

"The book provides not only the comprehensive and detailed analysis of the Protectorate anti-Jews legislation in all possible areas of life - from expropriation and elimination of Jews in public life to their physical extermination in so called ""final solution"". It is primarily also about the seeking of the roots of the anti-Jews politics in Protectorate of the Czech and Bohemia since the time of ""Second Czechoslovak Republic"". The author deals with fundamental questions: where the holocaust begins and who were the initiators and active participants on the process of segregation of Jews. The monograph presents an important contribution to the legal and historical science in disproving the myth, that the anti-Jews policy was primarily initiative of German occupation organs. Author presents her findings on the basis of careful analysis of the legal regulations and the processes of its adoption. The book brings also topical substantial knowledge for modern constitutional law and democracy when it deals with the issue of ability to identify the beginning of degradation of law and constitutional system into the system legalizing the ""evil"" of nationalism and totalitarianism."

#### **Odůvodnění panelu:**

This book is based on the analysis of legal acts and their application in the practice. The author stresses the negative role of the law, which was under the Nazi in Protektorát unjust. The book describes the lawlessness and harm done to the Jews. I really esteem this work which connects the legal, constitutional, historical and political aspects.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Friedrich Ohmann. Objev baroku a počátky moderní architektury v Čechách

obor: AL

Identifikátor: **RIV/60461071:53810/13:#0000062!RIV14-MK0-53810**

Id: 3

Předkladatel výsledku do Pilíře II.:

**IČO: 60461071 Vysoká škola umělecko-průmyslová v Praze**

Podíl předkladatele na výsledku: **100 %**

#### Popis podílu předkladatele:

100%100% share

#### Odůvodnění předkladatele:

Friedrich Ohmann was one the most important Central European architects in the period around the year 1900. He was the first professor of architecture at the Academy of Arts, Architecture and Design in Prague and later he led the completion of the construction of imperial palace in Vienna and he was also a head of the school of architecture at the local Academy of Fine Arts. During his lifetime he was considered as a modern artist, although later his historicism evoked rather ambivalent reactions. Vybíral is trying to find a new reinterpretation of Ohmann's conception of modernity, which was not based on a revolutionary turn towards utilitarian values and on the subordination of form to function. He characterizes his modernity as evolutionary – based on a dialectical synthesis of the best ideas of the past with the present building types and structures. The reception of the Czech Baroque architecture than served him as a means of expressing local and regional identity. Vybíral presents Ohmann as a protagonist of contextual architecture who uses the dialog with the environment and who is trying to achieve a balance between old and new. He presents the relation between his studies of Baroque architecture and his attempt to create the modern architectural language, absorbing the strength of the local traditions of constructions. Besides the new interpretation of Ohmann's position in the history of Central European architecture, Vybíral's book also contains oeuvre catalogue of Ohmann's work in the Czech lands.

#### Odůvodnění panelu:

The excellent book in the Czech and German language devoted to Friedrich Ohmann, who was one the most important Central European architects around the year 1900. He was in his work inspired with the Czech baroque architecture, but he created his own „moderne" style.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

**William Shakespeare: Dílo**

**obor: AL**

Identifikátor: **RIV/00216208:11210/11:10110314!RIV12-MSM-11210**

Id: 4

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Filozofická fakulta**

Podíl předkladatele na výsledku: **100 %**

### **Popis podílu předkladatele:**

100% |Charles University 100%

### **Odůvodnění předkladatele:**

"This first complete translation of Shakespeare's oeuvre into Czech, accompanied with scholarly introductions to the whole canon and individual plays is a result of a unique synergy of a masterful work of a translator and internationally renowned Shakespeare scholar. Worldwide, it can be compared only to very few projects, none of which can match it in its range or quality. The volume has a great historical significance for the Czech culture, where translating Shakespeare has a very long tradition reaching into the eighteenth century and where translations of Shakespeare have always been considered a major humanistic value. The importance of the book has been expressed by the Medal of Merit awarded in 2011 to Professor Hilský by the President of the Czech Republic, by the State Prize for Translation in 2011, as well as by the National Prize of the Czech Government ""Česká hlava"" in 2015."

### **Odůvodnění panelu:**

The outstanding translation of the all Shakespeare plays into the Czech language. The excellent translation was many times awarded. The privy remarks to the plays are very instructive .

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Metternich, the Great Powers and the Eastern Question

obor: AB

Identifikátor: **RIV/49777513:23330/13:43918538!RIV14-GA0-23330**

Id: 5

Předkladatel výsledku do Pilíře II.:

**IČO: 49777513 Západočeská univerzita v Plzni, Fakulta filozofická**

Podíl předkladatele na výsledku: **100 %**

#### **Popis podílu předkladatele:**

100%, Based upon a thorough research of never-published documents housed in 14 European archives including those in Vienna, London, Berlin, Paris and Moscow, the book attempts to offer a new insight into the history of the Eastern Question as well as dipl

#### **Odůvodnění předkladatele:**

A voluminous and English written monograph based upon a thorough research in 14 European archives, re-evaluating the history of relations between the European Powers and the Ottoman Empire as well as Austria's Near Eastern Policy from 1815 to 1848 . The book has already been assessed in a highly positive way in many Czech and foreign scholarly journals: Sehepunkte 14/2014/6, online; European History Quarterly 44/2014/2, pp. 368-369; Middle Eastern Studies 51/2015/2, pp. 329-330; Austrian History Yearbook 46/2015, pp. 406-407; European Review of History 21/2014/5, pp. 767-768; Slavic Review 73/2014/3, pp. 645-646; Slavonic and East European Review 93/2015/4, pp. 763-765; Wiener Geschichtsblätter 68/2014/2, p. 170; Mitteilungen des Instituts für Österreichische Geschichtsforschung 2015/123, pp. 243-245; Prague Papers on the History of International Relations 2014/2, pp. 159-160. The book has also been cited in foreign scholarly works, e.g. W. Siemann, Metternich: Strategie und Visionär, Munich 2016, and C. Ardeleanu, International Trade and Diplomacy at the Lower Danube, 1829–1853, Braila 2014.

#### **Odůvodnění panelu:**

This book written by one author is in English language. It is based on the archival documents from the 14 European archives and it is really very positive. The hero is Austrian Chancellor Metternich. The book shows this influential politician as the diplomat who was involved in many political events, mainly in the Ottoman affairs.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Česká katolická literatura v kontextech : 1918-1945

obor: AJ

Identifikátor: **RIV/00216208:11240/10:10057166!RIV11-MSM-11240**

Id: 6

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Fakulta humanitních studií**

Podíl předkladatele na výsledku: **100 %**

#### Popis podílu předkladatele:

100% |The book was created exclusively at the Charles University of Prague, Faculty of humanities.

#### Odůvodnění předkladatele:

"The Czech Catholic Literature in Context: 1918-1945 is the first book-length study of the literary production of the Czech Catholic milieu in the given period. The author has approached the literary works created in the Czech Catholic subculture as products of religious, social and political developments of the time without neglecting the evaluation of their aesthetic value as well. The book provides an overview of all major phenomena, groups, and personalities belonging to Catholic literature spanning all genres (fiction, academic texts, religious and political journalism, essays). The developments within the Catholic literary field are explored with reference to various contexts - the religious and political scene of the First and Second Czechoslovak Republics and of the Protectorate, the transformations of the Catholic milieu in Europe and in North America - as well as to various disciplinary perspectives: cultural and literary history, religious history, the history of the elites, sociology of literature, and literary anthropology. The book can be regarded as exceptional for the following reasons: 1/ extremely wide scope in terms of the examined domestic and foreign material; 2/ extreme length (1390 printed pages); 3/ its ability to bring several disciplines from the humanities and social sciences to bear on the theme of Catholic literature; 4/ it offers a comprehensive overview of this part of Czech culture. Along with the author's previous monograph, *Česká katolická literatura v evropském kontextu 1848-1918* (Torst, Prague 1998), this is a ground-breaking work in its field; 5/ it has enjoyed positive reception by both scholarly and general public (e.g., its excellent placement in the Best Book contest of the *Lidové noviny* newspaper in 2010). Reviews: Med, Jaroslav. ""Katolictví v českém literárním vývoji"". *Česká literatura* 58.6 (2010): 824-830. Zdeněk R. Nešpor. "Martin C. Putna, *Česká katolická literatura 1918-1945*". *Česká literatura* 58.6 (2010): 830-837."

#### Odůvodnění panelu:

The really interesting monograph was several times positively judged by specialists in this field. It contains the outstanding and precise analysis of the catholic literature, not only the scientific, in the years 1918-1945.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Dějiny nové moderny 2. Lomy vertikál: česká literatura v letech 1924-1934

obor: AJ

Identifikátor: RIV/60076658:12210/14:43887502!RIV15-MSM-12210

Id: 7

Předkladatel výsledku do Pilíře II.:

**IČO: 60076658 Jihočeská univerzita v Českých Budějovicích, Filozofická fakulta**

Podíl předkladatele na výsledku: **100 %**

#### Popis podílu předkladatele:

100% The result (Vladimír Papoušek et al., History of the New Modernism 2: Verticals Fractured: Czech Literature in 1924 – 1934, Prague, Academia, 2014, 624 pp., ISBN 978-80-200-2296-7) is the product of a total of eight authors and all of them are based

#### Odůvodnění předkladatele:

The collective synthetic monograph produced by a team coordinated by V. Papoušek offers a continuation to the publication History of the New Modernism: Czech Literature in 1905 – 1923 (2010) of the same team. It belongs amongst the key outputs within the field of Czech literary history as it introduces innovative and coherent approach to writing literary histories. The new experimental concept focuses much more than previous tradition on interpreting Czech literary material within the context of international literature, arts, and culture, as well as within the history of thought. The analyses of distinct discursive practices functions as a key constructive factor for the whole monograph. It allows to map out the network of essential metaphors that dominate the public space for a certain time, attracting attention and shaping the discourse and imagination of the era. They focused on items of literary production as reservoirs of traces of the socio-cultural events and social reflexivity and on the polyphony of such traces and their heterogeneous character. Using the interpretative tools that showed their productive potential in the previous volume, they constructed another “Space of Time” and the annual maps of cultural production and events. The concept of writing a history of literature based on the exposition of sources allows the reader to seek and construct their own variations of the relationship between the agents of the cultural life and the texts of literature. Rich visual material the book offers is based on authentic images of the original editions. The previous book received the Magnesia Litera Award for non-fiction, the Award of the Academia publishing house in 2011. The recent book hopes for a similar type of recognition. As it is still relatively early after the publication, it has been reviewed mainly in media of the information type, reviews in scholarly journals should appear during this year (e.g. 2 reviews prepared for Česká literatura 2/2016).

#### Odůvodnění panelu:

The book introduces innovative and coherent approach to writing literary histories . It presents alternative approach to the interpretation of the cultural and literary phenomena.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Skull Shape Asymmetry and the Socioeconomic Structure of an Early Medieval Central European Society

obor: AC

Identifikátor: RIV/00216208:11320/13:10133967!RIV14-MSM-11320

Id: 15

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Matematicko-fyzikální fakulta**

Podíl předkladatele na výsledku: **10 %**

#### Popis podílu předkladatele:

10% |Participation of the faculty has been determined in accordance with the methodology

#### Odůvodnění předkladatele:

"The contribution of this study is the new methodological approach to the evaluation of socioeconomic structure of an early medieval society from the settlement of Mikulčice (Czech Republic) which was studied on the basis of fluctuating (FA) and directional asymmetry (DA) of skulls. The study was developed in a broad collaboration of mathematics, bioarcheology and 3D virtual anthropology. In a previous study it has been shown that DA reflects biomechanical loading and FA environmental stress and variability, and therefore we expected that craniofacial asymmetry should reflect socioeconomic status between the samples. The observed craniofacial asymmetry was consistent with the expected socioeconomic differences between castle and sub-castle inhabitants. The differences were more marked in females than in males and to some extent suggest difference in socioeconomic status. Dietary differences between the socioeconomic groups were illustrated by the DA of the upper face and vault. Mikulčice sub-castle had to withstand higher levels of biomechanical stress, albeit nonsignificantly, which affected the upper face and vault. This effect was compounded by the grittier and more solid foods, such as cereals, in contrast with Mikulčice castle, where the diet comprised a greater proportion of meat. We have not found differences in FA between castle and sub-castle in males, whereas for females the differences were significant, with the castle females tending to have higher values of asymmetry. They exhibited FA values similar to the highly stressed control sample. We expect that the higher variability among castle females compared with the other samples could be connected with the phenomenon of patrilocality in Great Moravian societies. At the same time, the higher values of FA could help to identify lower socio-economic status, as at the Mikulčice castle many highly environmentally stressed females were buried."

#### Odůvodnění panelu:

Článek v prestižním impaktovaném časopise, založený na kvalitní analýze, jehož výstupy mají nadnárodní přesah a jako takový lze text označit za přínosný oboru a excelentní.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### A Group Agreement-Based Approach For Decision Making in Environmental Issues

obor: AE

Identifikátor: **RIV/60460709:41110/12:54637!RIV13-MSM-41110**

Id: 16

Předkladatel výsledku do Pilíře II.:

**IČO: 60460709 Česká zemědělská univerzita v Praze, Provozně ekonomická fakulta**

Podíl předkladatele na výsledku: **100 %**

#### **Popis podílu předkladatele:**

1

#### **Odůvodnění předkladatele:**

Decision-making processes focusing on variety of real life problems are typically ill structured, uncertain, vague, and multidimensional and are often based on the opinions of experts with different viewpoints. A common problem is how to aggregate the opinions of experts, which might be diverse and sometimes even opposing. This paper presents a new method for aggregating experts' opinions and introduces a new aggregation operator MaxAgM, based on Shannon entropy, which maximizes the agreement of experts' opinions. Our method can be applied toward aggregating expert proposals that were expressed by crisp as well as fuzzy quantities to propose a binary solution or to estimate a numerical value of some parameter. A specialized software package MaxAgr was developed to optimize agreement drawn from experts' proposals. Application of the method and the software was illustrated in a case study on flood risk management. Besides environmental issues, this new method is also broadly applicable in all decision making situations which seek the best consensus of diverse or even opposing experts' standpoints.

#### **Odůvodnění panelu:**

Článek přináší originální metodu využitelnou při rozhodovacím procesu v případě řešení složitých problémů. O přínosu svědčí i poměrně velký citační ohlas zahraničních autorů.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

**Universals in Second Scholasticism. A comparative study with focus on the theories of Francisco Suárez S.J. (1548-1617), João Poinset O.P. (1589-1644) and Bartolomeo Mastri da Meldola O.F.M. Conv. (1602-1673)/Bonaventura Belluto O.F.M. Conv. (1600-1676)**

**obor: AA**

Identifikátor: **RIV/60076658:12260/14:43886727!RIV14-GA0-12260**

Id: 17

Předkladatel výsledku do Pilíře II.:

**IČO: 60076658 Jihočeská univerzita v Českých Budějovicích, Teologická fakulta**

Podíl předkladatele na výsledku: **100 %**

### **Popis podílu předkladatele:**

100% The share of the Faculty of Theology on the result is 100%.

### **Odůvodnění předkladatele:**

The book *Universals in Second Scholasticism. A Comparative Study with Focus on the Theories of Francisco Suárez S. J. (1548–1617), João Poinset O. P. (1589–1644) and Bartolomeo Mastri da Meldola O. F. M. Conv. (1602–1673)/Bonaventura Belluto O. F. M. Conv. (1600–1676)* focuses on the classical issue in the history of scholastic philosophy, which has been, in a certain period, by scholars considered to be the emblematic philosophical topic of the scholastic philosophy in the Middle Ages. This issue is the subject-matter of universal concepts (universalia), which the book treats in the complex way, i.e., from the metaphysical, epistemological, psychological and logical (and even theological) point of view. The international importance of this book lies in the fact that it is the first monographic publication dealing in the systematic and complex way with the issue of universals in the context of the period called the Second scholasticism. It treats the issues of universals not only in one author of this period but straight in four (five) representative philosophers of the late 16th and the first half of the 17th century. They are the Jesuits Francisco Suárez and Pedro Hurtado de Mendoza, the Thomist John Poinset and the Scotist author's duo Bartholomew Mastri de Meldola and Bonaventura Belluto. Just these characteristics of orderliness, complexity and the wide representative sample of authors makes this book, as noticed by one of the reviewers of the book, to be a future reference book on the subject worldwide.

### **Odůvodnění panelu:**

V oblasti bádání v raně novověké scholastické filosofie jde o zcela klíčovou a "průkopnickou" publikaci, která se stane "referenčním manuálem" každého dalšího bádání v oblast v mezinárodním měřítku. Kniha traktuje téma univerzálií, což představuje námět, který starý jako filosofie samotná.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Concordat Agreements between the Holy See and the Post-Communist Countries (1990-2010)

obor: AA

Identifikátor: RIV/61989592:15260/12:33141351!RIV13-MSM-15260

Id: 18

Předkladatel výsledku do Pilíře II.:

**IČO: 61989592 Univerzita Palackého v Olomouci, Cyrilometodějská teologická fakulta**

Podíl předkladatele na výsledku: **100 %**

#### **Popis podílu předkladatele:**

100% contribution from Palacký University, Olomouc

#### **Odůvodnění předkladatele:**

The monograph analyses the relations between State and Churches in the post-Communist countries in two decades 1990-2010. The book systematically describes and critically evaluates the contractual regulations of relations between the Catholic Church and the post-Communist countries, showing the prevailing models of solution and the basic regulative principles that have been legally laid down. The publication provides the reader with a systematic overview of concordatory law, typology of the concordats, their place in the hierarchy of legal sources, and different models of their positioning in relation to State law, in connection with new principles of Church-State relations introduced by Vatican II and the incorporation of those principles in the post-conciliar concordats. As emphasised by the reviewers, the book is an insightful account of modern concordatory law in general and the way in which concordats between the Holy See and a number post-Communist countries have demarcated new agendas in the area of relationships between religion and the state and the individual approaches the Holy See adopts in negotiating those relationships in each concordat (P. Petkoff, Oxford Journal of Law and Religion 3/1, 2014, 191-193). It is a rigorous and highly useful work, which identifies the legal position of the Catholic Church in a geographic area of prime political importance in the European context (M. R. Blanco in Ius Canonicum 54, 2014, 863-865).

#### **Odůvodnění panelu:**

Monografie přináší analýzu vztahu mezi státem a církví v postkomunistických zemích mezi roky 1990-2010 a s ohledem na zpracování a mezinárodní přesah výzkumu lze publikaci označit za excelentní vědecký výstup.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Skull Shape Asymmetry and the Socioeconomic Structure of an Early Medieval Central European Society

obor: AC

Identifikátor: RIV/00216208:11310/13:10133967!RIV14-MSM-11310

Id: 19

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **70 %**

#### Popis podílu předkladatele:

70% |Charles University, Fac Sci 70%

#### Odůvodnění předkladatele:

"The contribution of this study is the new methodological approach to the evaluation of socioeconomic structure of an early medieval society from the settlement of Mikulčice (Czech Republic) which was studied on the basis of fluctuating (FA) and directional asymmetry (DA) of skulls. The study was developed in a broad collaboration of mathematics, bioarcheology and 3D virtual anthropology. In a previous study it has been shown that DA reflects biomechanical loading and FA environmental stress and variability, and therefore we expected that craniofacial asymmetry should reflect socioeconomic status between the samples. The observed craniofacial asymmetry was consistent with the expected socioeconomic differences between castle and sub-castle inhabitants. The differences were more marked in females than in males and to some extent suggest difference in socioeconomic status. Dietary differences between the socioeconomic groups were illustrated by the DA of the upper face and vault. Mikulčice sub-castle had to withstand higher levels of biomechanical stress, albeit nonsignificantly, which affected the upper face and vault. This effect was compounded by the grittier and more solid foods, such as cereals, in contrast with Mikulčice castle, where the diet comprised a greater proportion of meat. We have not found differences in FA between castle and sub-castle in males, whereas for females the differences were significant, with the castle females tending to have higher values of asymmetry. They exhibited FA values similar to the highly stressed control sample. We expect that the higher variability among castle females compared with the other samples could be connected with the phenomenon of patrilocality in Great Moravian societies. At the same time, the higher values of FA could help to identify lower socio-economic status, as at the Mikulčice castle many highly environmentally stressed females were buried."

#### Odůvodnění panelu:

Článek v prestižním impaktovaném časopise, založený na kvalitní analýze, jehož výstupy mají nadnárodní přesah a jako takový lze text označit za přínosný oboru a excelentní.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Influence of lower limb configuration on walking cost in Late Pleistocene humans

obor: AC

Identifikátor: RIV/00216208:11310/14:10272454!RIV15-MSM-11310

Id: 20

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **100 %**

#### Popis podílu předkladatele:

100% | Charles University 100%

#### Odůvodnění předkladatele:

"This study concentrates on the evolution of anatomically modern humans and replacement of Neandertals in Europe using a mathematical model of lower limb configuration and experimental testing using recent humans. It has been proposed that Neandertals had about 30% higher gross cost of transport than anatomically modern humans (AMH) and that such difference implies higher daily energy demands and reduced foraging ranges in Neandertals. Thus, lower walking economy could be among the factors contributing to the Neandertals' loss in competition with their anatomically modern successors. Previously, Neandertal walking cost had been estimated from just two parameters and based upon a pooled-sex sample. In the present study, authors estimate sex-specific walking cost of Neandertals using a model accounting for body mass, lower limb length, lower limb proportions, and other features of lower limb configuration. Their results suggest that Neandertals needed more energy to walk a given distance than did AMH, but the difference was less than half of that previously estimated in males. That difference is even less pronounced in females. In contrast, comparison of the estimated walking cost adjusted to body mass indicates that Neandertals spent less energy per kilogram of body mass than AMH thanks to their lower limb configuration, males having 15% lower and females 13% lower mass-specific net cost of transport than AMH of the same sex. The primary cause of high cost of transport in Neandertal males is thus their great body mass, possibly a consequence of adaptation to cold, which was not fully offset by their cost moderating lower limb configuration. The estimated differences in absolute energy spent for locomotion between Neandertal and AMH males would account for about 1% of previously estimated daily energy expenditure of Neandertal or AMH males."

#### Odůvodnění panelu:

Jde o velice zajímavé srovnání anatomické struktury moderního člověka s neandrtálci v kontextu výdaje množství energie v souvislosti se sháněním potravy. Autoři tvrdí, že tento faktor mohl být z jedním důležitých faktorů, proč předchůdci dnešního člověka evolučně nakonec "zvítězili".

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Origin, Ideology and Transformation of Political Parties. East-Central and Western Europe Compared

obor: AD

Identifikátor: RIV/00216224:14230/10:00040525!RIV11-MSM-14230

Id: 21

Předkladatel výsledku do Pilíře II.:

**IČO: 216224 Masarykova univerzita, Fakulta sociálních studií**

Podíl předkladatele na výsledku: **100 %**

#### **Popis podílu předkladatele:**

100%The authors are the only authors of this book, which implies an essential role of the Masaryk University in creation of this output. The authors worked on the book as members of Depts. of International Relations and European Studies (Hloušek) and Poli

#### **Odůvodnění předkladatele:**

Ashgate, which published this book is usually considered one of the most prestigious academic press in the world in the field of political science. This book is the first comparative study of party families in Central European countries. Building on wide knowledge of the party families' concept and its application in the Western European context, the authors created an original analysis of party families in selected Central European countries in the context of post-communist transition to democracy as well as in the context of path-dependency on historical development from the stages of early democratic or semi-democratic regimes. Doing so, the authors not only collected and analysed broad empirical material but their work substantially contributes to the general debate on specific features of post-communist party politics showing well similarities as well as differences between Western and Central European party families and stressing that the impact of communist period on the shape and substance of Central political parties shall definitely not be overestimated. Times Cited: 31 (Google Scholar)

#### **Odůvodnění panelu:**

Kniha přináší podnětnou a originální studii týkající se politických stran v post-komunistické sféře. Kniha vychází z obsáhlého výzkumu a analýzy velkého množství zdrojů.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Transitions and Non-Transitions from Communism: Regime Survival in China, Cuba, North Korea, and Vietnam

obor: AD

Identifikátor: **RIV/00216224:14230/12:00065938!RIV14-GA0-14230**

Id: 22

Předkladatel výsledku do Pilíře II.:

**IČO: 216224 Masarykova univerzita, Fakulta sociálních studií**

Podíl předkladatele na výsledku: **100 %**

#### **Popis podílu předkladatele:**

100%The author is the only author of this article, which implies an essential role of the Masaryk University in creation of this output. The author worked on the book as professor of Dept. of Social Policy and Social Work and Institute for Public Policy a

#### **Odůvodnění předkladatele:**

Cambridge University Press, which published this book is usually considered the most prestigious academic press in the world.This book is the first comparative study of why some communist-led regimes remained in power, while others lost power. It is also innovative in combining a régime-type approach with a societal-social movement approach. It provides theoretical explanations of such issues as why different groups/classes have different preferences for demonstrating (while most previous studies take preferences as given), why different countries developed different regimes types (while most previous studies usually just explain that IF a country has a certain regime-type, it will behave in a certain way) and it gives a different view of civil society than is usually the case and it develops the notion of semi-civil society.Times Cited: 10 (Google Scholar)

#### **Odůvodnění panelu:**

Pozoruhodná přehledová a srovnávací monografie o pádu komunistických režimů včetně pokusu o typologii i výkladu příčin, proč se v některých zemích komunistická vláda udržela.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Modeling Neolithic dispersal in Central Europe: demographic implications

obor: AC

Identifikátor: **RIV/49777513:23330/11:43898492!RIV12-AV0-23330**

Id: 23

Předkladatel výsledku do Pilíře II.:

**IČO: 49777513 Západočeská univerzita v Plzni, Fakulta filozofická**

Podíl předkladatele na výsledku: **38 %**

#### **Popis podílu předkladatele:**

50%, The study brings a novel approach to the spread of Neolithic farming into Europe that links data from demography, ethnology, biological and social anthropology. Given the fact that Neolithic dispersal in Central Europe was very rapid and extended int

#### **Odůvodnění předkladatele:**

An original research presented in a prestigious American refereed journal, already acknowledged by the "EP-02 Panel" as an excellent output when it was presented by the Charles University for evaluation.

#### **Odůvodnění panelu:**

Stat', publikována v respektovaném zahraničním odborném časopise, je interdisciplinární studií přispívající do debaty o neolitickém osídlení střední Evropy využitím inovativních metod analýzy, které zpochybňují existující stav poznání. (Druhý spoluautor získal hodnocení A v hodnocení roku 2014)

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Are educational computer micro-games engaging and effective for knowledge acquisition at high-schools? A quasi-experimental study

obor: AM

Identifikátor: RIV/00216208:11320/11:10103400!RIV12-MSM-11320

Id: 24

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Matematicko-fyzikální fakulta**

Podíl předkladatele na výsledku: **67 %**

#### Popis podílu předkladatele:

67% |Participation of the faculty has been determined in accordance with the methodology

#### Odůvodnění předkladatele:

"It is not easy to use educational computer games in the context of formal schooling systems due to numerous technical reasons. This study shows one way of how these games can be used effectively in this context. The new methodological aspect is the usage of both immediate and one-month delayed knowledge tests, which was rare at the time of conducting the study. A recent meta-analysis of the comparative game-based learning studies (Wouters et al., 2013, Jn Edu Psy 105(2), 249-265) located primary studies with the total sample of 5,547 experimental participants filling in immediate knowledge tests, but only 499 participants filled in also delayed knowledge tests. Therefore, this study advanced notably knowledge on long-term educational effects of game-based learning. Times cited: 22 (WoS), 32 (Scopus). Published in Computers and Education, the journal with the 7th highest impact factor (2.621 in 2011 JCR) in WoS category ""EDUCATION & EDUCATIONAL RESEARCH"" in 2011. According to the Czech Information Register of R&D results ("RIV"), this was the first article from the Czech Republic published in TOP 5% journals indexed by WoS in this category."

#### Odůvodnění panelu:

Kvalitně vypracovaná metodologie hodnotící okamžitý a o jeden měsíc zpožděný efekt výuky pomocí počítačových her (prestižní časopis Computers and Education, IF 2,556).

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Tracing the Discourses of Terrorism : identity, Genealogy and State

obor: AD

Identifikátor: RIV/00216208:11230/14:10271997!RIV15-MSM-11230

Id: 25

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Fakulta sociálních věd**

Podíl předkladatele na výsledku: **50 %**

#### Popis podílu předkladatele:

50% |Charles University 50%

#### Odůvodnění předkladatele:

"The monograph traces the emergence and the evolution of the political and expert discourse of terrorism since it first became a subject of robust international debate in the 1930s. It deploys the method of Foucauldian genealogy as a discourse analysis that seeks to estrange itself from, historicise and critically engage the present predominant and seemingly depoliticised truths about terrorism, showing how these truths have become established in the discourse not in a natural and linear fashion, but rather as a result of complex interactions at the intersection of power and knowledge. To expand its critical purchase as a history of the present, not only does it engage a concept of terrorism that presently strategically orients an entire apparatus or, to use a Foucauldian term, a dispositif of global practices inflicting punishment, disciplining, surveilling that bear on states, populations and individual human bodies. It is also a genealogy that - arguably a rare example in the field of International Relations and/or Security Studies - is deployed onto a mass of empirical material to perform both the discourse analytic and to show the discursive variations in time. A large part of this material was retrieved through primary archival research and has not been systematically analysed before in the field. The monograph, conceived in its entirety thanks to the institutional support of the Faculty of Social Sciences, Charles University in Prague, has been published with a respectable international publisher, Palgrave Macmillan. Since then, it has received favourable reviews in a leading journal in terrorism research, *Terrorism and Political Violence* (Vol. 27, No. 3), and in a leading journal in the field of critical terrorism studies in which it is specifically grounded, *Critical Studies on Terrorism* (Vol. 8, No. 2)."

#### Odůvodnění panelu:

Jde o knihu s aktuálním tématem podmínek a pravidel diskurzu terorismu (a kritiky těchto pravidel a podmínek) publikovanou u prestižního zahraničního vydavatele.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Touchstones from early medieval burials in Tuna in Alsike, Sweden

obor: AC

Identifikátor: RIV/67985912: /14:00422382!RIV15-AV0-67985912

Id: 26

Předkladatel výsledku do Pilíře II.:

**IČO: 67985912 Archeologický ústav AV ČR, Praha, v. v. i.**

Podíl předkladatele na výsledku: **100 %**

#### Popis podílu předkladatele:

The author of the Institute of Archaeology Prague created 100 percent.

#### Odůvodnění předkladatele:

One of the most essential publication representing modern approaches in national archaeological research. Author of the study is for a long time engaged in an issue of ancient touchstones as means of past socio-economic relations in Europe. In this study he deals with the approaches for determining the value of metal appearing among grave goods in prehistoric and early medieval Europe: they served as symbols of access to precious metal. As is the case with many other sites, four prestigious early medieval burials excavated in Tuna in Alsike, Sweden, contained stone artefacts with the characteristic shape of touchstones. The intent of the article is to present the results of chemical microanalyses of metal traces preserved on the stone artefacts from Tuna. The streaks of precious and other non-ferrous metals are as common as those that appear on touchstones throughout Europe, however, in this case are presented and discussed also traces of nickel and zinc.

#### Odůvodnění panelu:

Článek v prestižním impaktovaném časopise, založený na moderních příístupech v archeologickém výzkumu, a následném vlastním výzkumu, přinášející nové poznatky, které ho umožňují označit za excelentní výstup s mezinárodním přesahem.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Komplementární myšlení Nielse Bohra v kontextu fyziky, filosofie a biologie

obor: AA

Identifikátor: **RIV/00216275:25210/14:39898054!RIV15-GA0-25210**

Id: 27

Předkladatel výsledku do Pilíře II.:

**IČO: 216275 Univerzita Pardubice, Fakulta filozofická**

Podíl předkladatele na výsledku: **100 %**

#### **Popis podílu předkladatele:**

100% The author is from University of Pardubice. The book is available in the National Library of the Czech Republic.

#### **Odůvodnění předkladatele:**

The book has been awarded the Josef Hlávka Prize for scientific literature on the sciences of inanimate nature in 2014. The book is the first comprehensive publication in Czech about the Physics Nobel Laureate Niels Bohr, who, together with Albert Einstein, contributed to fundamental changes in the development and image of the natural sciences and scientific thinking in the 20th century. We have not, de facto, been learning anything essential about Bohr's way of thinking or his philosophy of science for decades (not even on the pages of Czech scientific journals). In the indicated context and its original approach, author's contribution considerably advances not only conclusions and interpretations we are unlikely to find even in the foreign literature, but it is also written in a very accessible manner despite its use of physical, philosophical, chemical or biology terms.

#### **Odůvodnění panelu:**

Zajímavým způsobem pojatá publikace přinášející nové pohledy na známého fyzika z netradičních úhlů pohledu, vycházející ze studia a zpracování velmi velkého objemu zdrojových materiálů.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Stature and body mass estimation from skeletal remains in the European Holocene

obor: AC

Identifikátor: **RIV/00216208:11310/12:10124521!RIV13-MSM-11310**

Id: 28

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **40 %**

#### Popis podílu předkladatele:

40% | Charles University 40%

#### Odůvodnění předkladatele:

"Stature and body mass are among key features important in archaeological and anthropological analysis and individual characteristics. The currently available techniques for estimating stature and body mass from European skeletal remains are all subject to various limitations and bias in the final estimate. Therefore an international team headed by Chris Ruff (Johns Hopkins University School of Medicine, Baltimore, USA) developed new prediction equations for stature and body mass based on large skeletal samples representing much of the continent in temporal periods ranging from the Mesolithic to the 20th century. Czech team headed by Vladimír Sládek concentrated on the skeletal sample from Central European past and conducted collection of osteometric material as well as the final analysis of the Central European postcranial variation. Two other teams were also included (one from Finland and one additional from USA). For the first time, the teams have also collected sufficient postcranial skeletal data from European prehistory to test several hypotheses concerning stature and body mass estimates and ecogeographic variation of past human populations. Anatomical reconstruction of stature has been carried out for 501 individuals, and body mass has been calculated from estimated stature and biiliac breadth in 1,145 individuals."

#### Odůvodnění panelu:

Mezinárodní tým tří skupin antropologů vypracoval novou metodu predikace postavy a tělesné hmotnosti založenou na výzkumu velkého souboru skeletů pocházejících od mezolitu až po 20. století. Výpočty vycházejí z anatomické rekonstrukce postavy u 501 jedinců a odhadu postavy a šířky pánve u 1 145 jedinců. Předložená studie předkládá další směry budoucího antropologického výzkumu.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### The Expansion of mtDNA Haplogroup L3 within and out of Africa

obor: AC

Identifikátor: RIV/67985912: /12:00380561!RIV13-AV0-67985912

Id: 29

Předkladatel výsledku do Pilíře II.:

**IČO: 67985912 Archeologický ústav AV ČR, Praha, v. v. i.**

Podíl předkladatele na výsledku: **14,3 %**

#### Popis podílu předkladatele:

The author of the Institute of Archaeology Prague created 14,3 percent.

#### Odůvodnění předkladatele:

This study is essential for its impact that exceeds the European area and it is directly linked with the dispersal of ancient humans from Africa. The research team of which V. Černý is a member has focused their attention to the human mitochondrial DNA haplogroup L3 encompassing not only many sub-Saharan Africans but also all ancient non-African lineages. The age estimate of this specific clade therefore provided upper time limit for the dispersal of modern humans out of Africa. The team analysed 369 complete African L3 genomes and placed the maximum at 70 ka. Therefore they were able to rule out a successful exit of the anatomically modern humans before 74 ka, the date of the Toba volcanic super-eruption in Sumatra. The later time of the spread of modern humans can be linked rather to improved climatic conditions in Africa than to behavioural changes that appeared earlier. Furthermore, they have concluded that another migrations emanated from Eastern to Central Africa between 60 - 35 ka and again after last glacial maximum at 20 ka. However, the largest demographic growth seen in their L3 dataset is 3 - 4 ka in Central Africa corresponding to the expansion of the Bantu pastoralists. The journal where the study is published has a largest IF so far for a member of the Institute of Archaeology CAS, Prague, v.v.i. to publish in.

#### Odůvodnění panelu:

Tuto studii jednoznačně hodnotíme tím nejvyšším způsobem: jde o publikaci s nejvyšším IF, v němž člen Archeologického ústavu kdy publikoval, a jedná se o studii globálního významu.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### How Context Matters? Mobilization, Political Opportunity Structures and Non-Electoral Political Participation in Old and New Democracies

obor: AD

Identifikátor: RIV/68378025: /14:00432343!RIV15-AV0-68378025

Id: 30

Předkladatel výsledku do Pilíře II.:

**IČO: 68378025 Sociologický ústav AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **100 %**

#### Popis podílu předkladatele:

Katerina Vrablikova is the only author of the article and she is responsible for 100 per cent of the work done.

#### Odůvodnění předkladatele:

The article's original contribution lies in its new explanation of cross-country differences in the extent to which people get involved in non-electoral politics. It shows that states with more competitive institutional veto points (territorial decentralization and division of power among horizontal state institutions) facilitate non-electoral political activism and mobilization into this activism. The article was published in *Comparative Political Studies*, which is a top journal in comparative politics and belongs to leading journals in political science (impact factor of 2.028 and ranking 12/161 in Political Science). The article was ranked as the third most read article in *Comparative Political Studies* in February 2014 and in the two years since its publication, the article has received 4 citations via the Web of Science and 29 on Google Scholar. The article has been cited for instance in: Albacete, Gema, Garcia. 2014. *Young People's Political Participation in Western Europe: Continuity Or Generational Change?* Palgrave MacMillan. [https://books.google.de/books?hl=cs&lr=&id=vWOoBAAQBAJ&oi=fnd&pg=PP1&ots=oxlAlxTeaM&sig=CEB7oY4vpUyOx7f8mLgFk2fKONo&redir\\_esc=y#v=onepage&q&f=false](https://books.google.de/books?hl=cs&lr=&id=vWOoBAAQBAJ&oi=fnd&pg=PP1&ots=oxlAlxTeaM&sig=CEB7oY4vpUyOx7f8mLgFk2fKONo&redir_esc=y#v=onepage&q&f=false). Barret, Martyn a Brunton-Smith, Ian. 2014. „Political and Civic Engagement and Participation: Towards and Integrative Perspective.“ *Journal of Civil Society* 10, 1, 5-28. DOI: 10.1080/17448689.2013.871911, <http://www.tandfonline.com/doi/abs/10.1080/17448689.2013.871911#.VPgpROEn0sI>. Braun, Daniel a Hutter, Swen. 2014. „Political trust, extra-representational participation and the openness of political systems.“ *International Political Science Review* published online before print, doi: 10.1177/0192512114559108, <http://ips.sagepub.com/content/early/2014/11/28/0192512114559108.abstract>. Christensen, Henrik, Serup. 2015. *Power Sharing and Political Dissatisfaction: A Multilevel Analysis of the Link Between Power-Sharing Institutions and Kinds of Political Dissatisfaction in 24 European Democracies.* European Politics and Societies. First on-line doi=10.1080/23745118.2015.1013311, <http://www.tandfonline.com/doi/abs/10.1080/23745118.2015.1013311#.VPgxMuEn0sI> [until 2014 the name of a journal was *Perspectives on European Politics and Society*] Csörgő, Zsuzsa. 2015. „Ethnic struggle, coexistence, and democratization in Eastern Europe.“ *Nationalities Papers: The Journal of Nationalism and Ethnicity*, 43(4): 637-640. <http://www.tandfonline.com/doi/abs/10.1080/00905992.2015.1042276?journalCode=cnap20> de Moor, Joost. 2015. „External Efficacy and Political Participation Revisited: The Role of Perceived Output Structures for State- and Non-State-Oriented Action Forms,” *Parliamentary Affairs*, First published online: October 29, 2015. <http://pa.oxfordjournals.org/content/early/2015/12/13/pa.gsv055> Ekman, Joakim, Gherghina, Sergiu and Podolian, Olena. 2016. „Challenges and realities of political participation and civic engagement in central and eastern Europe.” *East European Politics*, 32(1): 1-11. <http://www.tandfonline.com/doi/abs/10.1080/21599165.2016.1141091?journalCode=fjcs21> Hájek, Roman and Carpentier, Nico. 2015. „Alternative mainstream media in the Czech Republic: beyond the dichotomy of alternative and mainstream media.” *Continuum: Journal of Media & Cultural Studies*, 29(3): 365-382. <http://www.tandfonline.com/doi/abs/10.1080/10304312.2014.986061#.Vt9e6NDw9TM>. Quaranta, Mario. 2015. *Political Protest in Western Europe*. Springer. [http://link.springer.com/chapter/10.1007/978-3-319-22162-5\\_1](http://link.springer.com/chapter/10.1007/978-3-319-22162-5_1) Martyn a Brunton-Smith, Ian. 2014. „Political and Civic Engagement and Participation: Towards and Integrative Perspective.” *Journal of Civil Society* 10, 1, 5-28. DOI:10.1080/17448689.2013.871911,

<http://www.tandfonline.com/doi/abs/10.1080/17448689.2013.871911#.VPgpROEn0sI>. Šerek, J., & Machackova, H. 2014. Online only: Which Czech young adults prefer online civic participation?. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace*, 8(3). doi: 10.5817/CP2014-3-6, <http://www.cyberpsychology.eu/view.php?cisloclanku=2014092901&article=6Solt>, Frederick. 2015. „Economic Inequality and Nonviolent Protest.“ *Social Science Quarterly*, 96(5): 1314-1327. <http://onlinelibrary.wiley.com/doi/10.1111/ssqu.12198/abstract;jsessionid=35AB0DD1E3C6D6CAB373DA773F419F78.f04t04?userIsAuthenticated=false&deniedAccessCustomisedMessage=> Susánszky, Pál, Kopper, Akos and Tóth, Gergely. 2016. “Pro-government demonstrations in Hungary – citizens’ autonomy and the role of the media.” *East European Politics*, 32(1): 63-80. <http://www.tandfonline.com/doi/abs/10.1080/21599165.2015.1128900> Torcal, Mariano, Rodon, Toni and Hierro, María José. 2016. „Word on the Street: The Persistence of Leftist-dominated Protest in Europe.” *West European Politics*, 32(2): 326-350. <http://www.tandfonline.com/doi/abs/10.1080/01402382.2015.1068525>. Troussel, Sarah, Gupta, Kuhika, Jenkins-Smith, Hank, Silva Carol L. and Herron, Kerry. 2015. “Degrees of Engagement: Using Cultural Worldviews to Explain Variations in Public Preferences for Engagement in the Policy Process.” *Policy Studies Journal* 43, 1, 44-69. DOI: 10.1111/psj.12083. <http://onlinelibrary.wiley.com/doi/10.1111/psj.12083/full>.

### **Odůvodnění panelu:**

Pro zařazení do kategorie A hovoří vysoká kvalita předložené studie a její uplatnění v prestižním odborném periodiku s vysokým impaktfaktorem. O uznání vědeckou komunitou svědčí to, že studie byla označena v roce 2014 jako třetí nejčtenější článek v rámci srovnávacích politologických studií a velmi brzy – během 2 let – získala 4 citační záznamy ve Web of Science a 29 na Google Scholar.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Riziko dyslexie : Pregramotnostní schopnosti a dovednosti a rozvoj gramotnosti v rizikových skupinách

obor: AM

Identifikátor: **RIV/00216208:11410/14:10285650!RIV15-MSM-11410**

Id: 31

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Pedagogická fakulta**

Podíl předkladatele na výsledku: **100 %**

#### **Popis podílu předkladatele:**

100% |Participation of the faculty has been determined in accordance with the methodology.

#### **Odůvodnění předkladatele:**

"The risk of dyslexia: Pre-literacy skills and abilities and literacy development in high-risk groups. According to contemporary research, there is a group of children at higher risk of literacy difficulties. It is widely accepted today that these children at risk of dyslexia are children with specific language impairment and children with hereditary predisposition of dyslexia. Both of these groups were examined by a longitudinal project ELDEL-WP2 and following project GAUK, which are the basis for this habilitation thesis. The publication has several independent parts, the first focuses on the identification of children at family risk of dyslexia and children with specific language impairment. The thesis then deals with developmental profiles of pre-literacy skills and abilities that are believed to be crucial for successful development of reading and writing skills at the beginning of education. Language and cognitive skills, as well as key pre-literacy abilities are in the centre of the attention in accordance to the psycholinguistic concept of literacy. The results have pointed out the dynamics of language and cognitive skills development, as well as pre-literacy skills of all the research groups. The group of children, which was endangered the most by the possibility of literacy problems, was the group of children with the specific language impairment. Children at family risk of dyslexia generally achieved lower scores than the children with typical development; however the differences were not significant. Despite of all that, the children at family risk of dyslexia appears to be at higher risk of literacy problems, than the children with typical development, specifically at the end of the 1st grade and even more during the 3rd grade. Achieved results are confronted and put into context with results in the Czech and abroad research literature. Methodological limits are also discussed."

#### **Odůvodnění panelu:**

Předložená publikace zjevně vychází z velmi obsáhlého mezinárodního výzkumu, jehož výsledky jsou pečlivě a systematicky zpracovány. Obsahuje řadu významných zjištění a konkrétně formulované závěry.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Single Motherhood and Child Mortality in Sub-Saharan Africa: A Life Course Perspective.

obor: AO

Identifikátor: RIV/68378025: /13:00396761!RIV14-AV0-68378025

Id: 32

Předkladatel výsledku do Pilíře II.:

**IČO: 68378025 Sociologický ústav AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **50 %**

#### **Popis podílu předkladatele:**

Dana Hamplova was responsible for analytical part of the article. She analyzed the DHS data on single motherhood and wrote part of result section. (50%)

#### **Odůvodnění předkladatele:**

The text focuses on the issue of child mortality in Sub-saharan Africa. So far, the effect of single motherhood on child mortality in this region has received surprisingly little attention despite the fact that it constitutes a major risk factor. Using a life course perspective and longitudinal data from 11 sub-Sahara African countries, the article explores two issues: the occurrence of single motherhood and its link to child mortality. It is one of the first comprehensive studies of single motherhood and its implications for children's well-being on the African continent. Previous studies that investigated female-headed households often obfuscated the link between single motherhood and child mortality as many of these households receive remittances from husbands who moved away for work. In contrast to previous studies, this article includes also single mothers who live in households with other relatives. It demonstrates that children of single mothers have significantly higher risks of dying before age 5. The importance of the article is demonstrated by the fact that it has been cited not only in demographic journals but also in the prestigious epidemiological and medical outlets (e.g. BMC Public Health). Furthermore, its findings have major social policy implications as it highlights vulnerability of children with single mothers. The paper has been published in a top journal in the field of Demography, which had an impact factor of 2.631 (in 2013) and ranked 1/25 in Demography on the Web of Science. As of March 2016 the article has been cited 22 times (according Google Scholar), or 10 times (according of Web of Science).

#### **Odůvodnění panelu:**

This article tackles a very important topic and a clear research question, with a high impact on the current academic debate and societal challenges. The analysis is clear, precise, straightforward and understandable. The paper uses appropriate methodological framework. The results are saliently interpreted and discussed. The paper was published by a top-notch international journal.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Reconsidering the effect of market experience on the “endowment effect”

obor: AH

Identifikátor: RIV/67985998: /10:00351612!RIV11-AV0-67985998

Id: 33

Předkladatel výsledku do Pilíře II.:

**IČO: 67985998 Národohospodářský ústav AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **66,7 %**

#### Popis podílu předkladatele:

Economics Institute of the Czech Academy of Sciences 66,7%

#### Odůvodnění předkladatele:

The article re-examines the so-called „endowment effect“ that describes the often observed phenomenon of under-trading relative to the rational prediction. When experimental participants randomly endowed with one of two goods can trade it for the other good, the average trading rate is significantly less than one half. Fundamental assumptions of economic theory are challenged as it implies irreversible indifference curves. Applications are challenged as under-trading i.a. implies that resource valuations depend on the status quo. The article addresses the origins of insufficient trading by separating uncertainty about preferences over objects from trading uncertainty. Experimental treatments involve 3 trading rounds, voluntary or compulsory. Providing strong incentives to first gather trade experience helps remove under-trading in the real trading stage, suggesting that trading experience can help overcome lack of trade (but is often avoided). *Econometrica* is a top-5 economics journal. According to AIS from the WoS, the journal ranks in the top 2% of journals in ECONOMICS category. In the relevant year, its IF was 3.185 and AIS was 8.812. The article has 17 citations in WoS, 22 in Scopus, and 54 in Google Scholar, excluding auto-citations. It has been cited in top journals such as the *Quarterly Journal of Economics*, *Journal of Political Economy*, *American Economic Review*, *European Economic Review*, *Journal of the European Economic Association*, and *Management Science*, including by leading scholars such as Charles Plott and John List. The article received grade B in last year's Pillar II Evaluation of Results of Research Organizations. The number of citations (excluding auto-citations) has since grown from 7 to 17 in WoS and from 31 to 54 in Google Scholar. Many of the additional citations are in high-quality journals such as the *Journal of the European Economic Association*, *Experimental Economics*, *European Economic Review*, and *Journal of Economic Behavior & Organization*.

#### Odůvodnění panelu:

This article is built around a straightforward, strong hypotheses. The argument is developed meticulously based on a robust experimental design, and the paper includes an excellent discussion. The article has been published in a top economics journal, has been extensively cited, and potentiality can influence further development in the discipline.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Correlations between biofuels and related commodities before and during the food crisis: A taxonomy perspective

obor: AH

Identifikátor: RIV/61384399:31110/12:00039685!RIV13-MSM-31110

Id: 34

Předkladatel výsledku do Pilíře II.:

**IČO: 61384399 Vysoká škola ekonomická v Praze, Fakulta financí a účetnictví**

Podíl předkladatele na výsledku: **50 %**

#### **Popis podílu předkladatele:**

50% Prof. Karel Janda, agreed with both of his affiliated institutions (Faculty of Finance and Accounting at University of Economics, Prague and Institute of Economic Studies at Faculty of Social Sciences at Charles University in Prague) and with both of

#### **Odůvodnění předkladatele:**

In this paper, we analyze the relationships between the prices of biodiesel, ethanol and related fuels and agricultural commodities with a use of minimal spanning trees and hierarchical trees. We utilize a straightforward methodology of taxonomy standardly used in networks and complex systems analysis for clear identification of relationships between components of the system. For the first time here, we apply the methodology on the system of biofuels and related agricultural and fuel commodities. We quantify these relationships over different market phases and time dimensions using a graphical display of price transmission network. In this way, we contribute to important policy discussion about impact of biofuels and energy prices on food prices. To distinguish between short-term and medium-term effects, we construct these trees for different frequencies (weekly and monthly). We find that in short-term, both ethanol and biodiesel are very weakly connected with the other commodities. In medium-term, the biofuels network becomes more structured. The system splits into two well separated branches -- a fuels part and a food part. Biodiesel tends to the fuels branch and ethanol to the food branch. When the periods before and after the food crisis of 2007/2008 are compared, the connections are much stronger for the post-crisis period. This is the first application of this methodology on the biofuels systems.

#### **Odůvodnění panelu:**

This paper asks an interesting and highly relevant research question, which it tackles using a robust, appropriate methodology. The paper produces several important results, which are thoroughly discussed, carefully interpreted and clearly explained. This makes it highly likely that it will be cited extensively. The paper has been published by a high-impact journal. The paper is likely to spur further research in this direction.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Efficient allocations in dynamic private information economies with persistent shocks: a first-order approach

obor: AH

Identifikátor: RIV/00216208:11640/13:00423397!RIV14-MSM-11640

Id: 35

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Centrum pro ekonomický výzkum a doktorská studia**

Podíl předkladatele na výsledku: **50 %**

#### **Popis podílu předkladatele:**

50% |Charles University in Prague, Center for Economic Research and Graduate Education 50%

#### **Odůvodnění předkladatele:**

"This paper studies efficient allocations in a dynamic private information economy with a continuum of idiosyncratic shocks that are persistent. The key methodological advancement lies in developing a first-order approach for this environment and showing that the problem has a simple recursive structure with only a small number of state variables, making the problem tractable. The key finding is that persistent shocks create a new tradeoff where the social planner decreases the informational rent of the agent today at the cost of providing higher insurance in the future. The article represents a fundamental contribution to the theory of dynamic mechanism design that seeks to find optimal policies in environments where economic agents have private information unknown to the social planner. The optimal mechanisms, widely used in optimal taxation, are, however, very complex and hence difficult to identify and analyze in dynamic environments. The first-order approach developed here substantially simplifies optimal mechanisms: recursive with only a small set of state variables. It can also be applied to external problems otherwise very difficult to solve. Review of Economic Studies belongs to the top 5 most respected journals in economics. The article has 8 citations in WoS, 7 citations in Scopus, and 65 citations in Google Scholar, all counts excluding auto-citations. It was cited e.g. twice in another top 5 journal Econometrica, 3 times in a prestigious field journal Journal of Economic Theory, in a book by N. Kocherlakota titled The New Dynamic Public Finance, a widely used text for public finance courses, and in a book chapter by M. Golosov and Tsyvinski, top experts in the field of optimal taxation affiliated at Princeton and Yale University. According to AIS from the WoS, the journal ranks among top 1% of journals in ECONOMICS category. It counts for the tenure decisions at any top university worldwide. In the relevant year IF was 3.235 and AIS was 7.848."

#### **Odůvodnění panelu:**

This paper has been published in a high-impact top-notch international journal. It very clearly conceptualizes the research problem, and makes an important methodological contribution to the discipline. The paper has been highly cited.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Simple market equilibria with rationally inattentive consumers

obor: AH

Identifikátor: RIV/67985998: /12:00377204!RIV13-AV0-67985998

Id: 36

Předkladatel výsledku do Pilíře II.:

**IČO: 67985998 Národohospodářský ústav AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **66,7 %**

#### **Popis podílu předkladatele:**

Economics Institute of the Czech Academy of Sciences 66,7%

#### **Odůvodnění předkladatele:**

The article further advances the authors' frontier research on rational inattention, which emphasizes decision-makers' limited ability to process relevant information. Rationally inattentive consumers struggle to acquire and process all relevant information about product quality or even prices, as is often the case in markets for consumer goods, insurance, real estate, etc. In a symmetric equilibrium, prices are continuously increasing in information acquisition cost and decreasing in firms' number. When consumers have heterogeneous information costs, firms selling low-quality products may choose to set high prices. The higher the information cost the higher are sellers' market power and prices. Unlike in earlier literature, the model allows for general forms of information acquisition and the implied solutions to demand and equilibrium market prices are robust to small changes in information costs. The model provides rationale for product quality regulation and potential room for sellers' obfuscation. The article was published in the Papers and Proceedings volume (i.e., the May special issue) of a top-5 economics journal. According to AIS from the WoS, the American Economic Review ranks in the top 2% of journals in ECONOMICS category. In the relevant year, its IF was 2.792 and AIS was 5.650. The article has 4 citations in WoS, 5 in Scopus, and 20 in Google Scholar, excluding auto-citations. The presented model is becoming a workhorse model in the literature on rational inattention. The author applied it to the study of market inefficiencies (Journal of Economic Theory 2015). The article also motivated an extension by the same authors providing new empirical tools to separately infer consumer preferences and beliefs from their market choices (American Economic Review 2015, with over 90 Google Scholar citations). Rational inattention can potentially explain many economic phenomena. The author obtained an ERC Starting grant for further study of the topic.

#### **Odůvodnění panelu:**

This paper has been published in a top international journal, with a high-impact factor. Its contribution is primarily methodological, built around a very clear and convincing conceptualization of the research problem. The paper is part of a broader research agenda of the authors, with significant potential impact on the discipline.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### The Farmland Rental Paradox: Extreme land ownership fragmentation as a new form of land degradation

obor: GA

Identifikátor: **RIV/60460709:41330/14:64538!RIV15-MZE-41330**

Id: 37

Předkladatel výsledku do Pilíře II.:

**IČO: 60460709 Česká zemědělská univerzita v Praze, Fakulta životního prostředí**

Podíl předkladatele na výsledku: **100 %**

#### **Popis podílu předkladatele:**

1

#### **Odůvodnění předkladatele:**

Our study demonstrates a quite new phenomenon that we call the Farmland Rental Paradox, where very small parcels tend to create large production blocks by being rented to larger farmers, and therefore to significantly homogenize the land-use pattern. The parcel size established as the threshold for this phenomenon is 1.07 ha. Below this threshold, the smaller the parcels were, the larger the blocks that they tended to create. Extreme farmland ownership fragmentation is becoming a limiting factor for sustainable land management in some countries. Scattered, excessively small parcels cease to be viable for individual farming, and owners feel forced to rent these parcels to larger enterprises farming on adjacent land. Our study points to the countries where this phenomenon may apply, especially the transitional countries of Central and Eastern Europe, China, India and others. The study discusses also the tempo of the fragmentation process, which accelerates exponentially in countries with the equal inheritance system. It goes on to discuss defragmentation, social impacts of the dominance of the land rental market, and environmental impacts of significant homogenization of the land-use pattern. The serious negative impacts of extreme land-ownership fragmentation show that this phenomenon can be considered as a significant form of land degradation.

#### **Odůvodnění panelu:**

This paper tackles a very important topic and potentially has a high impact on current academic and policy debates. The paper is clear, straightforward, and precise. Using Czech data, it tests an original theoretical concept "Farmland Rental Paradox", which makes it relevant for the international research community. The results are interesting and adequately discussed. The paper has been widely cited, and has been published in a top economics journal.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Associations between online friendship and Internet addiction among adolescents and emerging adults

obor: AN

Identifikátor: RIV/00216224:14230/12:00057283!RIV13-GA0-14230

Id: 38

Předkladatel výsledku do Pilíře II.:

**IČO: 216224 Masarykova univerzita, Fakulta sociálních studií**

Podíl předkladatele na výsledku: **80 %**

#### **Popis podílu předkladatele:**

80% This publication was co-authored by the world-renowned researcher and professor B. Bradford Brown (University of Wisconsin, USA). The empirical data used in this article were collected as part of a project at Masaryk University and the received expert

#### **Odůvodnění předkladatele:**

This publication was published in one of the best journals in the field of developmental psychology and it was co-authored by the world-renowned researcher and professor B. Bradford Brown (University of Wisconsin, USA). The empirical data used in this article were collected as part of a project at Masaryk University and the received expertise remains with the authors and Masaryk University. According to the editor of the journal *Developmental Psychology* (prof. Jacques Eccles), this article was the fifth most downloaded article in the past 10 years. It is also highly cited in the Web of Science and within Google Scholars. The past decades have witnessed a dramatic increase in the number of youths using the Internet, especially for communicating with peers. Online activity can widen and strengthen the social networks of adolescents and emerging adults, but it also increases the risk of Internet addiction. Using a framework derived from Griffiths (2000a), this study examined associations between online friendship and Internet addiction in a representative sample ( $n = 394$ ) of Czech youths ages 12-26 years ( $M = 18.58$ ). Three different approaches to friendship were identified: exclusively offline, face-to-face oriented, Internet oriented, on the basis of the relative percentages of online and offline associates in participants' friendship networks. The rate of Internet addiction did not differ by age or gender but was associated with communication styles, hours spent online, and friendship approaches. The study revealed that effects between Internet addiction and approaches to friendship may be reciprocal: Being oriented toward having more online friends, preferring online communication, and spending more time online were related to increased risk of Internet addiction; on the other hand, there is an alternative causal explanation that Internet addiction and preference for online communication conditions young people's tendency to seek friendship from people met online.

#### **Odůvodnění panelu:**

This paper has been published in a top-notch journal, with a very high impact factor, and has been highly cited. It is based on a robust methodology. It has a high potential impact on the discipline but also policy debates.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Gender gap in performance under competitive pressure: admissions to Czech universities

obor: AH

Identifikátor: RIV/67985998: /11:00362796!RIV12-MSM-67985998

Id: 39

Předkladatel výsledku do Pilíře II.:

**IČO: 67985998 Národohospodářský ústav AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **100 %**

#### Popis podílu předkladatele:

Economics Institute of the Czech Academy of Sciences 100%

#### Odůvodnění předkladatele:

The paper tests an important hypothesis of whether women perform worse than equally-able men in stressful competitive settings. Compared to recent studies using laboratory-generated data, the authors perform a strong field-data-based test. Using data on all 1998 college applications in the Czech Republic, the authors compare how the admission chances of men and women at tuition-free selective universities depend on the school-specific degree of over-subscription, which captures the degree of competition faced by university applicants. Compared to men of similar general skills (captured by high-school-graduation 'Maturita' tests) and subject-of-study preferences (captured by the field of study of the university that is being applied to), women do not shy away from applying to more competitive programs and perform similarly well when competition is less intense, but they perform substantially worse (are less likely to be admitted) when applying to very selective universities. No other study of the 'gender competitive gap' hypothesis has thus far been able to condition on subject-of-study preferences – an important confounding factor, and to utilize a similarly wide variation in the degree of competition. The article was published in the Papers and Proceedings volume (i.e., the May special issue) of a top-5 economics journal. According to AIS from the WoS, the American Economic Review ranks in the top 2% of journals in ECONOMICS category. In the relevant year, its IF was 2.693 and AIS was 5.674. The article has already generated substantial citation impact: 11 citations in WoS, 9 in Scopus, and 23 in Google Scholar, excluding auto-citations. Importantly, the article has been cited by papers published in high-quality journals such as the Journal of Labor Economics (three times), Journal of Economic Behavior & Organization (twice), Economics of Education Review, Economic Journal, and Economic Inquiry.

#### Odůvodnění panelu:

This paper has been published in an excellent economic journal with a high impact factor. It tackles a very important topic using high-quality Czech data and robust methodology and regression models. The paper offers new insights into an important scientific and societal issue. The results are saliently discussed and interpreted. The paper has been highly cited.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Behavioral Foundations of Microcredit: Experimental and Survey Evidence from Rural India

obor: AH

Identifikátor: RIV/00216208:11230/12:10218528!RIV15-MSM-11230

Id: 40

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Fakulta sociálních věd**

Podíl předkladatele na výsledku: **50 %**

#### Popis podílu předkladatele:

50% |Charles University 50%

#### Odůvodnění předkladatele:

"The article uses experimental measures of time discounting and risk aversion for villagers in south India to highlight behavioral features of microcredit, a financial tool designed to reduce poverty and fix credit market imperfections. The evidence suggests that microcredit contracts may do more than reduce moral hazard and adverse selection by imposing new forms of discipline on borrowers. Conditional on borrowing from any source, women with present-biased preferences are more likely than others to borrow through microcredit institutions. Another particular contribution of microcredit may thus be to provide helpful structure for borrowers seeking self-discipline. The article is cited 23 times in Scopus database and 175 times in Google Scholar, including top journals such as Quarterly Journal of Economics, American Economic Review, Review of Economic Studies or Journal of Development Economics. According to the Article Influence Score from the Web of Knowledge, the journal ranks among top 3% of journals in ECONOMICS category. American Economic Review is considered to be among top 5 journals in Economics and it counts for the tenure decisions at any top university worldwide. The impact factor in the year this article was published was 2.792 (note that the median impact factor in the ECONOMICS category is 0.860 using the last available data). The result was already evaluated other organization grade A. Our faculty attaches to this result."

#### Odůvodnění panelu:

This paper carries an "A" from the previous evaluation

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### A dynamic programming algorithm for identification of triplex-forming sequences

obor: IN

Identifikátor: **RIV/00216224:14330/11:00049911!RIV12-GA0-14330**

Id: 41

Předkladatel výsledku do Pilíře II.:

**IČO: 216224 Masarykova univerzita, Fakulta informatiky**

Podíl předkladatele na výsledku: **50 %**

#### **Popis podílu předkladatele:**

50%This work was written in bilateral collaboration of authors from Brno University of Technology and Masaryk University. Both institutions contributed equally to the paper and agreed on 50% formal share.

#### **Odůvodnění předkladatele:**

This work was focused on design and implementation of a novel method for detection of DNA sequences potentially capable to form triplex structure. Detection of such sequences is significant for biologists as they can help to understand gene expression and other processes affected by these triplex structures. The main result of this work is publication in Bioinformatics journal (IF=4.926).

#### **Odůvodnění panelu:**

Selected last year

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Anisotropic Elastic Moduli and Internal Friction of Graphene Nanoplatelets/Silicon Nitride Composites

obor: JG

Identifikátor: RIV/68407700:21340/13:00225369!RIV15-GA0-21340

Id: 42

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Fakulta jaderná a fyzikálně inženýrská**

Podíl předkladatele na výsledku: **18 %**

#### Popis podílu předkladatele:

18% - Rating A in H14  
[https://www.isvav.cz/h14/resultDetail.do?rowId=RIV%2F61388998%3A\\_\\_\\_\\_\\_%2F13%3A00386699%21RIV14-AV0-61388998](https://www.isvav.cz/h14/resultDetail.do?rowId=RIV%2F61388998%3A_____%2F13%3A00386699%21RIV14-AV0-61388998) - The contribution of FNSPE was in precise preparation of surfaces of samples for resonant ultrasound spectroscopy measurement

#### Odůvodnění předkladatele:

Ceramic-matrix composites with small amounts of graphene-type fillers (in particular with exfoliated graphene nanoplatelets, GNPs) are a novel class of materials exhibiting unique strongly anisotropic thermal and electrical conductivity, enhanced fracture toughness and superior machinability. Within collaboration between the Institute of Thermomechanics AS CR and the Institute of Ceramics and Glass CSIC (Madrid, Spain), a research focused on the mechanical properties of these composites was carried out. The contact-less resonant ultrasound spectroscopy (RUS) device developed at IT ASCR was used to determine the elastic constants and internal friction parameters of a composite consisting of a silicon nitride matrix filled with 3 wt.% of GNPs. It was shown that the anisotropic spatial arrangement of the GNPs results in strong anisotropization of both the elasticity and the internal friction of the composite. The results enabled also an insight into the micromechanics of the composite to be achieved, using the Sevostianov-Kachanov theoretical model of effective elasticity of materials with oriented arrays of defects. This analysis confirmed that although the presence of the fillers leads to overall elastic softening and deterioration of the matrix, the GNPs are not acting as micro-cracks in the composite structure, and cannot, thus, be responsible for initiation or growth of macroscopic fracture of the composite. The results of the study were published in the journal Composites Science and Technology that has according to ISI Web of Knowledge the highest impact factor in the respective category (Materials Science – Composites).

#### Odůvodnění panelu:

Selected last year

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Effect of silver doping on the TiO<sub>2</sub> for photocatalytic reduction of CO<sub>2</sub>

obor: JE

Identifikátor: RIV/61989100:27360/10:86076334!RIV11-MSM-27360

Id: 43

Předkladatel výsledku do Pilíře II.:

**IČO: 61989100 Vysoká škola báňská - Technická univerzita Ostrava,  
Fakulta metalurgie a materiálového inženýrství**

Podíl předkladatele na výsledku: **55 %**

#### **Popis podílu předkladatele:**

VŠB-TU Ostrava: photocatalytic tests, correlation of physico-chemical and photocatalytic properties.

#### **Odůvodnění předkladatele:**

(55%) Solving global warming is one of the key challenges in this century. CO<sub>2</sub> is a relatively inert and stable compound and its reduction is quite challenging, high-temperature and/or pressure are necessary to achieve it. Conversely, photocatalysis of CO<sub>2</sub> occurs under relatively mild conditions, especially when the reaction is activated by solar energy. The article describes the effect of silver doping on the TiO<sub>2</sub> for photocatalytic reduction of CO<sub>2</sub>. The yield of methane and methanol increases when modifying the TiO<sub>2</sub> by silver incorporation is caused by two mechanisms: up to 5% of Ag in TiO<sub>2</sub> the Ag impurity band inside the TiO<sub>2</sub> band gap decreases the absorption edge and increases so the electron-hole pair generation, above 5% of Ag in TiO<sub>2</sub> Ag metallic clusters are formed in TiO<sub>2</sub> crystals with Shottky barrier at the metal-semiconductor interface, which spatially separates electron and holes and increases their lifetime (decreases probability of their recombination). The relevance for the field is documented by 124 citations on Web of Science, including those from top researchers. Article belongs to the most cited articles published since 2009 in Applied Catalysis B – Environmental (rank 23th). Article was the 10th most downloaded article by Science Direct Top 25 in the period October 2009 to September 2010.

#### **Odůvodnění panelu:**

Excellent experimental paper on a hot research topic. Very good journal a very high number of citation response.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Meso-scale Approach to Modelling the Fracture Process Zone of Concrete Subjected to Uniaxial Tension

obor: JJ

Identifikátor: RIV/68407700:21110/10:00164526!RIV11-MSM-21110

Id: 44

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Fakulta stavební**

Podíl předkladatele na výsledku: **50 %**

#### Popis podílu předkladatele:

50% - The paper was prepared in collaboration between Milan Jirásek (senior author, Faculty of Civil Engineering of the Czech Technical University in Prague) and his former PhD student Peter Grassl (University of Glasgow). Milan Jirásek was the leading au

#### Odůvodnění předkladatele:

Theoretical modeling and numerical simulation of inelastic processes in quasibrittle materials up to failure represent a big challenge of contemporary mechanics. Traditional inelastic continuum models cannot provide an objective description of the complete failure process because they do not contain any intrinsic length-scale parameters. After the onset of strain localization (caused by interactions among growing defects), the boundary value problem becomes ill-posed and numerical results suffer by spurious sensitivity to the size of finite elements. The remedy can be sought in regularization techniques that enrich the underlying continuum by weighted spatial averages of internal variables. So far, such nonlocal models have been formulated using heuristic approaches, only vaguely motivated by micromechanical considerations. In this paper, the correspondence between the nonlocal enrichment and the fracture process zone in a heterogeneous material is for the first time studied quantitatively. The meso-level structure of concrete, with stiff aggregates embedded in a soft matrix and separated by weak interfaces, is used as a prototype inclusion-matrix composite, but the developed methodology is directly applicable to other quasibrittle materials as well. The mechanical response at the meso-scale is modelled by a discrete lattice approach. The link between the mesostructure and the nonlocal damage model is established using the spatial distribution of dissipated energy density as the primary physical variable of interest. The size and shape of the deterministic fracture process zone reflected by the nonlocal model is obtained as an average of random meso-scale analyses. The results of the present study open a new path to calibration of nonlocal models and remove one of the main obstacles to practical applications of such advanced models in failure simulations of quasibrittle structures. The paper has received considerable attention and has been cited 55 times in WoS.

#### Odůvodnění panelu:

Very good work published in the top ranking journal, impact proved by the very high number of citations.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Fuel properties of hydroprocessed rapeseed oil

obor: JT

Identifikátor: **RIV/60461373:22320/10:00023795!RIV11-MPO-22320**

Id: 45

Předkladatel výsledku do Pilíře II.:

**IČO: 60461373 Vysoká škola chemicko-technologická v Praze, Fakulta chemické technologie**

Podíl předkladatele na výsledku: **75 %**

#### **Popis podílu předkladatele:**

(75%) Research conception was proposed in the cooperation of the result submitter (UCT Prague, Šimáček, Pospíšil, Šebor) and cooperating organization (UniCRE, Kubička). The experiments were carried out at the workplace of cooperating organization. Develop

#### **Odůvodnění předkladatele:**

The article is focused on a highly topical issue of advanced biofuels. Hydrotreating of vegetable oils produces high quality hydrocarbon biocomponent that is used in diesel production. This biocomponent is non-aromatic, have excellent cetane number and excellent thermo-oxidative stability. This biofuel can be combusted in standard diesel engines in pure form or in a mixture with mineral diesel of any composition. Moreover, lower emissions are produced from combustion of this biofuel compared to mineral diesel. The article was published in a journal with a high IF (2010 IF 3.602). Relevance of the topic and quality of the results obtained are documented by citation of the article (62 citations until February 2016 according to WoS and 107 citations according to Google Scholar).

#### **Odůvodnění panelu:**

Very good paper on important research subject, very good journal and a high number of citations.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

**Method, apparatus and computer program for measuring the dose, dose rate or composition of radiation**

**obor: JB**

**Identifikátor: RIV/68407700:21670/12:00204273!RIV13-MSM-21670**

**Id: 46**

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Ústav technické a experimentální fyziky ČVUT**

Podíl předkladatele na výsledku: **50 %**

### **Popis podílu předkladatele:**

50% - see the attachment "PilirII\_204273\_KV04.pdf"

### **Odůvodnění předkladatele:**

see the attachment "PilirII\_204273\_KV04.pdf"

### **Odůvodnění panelu:**

The excellent scientific result with demonstrated impact and financial benefit; Published in several excellent papers and resulting in a commercialized US patent.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Tracking-Learning-Detection

obor: JD

Identifikátor: **RIV/68407700:21230/12:00200439!RIV13-MSM-21230**

Id: 47

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Fakulta elektrotechnická**

Podíl předkladatele na výsledku: **33 %**

#### **Popis podílu předkladatele:**

33% - Co-author.

#### **Odůvodnění předkladatele:**

A seminal paper that introduced the long-term tracking problem and showed that solutions to the problem must include tracking, learning and detection components. The paper has been published in the #1 journal in the field. A framework based on a novel learning method called P-N learning is introduced. Extensive quantitative evaluation showed a significant improvement over state-of-the-art approaches. The core of the idea is presented in a YouTube video <https://www.youtube.com/watch?v=1GhNXHCQGsM> which has been seen more than 800 000 times. For the work, the PhD student Zdenek Kalal has been awarded the UK ICT Pioneers 2011 prize. The paper has been cited more than 900 times in Google Scholar and more than 280 times in the Web of Science. The result is the foundation of which Zdenek Kalal built his successful start-up, TLD Vision, <http://tldvision.com/>, which is based in Tabor, Czech Republic.

#### **Odůvodnění panelu:**

Excellent results published in a top journal with an excellent scientific response. Practical implementation and success of the company startup testify for its actuality and commercialization potential.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Effect of promoters in Co-Mn-Al mixed oxide catalyst on N<sub>2</sub>O decomposition

obor: JJ

Identifikátor: RIV/61989100:27360/10:10225244!RIV11-GA0-27360

Id: 48

Předkladatel výsledku do Pilíře II.:

**IČO: 61989100 Vysoká škola báňská - Technická univerzita Ostrava,  
Fakulta metalurgie a materiálového inženýrství**

Podíl předkladatele na výsledku: **35 %**

#### **Popis podílu předkladatele:**

Research in the field of heterogeneous catalysis needs specialist in chemical engineering, reaction kinetics, chemical reactor engineering, material science and analytical chemistry. The research team from VŠB-TU Ostrava deal with catalytic tests of nitr

#### **Odůvodnění předkladatele:**

(35%) Catalytic decomposition of nitrous oxide (N<sub>2</sub>O) is suitable method for decreasing of N<sub>2</sub>O emissions in waste gases e.g. from nitric acid plants. The article describes the beneficial effect of potassium promoter on the efficiency of cobalt mixed oxide catalyst for reaction of N<sub>2</sub>O decomposition. Original results published in the article are the subject of Czech patent No. 300807 (Anex) and were also successfully confirmed in pilot scale in off gas from nitric acid production in BorsodChem-Moravské chemické závody Ostrava (Anex) under financial support of project TA01020336. Nowadays, our cobalt mixed oxide catalyst with potassium promoter is offered in the supply of nitric acid plants by Chemoprojekt company.

#### **Odůvodnění panelu:**

Excellent result, very good paper, high impact journal, a high number of citations and, particularly, clear evidence of impact beyond science - patent with industry application.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Mechanical and corrosion properties of newly developed biodegradable Zn-based alloys for bone fixation

obor: JG

Identifikátor: **RIV/60461373:22310/11:43892490!RIV12-MSM-22310**

Id: 49

Předkladatel výsledku do Pilíře II.:

**IČO: 60461373 Vysoká škola chemicko-technologická v Praze, Fakulta chemické technologie**

Podíl předkladatele na výsledku: **100 %**

#### **Popis podílu předkladatele:**

(100%) The workers of ICT Prague (new name UCT Prague) proposed, planned and carried out all the experimental works and evaluated all results. The work was a part of continuous research lead by D. Vojtěch who planned and designed the experimental procedur

#### **Odůvodnění předkladatele:**

Biodegradable alloys are currently studied as prospective biomaterials for temporary medical implants like stents for repairing damaged blood vessels and devices (screws and plates) for fixing fractured bones. Among biodegradable metals, magnesium alloys have been the most extensively studied since the beginning of the 20th century. The main drawback of Mg alloys is too rapid corrosion under physiologic conditions resulting in hydrogen evolution and excessive alkalization close to the implant. In this work, a novel class of biodegradable Zn-Mg alloys containing up to 3 wt. % Mg are presented and characterized for the first time. It is demonstrated that the Zn-based alloys possess much lower corrosion rates than Mg alloys. Moreover, the corrosion process of Zn is not accompanied by harmful hydrogen evolution. For these reasons, Zn appears as a very promising alternative to biodegradable polymers and Mg alloys.

#### **Odůvodnění panelu:**

Solid scientific topic, excellent result, top journal and a high number of citations.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### New Configuration of Traction Converter With Medium-Frequency Transformer Using Matrix Converters

obor: JA

Identifikátor: **RIV/49777513:23220/11:43898638!RIV12-GA0-23220**

Id: 50

Předkladatel výsledku do Pilíře II.:

**IČO: 49777513 Západočeská univerzita v Plzni, Fakulta elektrotechnická**

Podíl předkladatele na výsledku: **100 %**

#### Popis podílu předkladatele:

100%, All authors are from UWB.

#### Odůvodnění předkladatele:

"The paper is published in the journal IEEE Transactions on Industrial Electronics, with impact factor of 6.5 according to the ISI Web of Knowledge, which is the highest impact factor in the categories of Automation & Control Systems (1/58), Instruments & instrumentation (1/56), and second highest impact factor in the category Engineering, electrical and electronic (2/249). The paper has been cited 27 times according to the Web of Knowledge. The paper presents a new technology which is prospective solution for future generation of multisystem locomotives and suburban units (EMUs). The paper introduced novel topology of main traction converter with significant impact on weight reducing of traction transformer which allows increasing of traction vehicle power or it makes possible to increase the passenger capacity of EMUs. It employs recent medium-voltage power electronics converters in comparison with medium-frequency transformer. This technology in different modifications is at present under the tests by all leading manufacturers in the world (ABB, Siemens, Bombardier, Toshiba, etc.)."

#### Odůvodnění panelu:

A good paper presenting new industrial technology, Q1 journal, a high number of citations, successful industrial application.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Energy Efficient Scheduling for Cluster-Tree Wireless Sensor Networks With Time-Bounded Data Flows: Application to IEEE 802.15.4/ZigBee

obor: JC

Identifikátor: **RIV/68407700:21230/10:00169642!RIV11-MSM-21230**

Id: 51

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Fakulta elektrotechnická**

Podíl předkladatele na výsledku: **75 %**

#### **Popis podílu předkladatele:**

75% - The authors are Z. Hanzalek (CTU FEE) and P. Jurcik (CTU FEE employee and PhD. student was on his research visit at Polytechnic Institute of Porto at the time). Both authors have the same share, i.e. 50% each.

#### **Odůvodnění předkladatele:**

Published in Q1 WoS journal. 35 hetero-citations in WoS (4x more than IF of the journal, which is 8.785), mostly from other journals. 49 citations according to Scopus. 61 hetero-citations in Scholar. This method for optimal setting of parameters in IEEE 802.15.4 wireless network was further extended by a parameter setting in IEEE 802.11p wireless networks used in Car-to-Car communication, which was contracted (47600,- EURO in 2013-2015) as a Linux implementation by Volkswagen Wolfsburg. The total amount of our contracts with Volkswagen in the area of vehicular communication protocols was 186000,- EURO in 2010-2015.

#### **Odůvodnění panelu:**

Very good paper with relevant scientific impact and industrial applications.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Control Design for Time-delay Systems Based on Quasi-direct Pole Placement

obor: BC

Identifikátor: **RIV/68407700:21220/10:00162767!RIV11-MSM-21220**

Id: 52

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Fakulta strojní**

Podíl předkladatele na výsledku: **60 %**

#### Popis podílu předkladatele:

60% - The first author W. Michiels (40%) is from KU. Leuven, whereas the other two T. Vyhlídal (40%) and P. Zítek (20%) are from the Faculty of Mechanical Engineering, CTU in Prague, Department of Instrumentation and Control Engineering. The paper pres

#### Odůvodnění předkladatele:

A novel method for determining the controller parameters in a broad class of time delay systems is presented in the paper. This method is based on an appropriate shaping of the spectrum of the closed-loop, which is due to distributed nature of delay systems infinite. Utilizing a classical state feedback with gain parameters, only limited number of poles can be assigned. Therefore, the application of the proposed method follows the two steps. First, a number of rightmost poles, smaller than the number of controller parameters, are directly assigned. This leads to constraints on the controller parameters. By means of algebraic techniques a complete parametrization of all controllers satisfying these constraints is obtained. In the second step, the remaining degrees of freedom in the parameter space are used to shift the remaining part of the system spectrum as far to the left as possible. This corresponds to an optimization problem involving a nonsmooth, non-convex objective function. In order to demonstrate the capability of the proposed method, it has been applied to the control synthesis of a mathematical model of the experimental heat transfer set-up with two heating circuits and several heat exchangers, which was built in the authors' department at CTU in Prague. To stress the contribution of the results, note that the classical finite spectrum assignment method for delay systems provides a functional feedback of high complexity, which is a considerable limitation for its practical use. On the contrary, in the proposed methodology, utilizing modern spectrum optimization approach, the complexity is moved to the design part and the resulting controller is of finite order and easy to apply structure. The high impact of the research results to the specialized and relatively narrow field of time delay system control is documented by 15 citations of the paper in WoS and 21 in Scopus.

#### Odůvodnění panelu:

Very good results published in an average journal but significant impact in the research community and potential for applications.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Robust Multichannel Blind Deconvolution via Fast Alternating Minimization

obor: JD

Identifikátor: RIV/67985556: /12:00376080!RIV13-MV0-67985556

Id: 53

Předkladatel výsledku do Pilíře II.:

**IČO: 67985556 Ústav teorie informace a automatizace AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **66 %**

#### Popis podílu předkladatele:

UTIA 66% -The UTIA's author proposed the main idea and performed all proofs and experiments.

#### Odůvodnění předkladatele:

This work summarizes our research in the area of blind deconvolution, which belongs to the category of ill-posed problems. The instability of blind deconvolution can be alleviated by considering multiple images of the same scene. In this case blurs can be directly estimated from degraded images. We formulate deconvolution as a regularized optimization problem and look for a solution by alternately optimizing with respect to the image and blurs. Several improvements were presented in this paper, namely increased robustness to noise, stability in the case of large blurs and rapid convergence achieved by the numerical method of augmented Lagrangians.

#### Odůvodnění panelu:

Very good paper in good journal with serious impact confirmed by numerous citations.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Rotation-Invariant Image and Video Description With Local Binary Pattern Features

obor: JD

Identifikátor: **RIV/68407700:21230/12:00192658!RIV13-GA0-21230**

Id: 54

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Fakulta elektrotechnická**

Podíl předkladatele na výsledku: **25 %**

#### **Popis podílu předkladatele:**

25% - Co-author.

#### **Odůvodnění předkladatele:**

The paper presents a novel approach to compute rotation invariant features from histograms of local, non-invariant patterns with multiple applications such as texture recognition and video description. The method has become widely used and cited. The journal in which it was published is #1 in the field of image processing. The paper has been cited more than 50 times in the Web of Science collection and 140 times in Google Scholar.

#### **Odůvodnění panelu:**

Excellent paper with a good practical impact and many citations.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Effect of surface texturing on rolling contact fatigue within mixed lubricated non-conformal rolling/sliding contacts

obor: JR

Identifikátor: **RIV/00216305:26210/10:PU88651!RIV11-GA0-26210**

Id: 55

Předkladatel výsledku do Pilíře II.:

**IČO: 216305 Vysoké učení technické v Brně, Fakulta strojního inženýrství**

Podíl předkladatele na výsledku: **100 %**

#### **Popis podílu předkladatele:**

All members of the author team are from the same department of the Faculty of Mechanical Engineering, Brno University of Technology.

#### **Odůvodnění předkladatele:**

The rolling contact fatigue (RCF) life of highly loaded machine components is significantly influenced by the surface roughness features so that there is a continuous effort to design the topography of rubbing surfaces to enhance lubrication efficiency and prolong the operation of machine components. It can be suggested from the recent experimental results that lubricant emitted from shallow micro-dents could effectively lift off the real roughness features and reduce the asperities interactions within rolling/sliding mixed lubricated contacts. Thereby the additional supply of lubricant from surface features could help to reduce the risk of surface damage through the reduction of the interaction of rubbing surfaces during start-up or starvation. However, the introduction of such roughness features into the rubbing surfaces of highly loaded non-conformal contacts should consider not only the effects on lubrication film thickness but also on RCF. That is why this study is focused on the effects of surface texturing on RCF within non-conformal rolling/sliding contacts operated under mixed lubrication conditions. The principal task has been whether possible beneficial effect on film thickness is not accompanied by the reduction in RCF life. Textures with various sizes of micro-dents and their arrangement within the contacts have been considered. It has been found that results obtained with textured surfaces have exhibited no obvious reduction in RCF. The original research paper "Effect of surface texturing on rolling contact fatigue within mixed lubricated non-conformal rolling/sliding contacts" was published in prestigious journal Tribology International having IF 1.936 (2014). This paper was 26 times cited in Web of Science Core Collection.

#### **Odůvodnění panelu:**

A very good paper published in a good journal very high number of citations considering the field.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Experimental analysis of model predictive control for an energy efficient building heating systém

obor: BC

Identifikátor: **RIV/68407700:21230/11:00179562!RIV12-MPO-21230**

Id: 56

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Fakulta elektrotechnická**

Podíl předkladatele na výsledku: **50 %**

#### **Popis podílu předkladatele:**

50% - The article, which is given as the major one, has been done with 50% at the CTU in Prague, FEE. The other two articles have been done only at CTU in Prague, FEE. There is also related development in pilot projects, which have been used in several bu

#### **Odůvodnění předkladatele:**

Q1 journal, 80 hetero-citations in WoS, over 150 at Scholar. This article is one of a series of articles published about the topic of model predictive control of heating and ventilation in buildings. Other related articles are e.g.: (1) Cigler, J., Privara, S., Vana, Z., Zacekova, E., Ferkl, L. Optimization of Predicted Mean Vote index within Model Predictive Control framework: Computationally tractable solution. Energy and Buildings. 2012. - 13 citations in WoS (2) Privara, S. - Váňa, Z. - Žáčková, E. - Cigler, J.: Building Modeling: Selection of the Most Appropriate Model for Predictive Control. Energy and Buildings. 2012, vol. 55, no. 12, p. 341-350. ISSN 0378-7788. - 11 citations in WoS.

#### **Odůvodnění panelu:**

Excellent paper in a good journal with a very significant impact.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Nonlinear System Identification Using Exponential Swept-Sine Signal

**obor: JA**

Identifikátor: **RIV/68407700:21230/10:00171524!RIV11-MSM-21230**

Id: 57

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Fakulta elektrotechnická**

Podíl předkladatele na výsledku: **50 %**

#### **Popis podílu předkladatele:**

50% - The work is the result of a long-term collaboration between the Faculty of Electrical Engineering, Czech Technical University (FEE CTU) and the Laboratoire d'Acoustique de l'Université du Maine (LAUM) and was part of the Antonin Novak's double degree

#### **Odůvodnění předkladatele:**

PilirII\_171524\_KV04.pdf

#### **Odůvodnění panelu:**

Very good result published in an average journal yet received numerous citations. Good application potential.

**PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A**  
**Light Transport Simulation with Vertex Connection and Merging**  
**obor: IN**

Identifikátor: **RIV/00216208:11320/12:10127584!RIV13-MSM-11320**

Id: 58

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Matematicko-fyzikální fakulta**

Podíl předkladatele na výsledku: **40 %**

**Popis podílu předkladatele:**

40% |Participation of the faculty has been determined in accordance with the methodology

**Odůvodnění předkladatele:**

"This is the first paper to establish the connection between previously disconnected approaches to light transport simulation: photon density estimation and path integral estimators. The resulting VCM algorithm got integrated into industry-standard renderers and it is currently considered as the most robust solution for rendering scenes with complex specular materials. The acronym VCM has become widely known both in the rendering research and in the industry. , Times cited: 21 (WoS), 19 (Scopus). Published in ACM Transactions on Graphics, the journal with the highest impact factor (3.361 in 2012 JCR) in WoS category ""COMPUTER SCIENCE, SOFTWARE ENGINEERING"" in 2012."

**Odůvodnění panelu:**

Very good result, top journal and great scientific as well as practical impact.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Method of generation of pressure pulsations and apparatus for implementation of this method

obor: JQ

Identifikátor: RIV/68145535: /11:00366872!RIV12-AV0-68145535

Id: 59

Předkladatel výsledku do Pilíře II.:

**IČO: 68145535 Ústav geoniky AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **100 %**

#### Popis podílu předkladatele:

The authors of the patent are Dr. Foldyna from the Institute of Geonics of the CAS. and Dr. Švehla (Slovakia) who did the work for the Institute of Geonics on the contractual basis. The only patent owner is the Institute of Geonics of the CAS. The pulsar

#### Odůvodnění předkladatele:

It is well known that the collision of a high-velocity liquid mass with a solid material generates short high-pressure transients which can cause serious damage to the surface and interior structure of the target material. Therefore, the research activities were focused on the study of possibilities for influencing the flow upstream the nozzle exit in a way that a water jet exploiting the above mentioned physical phenomenon is generated. A proprietary method of generation of pressure pulsations in high-pressure system to generate pulsating water jets (PWJs) using an acoustic generator was developed. PWJs generated by the method demonstrated significant increase in disintegration effects on various types of materials in comparison to continuous ones. Research in fundamentals of the process of excitation and the propagation of acoustic waves (high-frequency pressure pulsations) in liquid via a high-pressure system and their influence on the formation and properties of a PWJ was crowned by granted US, Canadian, Australian and European (validated in 20 countries) patents and Japanese utility model. An exclusive license agreement on commercial application of PWJs was signed with a renowned German manufacturer of high-pressure equipment, Hammelmann GmbH company. The agreement brought revenues over 80,000 EUR during the period 2010-2014. In addition, the cooperation with the industrial partner under the license agreement provided new stimuli for the research. The cooperation resulted in the development of a unit for deburring of cylinders of car engines based on PWJs. The unit was installed by Dürr Ecoclean (Germany) in the BMW plant in Austria for pilot testing. Partial results of the research in the area of PWJs development were also published in the IF journals (see Additional documentation of the result).

#### Odůvodnění panelu:

Method of generation of pressure pulsations and apparatus for implementation of this method

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Raman Microspectroscopy of Individual Algal Cells: Sensing Unsaturation of Storage Lipids in vivo

obor: JB

Identifikátor: RIV/68081731: /10:00350885!RIV11-AV0-68081731

Id: 60

Předkladatel výsledku do Pilíře II.:

**IČO: 68081731 Ústav přístrojové techniky AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **80 %**

#### **Popis podílu předkladatele:**

80% - The submitter's team built up and run the experimental system, developed and tested the detection method and analyzed experiments. The co-authors from other institutions provided samples of algae and results of comparative analyses of algae lipid co

#### **Odůvodnění předkladatele:**

Algae are becoming a strategic source of fuels, food, feedstocks, and biologically active compounds. This potential has stimulated the development of innovative analytical methods focused on these microorganisms. Algal lipids are among the most promising potential products for fuels as well as for nutrition. The crucial parameter characterizing the algal lipids is the degree of unsaturation of the constituent fatty acids quantified by the iodine value (well-established quantity in the food industry). The paper presents an original and pioneering method that determines the degree of lipid unsaturation (in the form of the iodine value) at the level of individual living alga cells in a contactless and non-destructive way using inelastic Raman scattering of an incident laser beam. This approach has attracted strong international attention (according to the number of citations) and has been already applied in a prototype of the optical Raman algae sorter.

#### **Odůvodnění panelu:**

Good result, nice paper, good citation response

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Karta COMBO-CG

obor: JC

Identifikátor: RIV/27730450: /14:#0000002!RIV15-TA0-27730450

Id: 61

Předkladatel výsledku do Pilíře II.:

**IČO: 63839172 CESNET, zájmové sdružení právnických osob**

Podíl předkladatele na výsledku: **50 %**

#### Popis podílu předkladatele:

CESNET is a co-author of the card together with INVEA-TECH company, which was renamed to Flowmon Networks in 2015. CESNET researchers have participated on the specification of the card and have designed and created the unique firmware, which is the core o

#### Odůvodnění předkladatele:

The COMBO-CG card is the first 100 Gbps FPGA card, which is able to utilize bifurcation technology (the connection of two PCI Express gen.3 x8 blocks through one x16 physical interface) to capture all packets from the network to the host PC at wire-speed without any packet drop. The card design is based on long experience with hardware acceleration of network security and monitoring applications and analysis presented at the AIMS conference [1]. The core of the card is unique firmware with patented technology for packet header analysis and header field extraction (United States Patent no. 8,923,300 [4] and Czech patent no. 303954. [2]). These patents enable wire-speed packet processing in the FPGA even for 100 Gbps lines. Next unique feature is an efficient distribution of packets among the CPU cores of the host computer. The packets are distributed equally among the cores. Moreover, all packets of the same flows are sent to the same CPU core, which significantly reduces communication among of CPU cores and consequently increases performance of target network applications. The card together with the firmware is presented by Xilinx as a recommended solution for packet capture in 100 Gbps networks. Let us note that Xilinx is the market leading FPGA chip designer and producer. The card has been created in early days of 100 Gbps Ethernet standard, which was very important for commercial utilization in all areas related to the high speed networks. CESNET has signed technology transfer contract with Flowmon Networks and Netcope Technologies companies. These companies have sold many cards to big Internet Service Providers in Great Britain, Switzerland, Canada and other countries. Many COMBO-CG cards have been delivered also as an accelerator of lawful interception solution or as a core component of test equipment. A market leader for the network test equipment uses these cards in their network protocol testers. The card has many unique features described in IEEE/ACM conference papers [1], [3] and US and Czech patents. The card has been presented at several IEEE and ACM conferences with positive feedback, and recommended by Xilinx. This positive feedback has been proven also by commercial utilization by Flowmon Networks and Netcope Technologies companies. Only in the first year (2015), the overall revenue generated by cards was more than 44 mil. CZK and the license fee profit for CESNET was 1 330 958 CZK. [1] Puš V.: Hardware acceleration for measurements in 100 Gb/s networks. In: Proceedings of 6th International Conference on Autonomous Infrastructure, Management and Security (AIMS), LNCS, vol. 7279, Springer, Heidelberg, 2012 [2] Viktor Puš: Connection for the fast analysis of packet headers transferred via data bus. Czech patent no. 303954. [3] Viktor Puš, Lukáš Kekely, Jan Kořenek: Design Methodology of Configurable High Performance Packet Parser for FPGA. In: Proceedings of the 17th IEEE Symposium on Design and Diagnostics of Electronic Circuits and Systems, Warsaw, Poland, 2014 [4] Viktor Puš: Connection for the fast analysis of packet headers transferred via data bus. United States Patent no. 8,923,300

#### Odůvodnění panelu:

A good practical result with impact, patents and licenses.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### A method for text localization and recognition in real-world images

obor: JD

Identifikátor: **RIV/68407700:21230/11:00175556!RIV12-MSM-21230**

Id: 62

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Fakulta elektrotechnická**

Podíl předkladatele na výsledku: **100 %**

#### **Popis podílu předkladatele:**

100% - CTU in Prague, FEE was the only institution participating at this research.

#### **Odůvodnění předkladatele:**

A new method for text detection in real-world image is proposed. The method has become a backbone of many text detection pipelines. As a consequence the authors were invited to present a keynote talk at a international workshop on robust reading, <http://imlab.jp/iwrr2014/program.shtml>. The result lead to receiving a Google Award (40 000 Eur) and a Google Fellowship, <https://cyber.felk.cvut.cz/cs/news/lukas/>, an extremely selective (one fellowship in a discipline per year) award, see <http://googleresearch.blogspot.cz/2013/06/2013-google-phd-fellowships-5-years-of.html>, the recipients are exclusively from top-level universities (and CVUT), see <http://services.google.com/fh/files/misc/2013GooglePhDFellowshipRecipients.pdf>. The fellowship brought 40 000 EUR in three consecutive years. The method is highly cited, with 160 Google Scholar citations. The WOS citation count differs if obtained via "cited reference search" (66) and by the number of citations linked to the publication. The further development of the method lead to a prize winning approach (best paper at ICDAR in 2015, <http://2015.icdar.org/program/awards-winners/>).

#### **Odůvodnění panelu:**

Both theoretical and practical result with a clear impact on the real world. shown. Many awards received including Google Award.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Unscented Kalman Filter: Aspects and Adaptive Setting of Scaling Parameter

obor: BC

Identifikátor: **RIV/49777513:23520/12:43915692!RIV13-GA0-23520**

Id: 63

Předkladatel výsledku do Pilíře II.:

**IČO: 49777513 Západočeská univerzita v Plzni, Fakulta aplikovaných věd**

Podíl předkladatele na výsledku: **100 %**

#### Popis podílu předkladatele:

100%, The paper was from 100% created by the team of University of West Bohemia

#### Odůvodnění předkladatele:

State estimation plays a key role in technical and non-technical areas where knowledge of the state, as a quantity completely summarizing history of system behaviour, is required for prediction, control, or fault detection. The article is devoted to the recursive state estimation of discrete-time nonlinear stochastic dynamic systems. In particular, the article is aimed at the selection of the user-defined parameters of which specification is required in a design of local nonlinear filters. So far, the parameter selection was left completely on a user without almost any recommendation. In the article, the impact of the user-defined parameters was thoroughly analysed and illustrated and a conceptually new technique for adaptive selection of the user-defined parameters was proposed. The technique might improve the filter estimation performance in order of several tens of per cent, although it is realized by a relatively simple algorithm with rather marginal computational overhead. The article was published in the journal IEEE Transaction on Automatic Control which is, together with the journal Automatica (of the International Federation of Automatic Control), considered to be the most prestigious journal in the area of the automatic control. Actual journal impact factor is 3.167. Although the article was published in September 2012, it has been already cited 26 times, 47 times, and 55 times according to WOS, Scopus, and Google Scholar databases, respectively. The citing articles either extend the theory of the user-defined parameter selection or apply the technique in various fields of research (e.g., system identification using neural networks, integrated navigation system design, artificial glucose control). The article belongs into a set of articles (published by the same team of authors) which was awarded by the Werner von Siemens Excellence Award 2014 for basic research.

#### Odůvodnění panelu:

Good result, top journal and many citations.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Adding Depth to Cartoons Using Sparse Depth (In)equalities

obor: IN

Identifikátor: **RIV/68407700:21230/10:00168103!RIV11-MSM-21230**

Id: 64

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Fakulta elektrotechnická**

Podíl předkladatele na výsledku: **20 %**

#### **Popis podílu předkladatele:**

20% - The first two authors (from overall five) are from CTU Prague, Faculty of Electrical Engineering, however the first author (Daniel Sykora) was supported by foreign grant (Marie Curie, Nr. 221320) from Trinity College Dublin at the time when the work

#### **Odůvodnění předkladatele:**

a) The paper presents a revolutionary new approach to an open problem of adding depth information into existing hand-drawn artwork. The technique enables to quickly transfer important semantic knowledge about depth in the scene using pair-wise relations which are easy to specify for the user. The presented method opened new possibilities and research directions that concentrate now on a combination of hand-drawn and computer generated animations. b) The paper was initially presented at Eurographics 2010 conference (premier European event in the field of Computer Graphics) where it got Günter Enderle Best Paper Award. It was then published in a special (conference) issue of Computer Graphics Forum, one of the world leading journals in the area. The paper has received 23 hetero-citations (in WoS) till 2015. c) The technique was already applied by leading movie producer (USA) for stereo conversion of classical hand-drawn feature movies (subject of NDA).

#### **Odůvodnění panelu:**

Innovative result, great scientific and practical impact.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

**A label-free and portable multichannel surface plasmon resonance immunosensor for on site analysis of antibiotics in milk samples**

**obor: JB**

**Identifikátor: RIV/67985882: /10:00350666!RIV11-AV0-67985882**

**Id: 65**

**Předkladatel výsledku do Pilíře II.:**

**IČO: 67985882 Ústav fotoniky a elektroniky AV ČR, v. v. i.**

**Podíl předkladatele na výsledku: 50 %**

### **Popis podílu předkladatele:**

The surface plasmon resonance biosensor and functionalization used in this work were developed by the team at the Institute of Photonics and Electronics. The detection applications were proposed by the Spanish partner. The experiments reported in the stud

### **Odůvodnění předkladatele:**

In this work an original surface plasmon resonance biosensor based on the spectroscopy of surface plasmons on a special diffraction grating was applied towards the simultaneous detection of antibiotic residues in milk. These residues covered three important antibiotic families: fluoroquinolones, sulfonamides and phenicols. Limits of detection as low as 30 pg/ml were demonstrated. The paper was published in BIOSENSORS & BIOELECTRONICS, one of the leading journals in the field of analytical chemistry (ranked 3 of 74 in analytical chemistry according to WOS). To date it has generated 52 citations.

### **Odůvodnění panelu:**

Very good paper, great impact

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Spatio-Temporal Motion Estimation for Respiratory-Correlated Imaging of the Lungs

obor: JD

Identifikátor: **RIV/68407700:21230/11:00179911!RIV12-MSM-21230**

Id: 66

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Fakulta elektrotechnická**

Podíl předkladatele na výsledku: **20 %**

#### **Popis podílu předkladatele:**

20% - Co-author.

#### **Odůvodnění předkladatele:**

3D+time computed tomography can provide patient-specific motion information for radiotherapy planning. The motion is extracted through image registration. We have improved the robustness of the image registration by using a global problem formulation. The work has been done in collaboration with the Leon Berard Cancer Center, Lyon, which permits us to test our methods on real patient data. The importance of this problem for the clinical practice is also attested by the number of citations (32 according to WoS, 54 according to Google Scholar).

#### **Odůvodnění panelu:**

Very good paper with serious impact confirmed by numerous citations.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Thermal stability of alumina thin films containing gamma-Al<sub>2</sub>O<sub>3</sub> phase prepared by reactive magnetron sputtering

obor: JI

Identifikátor: **RIV/49777513:23520/10:00503497!RIV11-MSM-23520**

Id: 67

Předkladatel výsledku do Pilíře II.:

**IČO: 49777513 Západočeská univerzita v Plzni, Fakulta aplikovaných věd**

Podíl předkladatele na výsledku: **100 %**

#### **Popis podílu předkladatele:**

100%, All the results reported in the article were obtained by the research team of Prof. Ing. Jindřich Musil, DrSc. in the laboratories of the Department of Physics at the Faculty of Applied Sciences, University of West Bohemia in Plzen, Czech Republic.

#### **Odůvodnění předkladatele:**

The paper reports on the formation and thermal stability of gamma-Al<sub>2</sub>O<sub>3</sub> phase of sputtered alumina thin films. It was found that a nanocrystalline gamma-Al<sub>2</sub>O<sub>3</sub> phase is (i) formed at a floating potential already at the low substrate temperature  $T_s=500$  C and (ii) thermally stable up to 1000 C without its conversion to the thermally stable alpha-Al<sub>2</sub>O<sub>3</sub> phase. These findings are of a great importance not only for the deepening of basic knowledge on ceramics with metastable phases but also for the production of protective gamma-Al<sub>2</sub>O<sub>3</sub> phase based coatings for high-speed cutting at temperatures around 1000 C. Besides, the obtained results showed a possibility to form new protecting coatings with one crystalline phase thermally stable above 1000 C. Such coatings represent a new generation of high-temperature crystalline coatings which (i) are thermally stable in a wide range from the room temperature to high temperatures considerably exceeding 1000 C and (ii) exhibit an enhanced resistance against conversion to other crystalline phase. These coatings are now already under development in our laboratories at the Department of Physics, Faculty of Applied Sciences at the University of West Bohemia in Plzen, Czech Republic. The results achieved were very positively accepted by the international scientific community. The number of citations according to the Web of Science on February 19, 2015: 37.

#### **Odůvodnění panelu:**

A very good paper with a good impact.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Building a Web-scale Image Similarity Search System

obor: IN

Identifikátor: **RIV/00216224:14330/10:00042682!RIV11-GA0-14330**

Id: 68

Předkladatel výsledku do Pilíře II.:

**IČO: 216224 Masarykova univerzita, Fakulta informatiky**

Podíl předkladatele na výsledku: **60 %**

#### **Popis podílu předkladatele:**

60%The paper was written in bilateral collaboration of the Masaryk University and Istituto di Scienza e Tecnologie dell'Informazione, Italy. The contribution of Masaryk University to the creation of the database, the search engine and the paper is 60%.

#### **Odůvodnění předkladatele:**

The paper represents the main result of the EU IST project SAPIR (Search In Audio-Visual Content Using Peer-to-Peer Information Retrieval), led by the IBM Haifa Research Laboratory. The paper reports the process of building, at that time, the largest collection of images annotated by not only keywords and GPS positions but also five different content-based visual descriptors. However, the main value of the work is a scalable similarity search engine, capable of executing queries in real time, which was an exclusive contribution of the Masaryk University partner. The value of the contribution was recognised by IBM which granted Masaryk University the IBM SUR (Shared University Research) Award for an innovative research project on Web-scale Similarity Search in Multimedia Databases. Till now, the built image database, called CoPhIR, has been used in more than one hundred other research projects and has become a benchmark for large-scale content-based search algorithms. Currently, the paper shows 76 citations on Scholar Google.Times Cited: 76 (Google Scholar); 48 (SCOPUS); 20 (Web of Science)

#### **Odůvodnění panelu:**

Good paper in the average journal, a high number of citations. Practical significance, IBM research award.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Discovery of optimal factors in binary data via a novel method of matrix decomposition

obor: BD

Identifikátor: RIV/61989592:15310/10:00010968!RIV11-MSM-15310

Id: 69

Předkladatel výsledku do Pilíře II.:

**IČO: 61989592 Univerzita Palackého v Olomouci, Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **100 %**

#### Popis podílu předkladatele:

100% contribution of authors from UP - no further comment needed

#### Odůvodnění předkladatele:

This paper, published in a leading journal on foundations of computer science, presents some key discoveries in the problem of decompositions of Boolean matrices. The problem itself has a long history and broad ramifications in several areas, including Boolean matrix theory, graph theory, and the analysis of Boolean data. Recently, a stream of papers in premier data mining conferences and journals proposed approximation algorithms to compute optimal decompositions (finding optimal ones is NP-hard). Most of them are, however, greedy approaches with limited theoretical insight. Our paper presents such insight, namely into the geometry of decompositions in terms of Galois connections, closure structures, and the lattices of their fixpoints. We provide a theorem describing optimal decompositions, propose a fast and efficient approximation algorithm for decompositions based on the theorem, complexity results, and extensive experimental evaluation. To this date, the algorithm remains both the fastest and best in terms of quality of decompositions and led to numerous subsequent work. The results impacted the community in a profound way: the paper has over 100 citations (considerable number in its area), including citations in premier journals and conferences such as SIG KDD, SIAM DM, IEEE ICDM. The paper opened a way to qualitatively better algorithms and better understanding of the problem.

#### Odůvodnění panelu:

Very good paper published in a good journal and with relevant impact in the scientific community.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Fuzzy Transform of Monotonous Functions with Applications to Image Processing

obor: IN

Identifikátor: **RIV/61988987:17610/10:A1100W0W!RIV11-MSM-17610**

Id: 70

Předkladatel výsledku do Pilíře II.:

**IČO: 61988987 Ostravská univerzita v Ostravě, Centrum excellence**

**IT4Innovations, divize OU, Ústav pro výzkum a aplikace fuzzy modelování**

Podíl předkladatele na výsledku: **50 %**

#### **Popis podílu předkladatele:**

The contribution of the home author from the University of Ostrava is 2/3 while the contribution of her co-author from the University Gent in Belgium is 1/3. The work has been done mainly during the research stay of Prof. Perfilieva in Gent. The main idea

#### **Odůvodnění předkladatele:**

The technique of fuzzy (F)-transforms proved to be very efficient in many applications, in particular in image processing where a number of effective algorithms, e.g., for reduction, compression, fusion or registration of images was elaborated. This technique is based on a sequence of integral transforms that are connected by basic functions, so that a fuzzy partition of a universe of discourse is established. The paper is focused on properties that are invariant with respect to the F-transform. It has been proved that monotonicity and Lipschitz continuity are among them. On the basis of monotonicity invariance, an effectively functioning algorithm for image compression and reconstruction is proposed. It should be noticed that efficiency of any professional compression algorithm depends on a preprocessing of the original image. This however, increases the entire complexity of any algorithm. Contrary to this practice, the proposed F-transform based compression does not require preprocessing. Therefore, the F-transform method is very fast. In the paper, a simple version of the compression algorithm is introduced and its complexity is proved to be linear. This version may be iterated with the purpose of increasing a quality of reconstruction. Later on, the proposed method was modified and improved by several other authors.

#### **Odůvodnění panelu:**

Good paper with serious impact confirmed by citations.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Surface plasmon resonance sensing of nucleic acids: A review

obor: JB

Identifikátor: RIV/67985882: /13:00396514!RIV14-MSM-67985882

Id: 71

Předkladatel výsledku do Pilíře II.:

**IČO: 67985882 Ústav fotoniky a elektroniky AVČR, v.v.i.**

Podíl předkladatele na výsledku: **100 %**

#### **Popis podílu předkladatele:**

This review was produced solely by the employees of the Institute of Photonics and Electronics.

#### **Odůvodnění předkladatele:**

This paper was an invited review solicited by the Editor of the Analytical Chimica Acta, one of the leading journals in the field of analytical chemistry (ranked 5 of 74 according to WOS). This paper analyzes the advances of surface plasmon resonance biosensor technologies used towards nucleic acids, with a review of applications related to both the research of molecular interactions involving nucleic acids as well as bioanalytics in the areas of food safety, medical diagnosis, and environmental monitoring. To date the paper has generated 54 citations.

#### **Odůvodnění panelu:**

Good paper in a good journal with serious impact confirmed by numerous citations.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Profinet IO IRT Message Scheduling With Temporal Constraints

obor: IN

Identifikátor: **RIV/68407700:21230/10:00169069!RIV11-MSM-21230**

Id: 72

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Fakulta elektrotechnická**

Podíl předkladatele na výsledku: **100 %**

#### **Popis podílu předkladatele:**

100% - CTU in Prague, FEE was the only institution participating at this research.

#### **Odůvodnění předkladatele:**

Published in WoS-Q1 journal with 11 citations in WoS (more than IF of the journal, which is 8.785) including citations in 4 other IEEE Transactions. 28 heterocitations by Scholar. The article describes an algorithm to create a message schedule for Profinet IRT, which was unique at the time of the publication. This was the primary work on Profinet IRT, which continued in a series of other activities such as the establishment of the Certified Profinet Training Centre (certified by Profibus & Profinet International) in 2011. The related Certified Profinet Engineer course has been provided for more than 50 participants from Czech Republic, Austria, Turkey, India and the total turnover in terms of commercial agreements has been more than 1 million CZK since then. In 2014 another commercial project for 0,5 million CZK has been done for Profibus Nutzerorganisation, whose objective was to develop a tool, which is called IRTcheck, to check the Profinet IRT message schedule with respect to other parameters describing the characteristics of the involved devices. This tool has been used by major automation manufacturers like Siemens, WAGO, Phoenix Contact, Beckhoff, Moxex, Hilscher whose development teams have been using the tool. From the point of view of PI an important fact is that the parameters generated by different Profinet IO Controllers, i.e. from different manufacturers, comply with the Profinet standard and thus the interoperability of the devices and the controllers is ensured. The tool is available for the members of PI for free.

#### **Odůvodnění panelu:**

The proposed algorithm is novel, original, the first in its class at the time of its publication, with a wide application potential. It has obtained numerous citations showing its high impact.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Způsob a zařízení pro detekci poruchy vysokonapětového závěsného izolovaného vodiče

obor: JE

Identifikátor: RIV/61989100:27240/11:86079582!RIV13-MSM-27240

Id: 73

Předkladatel výsledku do Pilíře II.:

**IČO: 61989100 Vysoká škola báňská - Technická univerzita Ostrava,  
Fakulta elektrotechniky a informatiky**

Podíl předkladatele na výsledku: **70 %**

#### Popis podílu předkladatele:

The creation and realization of the introduced result is possible to divide into five steps (A-D): A) development of the method for the CC fault detection B) verification of the method in the laboratory and real conditions C) preparation and realization proc

#### Odůvodnění předkladatele:

(70%) - Medium voltage (MV) covered conductors (CC) are specified by high reliability and safe operation. Recently, the CC are mostly installed into forested and broken territories, where the Aluminum Core Steel Reinforced (ACSR) overhead line is not possible to use due to its high failure rate. As well, the CC are installed in urban or suburban agglomerations, as the CC requires a less densely built area in comparison with the ACSR. However, the only disadvantage of the CC is rather the problematic fault detection compared to the ACSR. The contact of a tree branch with a CC and the fall of a conductor on the ground are among the most frequent CC faults. The standard protection relays are unable to detect the faults, and thus the faults pose a risk for individuals in the vicinity of the conductor, and as well it compromises the overall safety and reliability of the MV distribution system. The research team of VŠB-Technical University of Ostrava developed the new method for the CC fault detection, whereas other methods for detection of the above mentioned faults do not exist. For these faults, there is no single-phase-to-earth fault due to the insulation of the CC (it can be noted that it does not matter whether the conductor is broken). The standard protection relays work on the principle of an evaluation of the current or voltage at the point of the single-phase-to-earth fault. When such a CC fault is not detected, the live CC lying on the ground can endanger individuals close to the conductor, or it can threaten the reliability and safety of the distribution system. At the contact point, low-power capacitive current flows are generated by partial discharges (PDs). These PDs gradually degrade the CC insulation over time until the insulation system is locally destroyed. This fault state is very dangerous, the surface voltage gradient and the touch voltage are beyond the limits, and human life as well as safety and reliability of the medium voltage distribution system is endangered. As human life has an incalculable value, the biggest advantage of the introduced method is the possibility of the CC fault detection and the subsequent danger reduction. Next to be considered is a method enabling classification of the fault type. Such a classification is especially important for an operator of an MV distribution system to plan the optimal maintenance, or repair the faulty conductors since the contact of a tree branch with the CC can be solved later, whereas the breakdown of a conductor means an immediate action of the operator of the distribution system. This introduced method for the CC fault detection was implemented in the prototype of the fault detector. This fault detector was installed with the participation of the distribution system operator in selected places in the Czech Republic. The places of installation were selected according to criteria: (i) high frequency of the fault, (ii) variety and hard climatic conditions, (iii) broken topography. The functionality of the method was verified by real operation in the 11 places of installation, from 2014 to present. Next, cooperation with the CC distributor was initiated and the license agreement is prepared for use of this fault detector in Scandinavian countries, where CC are mostly used (95% of all medium voltage overhead lines). This method is protected by intellectual property rights by the national patent P302419 and the European Patent EP2187225B1. The license agreement allowing use of the intellectual property rights of the method was entered into between VŠB-Technical University of Ostrava and the company ČEZ in 2013.

#### Odůvodnění panelu:

## Panel EP04, Hodnocení 2015, Pilíř II

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Interesting result, clear application in industry, important for the scientific community as well, patented and license sold, higher impact expected in near future.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### System for Tariffication Control in Telecommunication Networks Based on Quality of Transmitted Call

obor: JA

Identifikátor: **RIV/68407700:21230/13:00200245!RIV14-MSM-21230**

Id: 74

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Fakulta  
elektrotechnická**

Podíl předkladatele na výsledku: **100 %**

#### **Popis podílu předkladatele:**

100% - The project was completely carried out by Jan Holub at Department of Measurement, Faculty of Electrical Engineering , Czech Technical University.

#### **Odůvodnění předkladatele:**

The European Patent (EPO) presents completely new and unique approach to manage billing in a commercial telecommunication network, based on quality of the transmitted call. The ability of removing the calls of compromised quality from customer final invoice improves telecommunication service vendor image and is used as a strong marketing factor. The patent (single) licence has been purchased (as a yearly-paid single licence grant fee) by German telecommunication company and the invented principle is successfully implemented and commercially available in their monitoring system for IP-based voice networks. The licence grant fee was set to 8000,-€ PER YEAR and the payments from 2014 and 2015 have been received by CTU already, means 16000,-€ in total. The next payment of 8000,- € for 2016 is expected in January 2016 etc.

#### **Odůvodnění panelu:**

Novel result, protected by a European patent, successfully commercialized.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Accelerating a FFT-based solver for numerical homogenization of periodic media by conjugate gradients

obor: JI

Identifikátor: **RIV/68407700:21110/10:00169181!RIV11-MSM-21110**

Id: 75

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Fakulta stavební**

Podíl předkladatele na výsledku: **100 %**

#### Popis podílu předkladatele:

100% - The paper was prepared at the Faculty of Civil Engineering of the Czech Technical University in Prague.

#### Odůvodnění předkladatele:

"The interest in structure-property relationships in heterogeneous materials has accelerated in recent years as developments in imaging techniques have enabled detailed in-situ 3D materials characterization. The growing availability of such high-resolution data triggers the need for efficient solvers on regular grids, mostly based on the Fast Fourier Transform (FFT). The first FFT-based solver was proposed by Moulinec and Suquet in 1994 and has gained widespread popularity in the community of computational micromechanics (e.g., it has received more than 500 citations in Web of Science as of 03/2016), because of efficiency, direct data handling, and ease of implementation. Still, a theoretical basis for the method had remained elusive over the past two decades. Our contribution to a deeper understanding the Moulinec-Suquet FFT solver has been twofold: first, we have shown that it is equivalent to a collocation method based on trigonometric polynomials and, second, we have provided computational evidence that the resulting singular non-symmetric algebraic system is solvable by the conjugate gradients method. The latter evidence has led to a more than tenfold acceleration over the original formulation, while requiring only minor implementation changes. These results provided the conceptual foundation for the Ph.D. thesis of Jaroslav Vondřejc, in which he presented a complete mathematical framework for FFT-based methods and improved their reliability and efficiency even more. The thesis was defended with distinction in 2013 and received second prize in the Ivo Babuška Awards for the best Ph.D. theses in Scientific Computing. Furthermore, these results have led to four additional papers published in journals ranking among the top 10% in Applied Mathematics and top 5% in Multidisciplinary Engineering and Mathematical Physics (according to the 2014 ISI Journal Citation Reports). The 2010 paper has received 38 citations in Web of Science (31 excluding self-citations)."

#### Odůvodnění panelu:

Good paper in a good journal. Enough citations to prove its quality.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Cobalt-Embedded Nitrogen-Rich Carbon Nanotubes Efficiently Catalyze Hydrogen Evolution Reaction at All pH Values

obor: JA

Identifikátor: RIV/68081731: /14:00436424!RIV15-AV0-68081731

Id: 76

Předkladatel výsledku do Pilíře II.:

**IČO: 68081731 Ústav přístrojové techniky AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **25 %**

#### Popis podílu předkladatele:

25% - Electron microscopy study and the vacuum heating of the samples was mostly performed by Eliška Mikmeková at ISI. The unique low energy transmission electron microscope was used for characterization of the sensitive material.

#### Odůvodnění předkladatele:

The special microscopical methods developed in close cooperation with the company FEI and ISI was used for the analysis of the cobalt-embedded nitrogen carbon nanotubes which provided valuable feedback for the synthesis process. This material can efficiently electrocatalyze the hydrogen evolution reaction with activities close to that of Pt and be well functional under acidic, neutral or basic media alike, allowing them to be coupled with the best available oxygen-evolving catalysts.

#### Odůvodnění panelu:

Good paper in top journal with a very high number of citations.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Model Fitting Using RANSAC for Surgical Tool Localization in 3-D Ultrasound Images

obor: JD

Identifikátor: **RIV/68407700:21230/10:00168921!RIV11-MSM-21230**

Id: 77

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Fakulta elektrotechnická**

Podíl předkladatele na výsledku: **90 %**

#### **Popis podílu předkladatele:**

90% - The key ideas come from M.Uhercik and J.Kybic, implementation was done by M.Uhercik. Our co-authors from INSA Lyon provided expert knowledge of ultrasound imaging and collaborated on the experimental evaluation.

#### **Odůvodnění předkladatele:**

We present a method to localize a thin surgical tool such as a biopsy needle or a microelectrode in a 3-D ultrasound image. This is an important practical problem, with application in computer guided surgery and medical robotics. The method is both faster and more robust than previously known alternatives, by combining shape and intensity modeling, random sampling and consensus (RANSAC), and local optimization. The work has 17 heterocitations according to WoS (35 according to Google Scholar). It is a result of a collaboration with the CREATIS team at INSA, Lyon, France and an ultrasound equipment manufacturer GE Medical Systems.

#### **Odůvodnění panelu:**

A new method with practical applications in medicine. Sufficiently high number of citations.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### High Performance Concrete with Czech Metakaolin: Experimental Analysis of Strength, Toughness and Durability Characteristics

obor: JI

Identifikátor: **RIV/68407700:21110/10:00168658!RIV11-GA0-21110**

Id: 78

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Fakulta stavební**

Podíl předkladatele na výsledku: **50 %**

#### **Popis podílu předkladatele:**

50% - This paper resulted from a common research work performed at the Department of Materials Engineering and Chemistry, Faculty of Civil Engineering, Czech Technical University in Prague and Faculty of Civil Engineering, Brno University of Technology. T

#### **Odůvodnění předkladatele:**

Although the capability of metakaolin as pozzolanic material to improve mechanical and durability properties of concrete if used as partial replacement of Portland cement is well noted in concrete science, its utilization in building industry was limited to date, mainly due to its high price dictated by the low production amounts. However, with the current shortage of silica fume and high-quality slag in some countries the attitude of concrete producers to metakaolin may change in the near future. This change of mind can be facilitated by providing a more comprehensive view of the properties of composite materials with metakaolin, thus contributing to wider realization of the benefits of metakaolin in concrete. In this paper, an extensive set of parameters of high performance concrete (HPC) with metakaolin including basic physical characteristics, mechanical and fracture-mechanical properties, durability characteristics, hydric and thermal properties and chloride binding characteristics was measured. The experimental results showed that the replacement of Portland cement by 10% of metakaolin as an optimal amount led either to improvements or at least did not significantly impair substantial properties of the analyzed HPC. The published data, together with the above reasoning, attracted a wide international attention. The paper obtained 28 citations in the Web of Science database until now.

#### **Odůvodnění panelu:**

Experimentally based paper but with clear interest from the relevant community. Paper in a good journal.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Complex frictional analysis of self-lubricant W-S-C/Cr coating

obor: JI

Identifikátor: **RIV/68407700:21230/12:00194551!RIV13-GA0-21230**

Id: 79

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Fakulta elektrotechnická**

Podíl předkladatele na výsledku: **50 %**

#### **Popis podílu předkladatele:**

50% - T. Polcar pioneers solid lubricant coatings from 2006, first as Postdoc in Cavaleiro group and later as Head of Advanced Materials Group at FEE, CTU (from 2009) and Director of National Centre for Advanced Tribology at the University of Southampton

#### **Odůvodnění předkladatele:**

The paper presented at prestigious Faraday Discussions conference (conference with 100 years tradition; 5 minutes of presentation is followed by 30 min discussion, which is recorded and published; IF of journal 4.6) deals with tribological behaviour of novel smart low-friction coatings with self-adaptive nanostructure. We have used combination of advanced surfaces characterization to describe and understand frictional mechanism of the coatings in different environment. Alloying of WSC self-adaptive film with chromium significantly reduces its performance in humid air. Based on our experimental findings, we question the role of doping metal as oxygen getter during deposition or sliding in humid air. In discussion, we challenge historical model of friction reduction with load based on material shear strength; we believe that nanoscale tribochemistry is key factor controlling tribological behaviour. Our finding indicate that ultrathin tribolayer (nanometer scale) is responsible for low friction. It opens new possibilities for theoretical simulations, since we can downscale problem to few atomic layers (see our last work on simulation, e.g. Levita et al, J Phys Chem C 118 (2014) 13809–13816 or Cammarata&Polcar, Inorganic Chemistry 54 (2015) 5739–5744). The coating was then successfully up-scaled and tested by several industrial partners, which eventually led to spin-out company Advamat, s.r.o. (owner T. Polcar; www.advamat.cz), which offers their industrial version (WSC). Recently we were awarded by direct contract from US Army (S. Berkebile, Vehicle Technology Directorate) to explore their potential for army vehicles.

#### **Odůvodnění panelu:**

Important result, presented at most prestigious Faraday Discussions conference, successfully commercialized.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Surface plasmon resonance biosensor for parallelized detection of protein biomarkers in diluted blood plasma

obor: JA

Identifikátor: RIV/67985882: /10:00350623!RIV11-AV0-67985882

Id: 80

Předkladatel výsledku do Pilíře II.:

**IČO: 67985882 Ústav fotoniky a elektroniky AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **100 %**

#### **Popis podílu předkladatele:**

This paper was produced solely by the employees of the Institute of Photonics and Electronics.

#### **Odůvodnění předkladatele:**

In this work we report on a high-resolution surface plasmon resonance (SPR) imaging sensor and a high-density protein array enabling parallelized measurements in over 100 independent sensing channels. The biosensor was evaluated for the detection of protein biomarkers relevant to cancer diagnostics: the limits of detection for human chorionic gonadotropin (hCG) and activated leukocyte cell adhesion molecule (ALCAM) in blood plasma samples were as low as 45 ng/mL (ALCAM) and 100 ng/mL (hCG), respectively. The paper was published in *BIOSENSORS & BIOELECTRONICS*, one of the leading journals in the field of analytical chemistry (ranked 3 of 74 in analytical chemistry according to WOS). To date the paper has generated 51 citations.

#### **Odůvodnění panelu:**

Good paper with serious impact confirmed by numerous citations.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Review on self-lubricant transition metal dichalcogenide nanocomposite coatings alloyed with carbon

obor: JI

Identifikátor: **RIV/68407700:21230/11:00183255!RIV12-GA0-21230**

Id: 81

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Fakulta elektrotechnická**

Podíl předkladatele na výsledku: **50 %**

#### **Popis podílu předkladatele:**

50% - T. Polcar pioneers solid lubricant coatings from 2006, first as Postdoc in Cavaleiro group and later as Head of Advanced Materials Group at FEE, CTU (from 2009) and Director of National Centre for Advanced Tribology at the University of Southampton

#### **Odůvodnění předkladatele:**

PilirII\_183255\_KV04.pdf

#### **Odůvodnění panelu:**

Although a review paper, it contains good original results of the authors, a good number of citations.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Combined heat and power production planning under liberalized market conditions

obor: JE

Identifikátor: **RIV/68407700:21230/12:00192758!RIV13-MSM-21230**

Id: 82

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Fakulta elektrotechnická**

Podíl předkladatele na výsledku: **100 %**

#### **Popis podílu předkladatele:**

100% - The work on the published methodology and paper was done 100% by the both authors (M.Dvořák, P.Havel) who were employed or Ph.D. students at the Czech Technical University, Faculty of Electrical Engineering, during the period when the methodology a

#### **Odůvodnění předkladatele:**

PilirII\_192758\_KV04.pdf

#### **Odůvodnění panelu:**

Good with proven impact in a real application. The described methodology is sold to a company, applied in six cogeneration plants and its benefits are well proven.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

**Immune response of chicken gut to natural colonization by gut microflora and to *Salmonella enterica* serovar enteritidis infection**

**obor: GJ**

**Identifikátor: RIV/00027162: /11:#0000777!RIV12-MZE-00027162**

**Id: 83**

**Předkladatel výsledku do Pilíře II.:**

**IČO: 27162 Výzkumný ústav veterinárního lékařství, v.v.i.**

**Podíl předkladatele na výsledku: 0 %**

### **Popis podílu předkladatele:**

Authors of the paper designed the study layout, performed all analyses shown in the paper, wrote the manuscript.

### **Odůvodnění předkladatele:**

In this study we were interested in the development of the gut microbiota, the immune response to natural microbial colonisation and the response to *Salmonella* Enteritidis infection as a function of chicken age. These interactions are of utmost importance since chickens are extremely sensitive to *S. Enteritidis* infection during first days of life but their resistance increase rapidly, with developing gut microbiota and gut immune system. In this paper we have shown how cecal microbiota develops during the first 3 weeks of life and how chicken immune system responds to gut colonization. A transient increase in IL-8 and IL-17 expression was observed on day 4 of life in chicken caecum indicating a physiological inflammation and maturation of the gut immune system. In agreement, the response of chickens infected with *S. Enteritidis* on day 1, 4 and 16 of life shifted from Th1 (characterised mainly by induction of IFN $\gamma$  and iNOS), observed in younger chicken, to Th17 observed in 16-day-old chickens (characterised mainly by IL-17 induction). Although this paper was published only in the *Infection and Immunity* (current impact factor 3.731), it was cited 18 times in the first 2 years following its publication reaching it personal impact factor 18, and this paper continued to be cited till present reaching 54 citations in less than 5 year post publication. This shows that data presented in this paper were of interest to a scientific community worldwide. Moreover, this was the first paper of this team in the area of gut microbiota and chicken immune system interaction what has led to a recent paper included in journal's highlights in *Applied and Environmental Microbiology* in March 2016 and cover photo of from this team in the same issue of AEM. We therefore believe that such characteristics and results are those meeting expectation for excellence in the Czech agricultural and veterinary research.

### **Odůvodnění panelu:**

Práce hodnocena jako velmi přínosná z hlediska chovu kuřecích brojlerů na maso, kdy výsledky mohou po zavedení do veterinární praxe výrazně ovlivnit úhyn v chovech. Článek publikovaný v kvalitním časopise s vysokým citačním ohlasem a aplikačním potenciálem.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Major changes in forest carbon and nitrogen cycling caused by declining sulphur deposition

obor: GK

Identifikátor: RIV/00025798: /11:00000418!RIV12-MSM-00025798

Id: 84

Předkladatel výsledku do Pilíře II.:

**IČO: 25798 Česká geologická služba**

Podíl předkladatele na výsledku: **80 %**

#### Popis podílu předkladatele:

80 % Filip Oulehle led the study and wrote the paper during his postdoctoral stay in the UK (CEH Bangor). All recent field data were measured and evaluated by the CGS scientists (Filip Oulehle, Jeňýk Hofmeister, Jakub Hruška). Historical soil data were pr

#### Odůvodnění předkladatele:

Many forest ecosystems in Europe and North America have suffered from soil acidification and ecosystem eutrophication as a result of anthropogenic emissions of SO<sub>2</sub>, NO<sub>x</sub> and NH<sub>3</sub>. Atmospheric sulphur (S) and nitrogen (N) depositions have decreased over the last three decades throughout much of Europe. A number of recent studies have argued that the decline in S deposition has led to a change in the terrestrial carbon (C) cycle. We analyzed changes in C and N pools in soil and tree biomass at a highly acidified spruce site in the Czech Republic during a 15-year period. Over the same period, C and N pools in the Oa horizon declined by 116 g C and 4.2 g N m<sup>-2</sup> yr<sup>-1</sup>, a total decrease of 47% and 42%, respectively. These profound changes in ecosystem biogeochemistry appear to be the result of suppressed decomposition, and consequent organic matter accumulation, during the peak of acidification, followed by the re-mobilisation of this pool as S deposition has declined. Our results suggest that S deposition has the potential to greatly alter the ecosystem C and N cycles. Whilst the impact of N deposition on forest C sequestration has received considerable attention in recent years, the potential role of S deposition is often overlooked. Our results suggest that C flux studies, soil resurveys, forest growth monitoring and other assessments of the C cycle located in areas of (currently or previously) elevated S deposition must take this into account when attempting to attribute observed change. In addition, our findings indicate that acidity changes in forest ecosystems have a strong confounding influence on ecosystem sensitivity to eutrophication, with acidification accelerating N saturation, and recovery potentially resulting in reversion to N limitation. Again, studies of ecosystem N dynamics should take account of this interaction to ensure that observed changes in N status are correctly interpreted. The paper has been cited 22x by WOS and 23x by SCOPUS.

#### Odůvodnění panelu:

Práce hodnocena jako důležitá analýza změn cyklů uhlíku a dusíku v lesním ekosystému v závislosti na změnách v depozici síry. Jedná se o podrobnou studii s dobrým citačním ohlasem mající potenciální vliv na management lesa.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

**Critical assessment of extraction methods for the simultaneous determination of pesticide residues and mycotoxins in fruits, cereals, spices and oil seeds employing ultra-high performance liquid chromatography-tandem mass spectrometry**

**obor: GM**

**Identifikátor: RIV/60461373:22330/12:43894725!RIV13-MSM-22330**

**Id: 85**

Předkladatel výsledku do Pilíře II.:

**IČO: 60461373 Vysoká škola chemicko-technologická v Praze, Fakulta potravinářské a biochemické technologie**

Podíl předkladatele na výsledku: **100 %**

### **Popis podílu předkladatele:**

(100%) This work was done entirely at UCT Prague by its members, there was no contribution of other parties.

### **Odůvodnění předkladatele:**

To protect effectively consumers' health, a wide range of residues, contaminants and/or natural toxins, potentially co-occurring as a chemical 'cocktail' in food crops and products thereof, should be reliably controlled on a routine-basis. In our study, we have addressed a critical issues in a current laboratory practices that mainly suffer from a rather limited sample throughput - each group of chemicals being analysed separately, by specific test thus relatively high cost of analyses. In planning our experiments, we have considered the fact, that many low molecular weight hazardous compounds mentioned above, although represent various origin classes, do not fairly differ in their physicochemical properties, thus their measurement might be integrated into a single analytical procedure. We have developed and validated a novel, fast multi-analyte method based on tandem mass spectrometry (LC-MS/MS) enabling to determine hundreds of pesticide residues and tens of mycotoxins in various complex food matrices simultaneously. The main focus was placed on an achieving good accuracy and other performance characteristics of generated data, as required by EU regulation. The correct performing of extraction step was shown to be a critical one for avoiding biased results.

### **Odůvodnění panelu:**

Významná práce srovnávající extrakční metody pro stanovení reziduí pesticidů a mykotoxinů v různých typech potravin. Vědecký článek s vysokým citačním ohlasem a aplikačním potenciálem v mezinárodním měřítku.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Challenging applications offered by direct analysis in real time (DART) in food-quality and safety analysis

obor: GM

Identifikátor: **RIV/60461373:22330/11:43892751!RIV12-MSM-22330**

Id: 86

Předkladatel výsledku do Pilíře II.:

**IČO: 60461373 Vysoká škola chemicko-technologická v Praze, Fakulta potravinářské a biochemické technologie**

Podíl předkladatele na výsledku: **100 %**

#### **Popis podílu předkladatele:**

(100%) This work was done entirely at UCT Prague by its members, there was no contribution of other parties.

#### **Odůvodnění předkladatele:**

The research concerned with application potential of novel advanced instrumental techniques, even before their full introduction to the market, represents one of challenges to become a leader in a respective field of science, and, as a consequence, establish intensive international cooperation, both with experts from vendor companies and other research groups representing academia. In particular case, we were offered by US Ionsense Company, to test the suitability of ambient mass spectrometry (AMS) employing Direct Analysis in Real Time (DART) ionization source in food quality, authenticity and safety control. In our work, we have documented that when coupled with high resolution mass spectrometry (HRMS), DART enables with a minimal sample pre-treatment its rapid screening, employing either targeted or non-targeted mode. In this way, information on various sample attributes including confirmation of particular analytes presence or documentation of sample authenticity can be obtained. Another interesting application is or fingerprinting of metabolome components which may rapidly provide a number of important information on living organisms. Based on the high credit of research outcomes achieved presented in our pioneering research, we were invited by prestigious journal Trends in Analytical Chemistry, TRAC to summarize our experience in this review.

#### **Odůvodnění panelu:**

Práce má charakter vědeckého článku, publikovaného ve vysoce prestižním časopise formou vyžádaného review, s vysokým citačním ohlasem, přinášející nové metodické přístupy do hodnocení potravin.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Proteome Analysis of Cold Response in Spring and Winter Wheat (*Triticum aestivum*) Crowns Reveals Similarities in Stress Adaptation and Differences in Regulatory Processes between the Growth Habits

obor: GE

Identifikátor: **RIV/00027006: /13:00002710!RIV14-MZE-00027006**

Id: 87

Předkladatel výsledku do Pilíře II.:

**IČO: 27006 Výzkumný ústav rostlinné výroby, v.v.i.**

Podíl předkladatele na výsledku: **80 %**

#### Popis podílu předkladatele:

80 % - Dr. K. Kosová in conjunction with her colleagues from the Crop Research Institute has carried out the whole proteomic experiment including the experiment design (experiment planning including plant material, cold treatment and sampling dates), culti

#### Odůvodnění předkladatele:

The original research paper represents the first proteomic study focused on comparison of proteomic and physiological response to cold (4 °C) between spring and winter growth habits in bread wheat. Utilization of two-dimensional differential gel electrophoresis (2D-DIGE) has enabled us to select protein spots of interest revealing significant quantitative differences between spring and winter growth habits. The originality of the paper lies in multidimensional statistical analysis of the proteomic data together with physiological data including acquired frost tolerance determined as LT50 values and levels of selected phytohormones (abscisic acid, cytokinins, auxin, bioactive gibberellins, jasmonic acid, salicylic acid, ethylene precursor aminocyclopropanecarboxylic acid) published in previous study (Kosová et al. 2012 Journal of Plant Physiology 169(6):567-576) carried out on the same plant materials. The joint cluster analysis of both differentially abundant proteins and phytohormones in the same plant materials has enabled us to provide complex characterization of both the similarities and the differences in cold response mechanisms between spring and winter growth habits of bread wheat. The paper represents a final output of a postdoctoral research project of Dr. Kosová no. P501/11/P637 financed by the Czech Science Foundation and also presents results of a long-term international cooperation between the Crop Research Institute and the Proteomic Platform within the Centre de Recherche Public, Gabriel Lippmann in Luxembourg (Dr. Renault) - both laboratories have cooperated in the COST Action FA0603 Plant Proteomics in Europe and since then have become members of the International Plant Proteomics Organization (INPPO). For her research in plant proteomics, Dr. Kosová from the Crop Research Institute received in 2014 an honorary award „For Women in Science“ organised by the L'Oréal Foundation, Academy of Sciences of the Czech Republic and UNESCO.

#### Odůvodnění panelu:

Jedná se o vědeckou práci zaměřenou na dynamiku fytohormonů vybraných kultivarů pšenice s cílem zvýšení jejich odolnosti vůči chladu. Práce publikovaná v kvalitním vědeckém časopise s dobrou citovaností, oceněná cenou v soutěži „For Women in Science“.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Odrůda ozimého kmínu kořenného APRIM

obor: GE

Identifikátor: RIV/26784246: /14:#0000915!RIV15-MZE-26784246

Id: 88

Předkladatel výsledku do Pilíře II.:

**IČO: 26784246 Agritec Plant Research s.r.o.**

Podíl předkladatele na výsledku: **100 %**

#### **Popis podílu předkladatele:**

Agritec Plant Research s.r.o. created 100 percent.

#### **Odůvodnění předkladatele:**

APRIM is the first registered variety of winter Caraway (*Carum carvi* L.) in the Czech Republic. It is medium early variety of winter type intended for seed production for food purposes. Medium plants are less resistant to moderate resistant lodging before harvesting. This variety is resistant to moderately resistant shedding of achenes, moderately resistant to resistant against attacks of *Mycocentrospora acerina*. This variety is resistant to winter killing. Due to the shorter growing period is *Acceria Carvi* attack rare. Seed yield is high to moderately high. Essential oil content in the seed is low. The proportion of carvone is standard. In first year after registration we sold 16 tons (app. 1500 ha) of certified seeds in CR, Lithuania, Estonia, Slovakia.

#### **Odůvodnění panelu:**

Nově vyšlechtěná odrůda kmínu, která získala řadu ocenění. Je odolná vůči mnoha škůdcům díky přezimování, má dobrý výnosový potenciál a charakteristické aromatické vlastnosti, komerčně úspěšná v ČR i zahraničí.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

**Authentication of milk and milk-based foods by direct analysis in real time ionization-high resolution mass spectrometry (DART-HRMS) technique: A critical assessment**

**obor: GM**

**Identifikátor: RIV/60461373:22330/14:43896665!RIV15-MZE-22330**

Id: 89

Předkladatel výsledku do Pilíře II.:

**IČO: 60461373 Vysoká škola chemicko-technologická v Praze, Fakulta potravinářské a biochemické technologie**

Podíl předkladatele na výsledku: **75 %**

### **Popis podílu předkladatele:**

(75%) This study was initiated at the Department of Food Analysis and Nutrition at UCT Prague and the major part of work was done at this department by Hrbek V., Václavík L. and Hajšlová J. They were responsible for whole project research plan, conducting

### **Odůvodnění předkladatele:**

Food authenticity is one of the key food quality parameters. In addition to economic losses, consumers' deception and, in some cases, even threat for their health are problems that have to be prevented. Following the introduction of a novel technique, ambient mass spectrometry (AMS) employing Direct Analysis in Real Time (DART) ion source, for rapid food quality screening, our research team has established a wide range of collaborations focused on solutions of real life problems including food authentication. Based on dairy industry experts' request for help, we have initiated the project aimed at rapid and easy identification of fraud on some of their products. We have developed a new strategy enabling recognition of addition of a (cheaper) cow milk to a (more expensive) sheep / goat milk. Thanks to differences in triacyl glycerols profiles (mass spectra obtained by DART-HRMS), we were able to identify milk origin. Similarly, this technique was effectively employed for analysis of non-polar fraction extracted from tested samples, it allowed a reliable detection of the vegetable oils (rapeseed, sunflower, and soybean) presence when added to soft cheese at amount as low as 1% (w/w). Employing advanced chemo metric data treatment marker ions (compounds) can be identified.

### **Odůvodnění panelu:**

Práce hodnocena jako vědecky hodnotná a prakticky využitelná studie zabývající se důležitou oblastí autenticity mléka a sýrů, využívající vědecký metodický postup s aplikací moderních analytických metod.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### History of myxozoan character evolution on the basis of rDNA and EF-2 data.

obor: GJ

Identifikátor: **RIV/60077344: /10:00350366!RIV11-AV0-60077344**

Id: 90

Předkladatel výsledku do Pilíře II.:

**IČO: 60077344 Biologické centrum AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **75 %**

#### **Popis podílu předkladatele:**

Completely done by the two team members.

#### **Odůvodnění předkladatele:**

To understand the great diversity of myxosporean species we need to explore the history of myxospore evolution. We performed analyses of character evolution of 20 traits based on three molecular markers to uncover the main evolutionary changes in the myxosporean spore morphology. We disclose ancestral morphotypes and point out several characters that are congruent with the phylogeny and determined that the discrepancy between phylogeny and taxonomy is due to an extreme myxospore plasticity.

#### **Odůvodnění panelu:**

Práce hodnocena jako hodnotná fylogenetická a evoluční studie, publikovaná ve vědeckém časopise a s dobrým citačním ohlasem. Příspěvek se týká metod izolace DNA, PCR amplifikace, klonování a sekvenování DNA. Popisuje rodové morfotypy a ukazuje jejich vývoj v průběhu roku.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

**Spermatozoa of tapeworms (Platyhelminthes, Eucestoda):  
advances in ultrastructural and phylogenetic studies.**

**obor: GJ**

**Identifikátor: RIV/60077344: /10:00345696!RIV11-AV0-60077344**

**Id: 91**

Předkladatel výsledku do Pilíře II.:

**IČO: 60077344 Biologické centrum AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **85,7 %**

### **Popis podílu předkladatele:**

majority (concept, search of data, phylogenetic analyses, manuscript writing); JM: comments on advanced draft of the manuscript.

### **Odůvodnění předkladatele:**

Spermatozoa of flatworms show a degree of variation that allows their use as a source of phylogenetic characters. Besides several unique adaptations of cestodes to parasitism, they differ markedly from other flatworms in that their spermatozoa lack mitochondria. In this review, a new classification of cestode spermatozoa is proposed, a key to their identification is given and new spermatological characters are discussed. A phylogenetic tree inferred from spermatological characters is provided.

### **Odůvodnění panelu:**

Kvalitní přehledová práce, shrnující poznatky o vývoji tasemnic, hodnocená jako zásadní práce v oboru s vysokou citovaností, poskytující v daném oboru významné informace.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A Šlechtitelské osvědčení 58/2013 lnička setá ZUZANA

obor: GE

Identifikátor: RIV/26296080: /13:#0000673!RIV14-MZE-26296080

Id: 92

Předkladatel výsledku do Pilíře II.:

**IČO: 26296080 Zemědělský výzkum, spol. s r.o.**

Podíl předkladatele na výsledku: **50 %**

### **Popis podílu předkladatele:**

Full investment to research and breeding work.

### **Odůvodnění předkladatele:**

The development of Cultivar Zuzana (*Camelina sativa* L. Crantz) was finalized 2013 by team of researchers from Agriculture Research Ltd. Cultivar Zuzana is the first variety of this species on the Czech varietal list. This variety has been protected by the Czech law (n. 408/2000) since 2013, it received a breeding certificate No 58/2013 in 2013. This variety is suitable for intercropping systems as well as for industry oil production. Cultivar Zuzana aroused interest almost immediately of both business and experts. Zuzana was awarded at the International Agricultural Fair and received Golden Spike Price in 2014. First 6 tons (estimated acreage 600 hectares) of seeds were exported in the same year, 9 tons (estimated acreage 900 hectares) were exported in 2015. Agriculture Research, Ltd. managed to conclude a royalty agreement concerning 6 hectares with a German partner in 2015. The estimated demand indicates that more than 50 hectares will be seeded by Cultivar Zuzana in 2016. Cultivar Zuzana has proved to be a successful example of R&D result as it was immediately transferred, begun bringing revenues and therefore will provide capitalization of both public and private investment.

### **Odůvodnění panelu:**

Registrace odrůdy lničky seté jarní cv. Zuzana v r. 2013; oceněna Zlatým Klasem na Zemi živitelce 2014. Odrůda je předmětem exportu a dobrým příkladem komercializace/finalizace výzkumu a zhodnocení veřejných i privátních zdrojů financí.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Antifungal efficacy of some natural phenolic compounds against significant pathogenic and toxinogenic fungi

obor: GF

Identifikátor: RIV/00027006: /13:00002627!RIV14-MSM-00027006

Id: 93

Předkladatel výsledku do Pilíře II.:

**IČO: 27006 Výzkumný ústav rostlinné výroby, v.v.i.**

Podíl předkladatele na výsledku: **100 %**

#### Popis podílu předkladatele:

1

#### Odůvodnění předkladatele:

Published in October 2013 in Chemosphere, the paper has become highly cited during few years. It could be considered almost like a pilot study, mainly thanks to the content of brand new and consistent information describing an antifungal effect of the great number of conveniently selected natural compounds. The important feature of this publication is an idea to measure and compare the level of important phenolic compounds inhibitory effect on the complex of filamentous fungi significant in agriculture and medicine, which was not described in such a combination until now. Antifungal activities on the levels of minimal inhibitory concentrations with confidence intervals were then discussed and elucidated with respect to their different molecular structures. In addition, in terms of food safety, species of the *Fusarium*, *Aspergillus* and *Penicillium* genera are considered the most significant because they produce the great majority of known mycotoxins. They are extremely hazardous to consumers. Raising resistance against commonly used synthetic fungicides have become a critical problem in areas such as agriculture, product storage and food production and even in serious human mycoses treatment. The need for research and development of new alternative antifungal treatment based on natural antifungal substances is obvious. The study brings a brand new knowledge about the extraordinary antifungal efficiency of basic natural compounds, which are often biological active components of e.g. essential oils or crude plant extracts and which are well suited for the development of environmentally-safe botanical fungicides.

#### Odůvodnění panelu:

Práce hodnocena jako kvalitní publikace ve velmi dobrém časopise s vysokou citovaností. Zabývá se perspektivním oborem vlivu fenolických látek na vybrané houbové patogeny.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Distribution of *Mycobacterium avium* subsp *avium* and *M. a. hominissuis* in artificially infected pigs studied by culture and IS901 and IS1245 quantitative real time PCR

obor: GJ

Identifikátor: RIV/00027162: /10:#0000638!RIV11-MZE-00027162

Id: 94

Předkladatel výsledku do Pilíře II.:

**IČO: 27162 Výzkumný ústav veterinárního lékařství, v.v.i.**

Podíl předkladatele na výsledku: **100 %**

#### Popis podílu předkladatele:

Authors designed study, performed all methods and laboratory analyses described in the paper and wrote the manuscript.

#### Odůvodnění předkladatele:

*Mycobacterium avium* subsp. *avium* (MAA) and *M. a. hominissuis* (MAH) belong to the *Mycobacterium avium* complex (MAC) and are frequently associated with diseases in animals and humans. Experimental infection of pigs by these two mycobacterial subspecies was performed with the aim to develop a system for rapid and accurate real time quantitative PCR (qPCR) identification and quantification of MAA (etiological agents of avian tuberculosis) and MAH (etiological agents of atypical mycobacterioses) from different samples. In parallel with this aim, the DNA isolation from tissue was standardized for the purposes of its usage in the developed triplex qPCR. Finally, the study was aimed at assessing the possible risk of mycobacterial infection in humans through consumption of raw or not properly cooked meat originating from infected pigs. Although impact factor based on WOS is “only” 2.8, journal *Veterinary Microbiology* has a high reputation in the field and the paper has been cited 40-times.

#### Odůvodnění panelu:

Práce publikovaná v kvalitním vědeckém časopise v vysokou citovaností. Velmi významné řešení problematiky přenášení chorob ze zvířete na člověka. Byl nalezen systém pro detekci v různých typech tkání a krve.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

**Zlata**

**obor: GE**

Identifikátor: **RIV/60109807: /14:#0000296!RIV15-MZE-60109807**

Id: 95

Předkladatel výsledku do Pilíře II.:

**IČO: 60109807 Výzkumný ústav bramborářský Havlíčkův Brod, s.r.o.**

Podíl předkladatele na výsledku: **100 %**

### **Popis podílu předkladatele:**

Description of the submitter shareThe result was obtained based on the realization of the research project NAZV QH82075 Utilization of Jerusalem artichoke in the agrarian sector, which was realized by Potato Research Institute Havlíčkův Brod, Ltd. during

### **Odůvodnění předkladatele:**

Jerusalem artichoke is an alternative crop with a broad application potential. Due to undemanding growing, the possibility of multi-year growing on the same plot and low energetic inputs Jerusalem artichoke is ranked among crops suitable for ethanol, biogas or heat production. In addition, it could be applied in pharmaceutical industry and fodder industry (as an important component of fodder mixtures for farm and exotic animals bred in captivity, what are especially animals in zoo and from specialized breeding). Its utilization in ecological farming is also significant (resistant plant with ameliorative effects during soil bioremediation).Jerusalem artichoke differs from other crop species with its unique saccharide system based on fructose and its polymers: fructooligosaccharides and inulin. It contains biologically-active substances, mineral substances – iron, silicon, zinc, magnesium, potassium, phosphorus and calcium, B and C- group vitamins, pectin substances, fiber, organic acids and amino acids. The significance of Jerusalem artichoke consists in the precaution and supporting therapy of diabetes, obesity, metabolic disorders, high cholesterol and especially body detoxification. Further, it regulates blood pressure and digestive system, protects liver and kidneys etc.The significance of the variety consists in the fact that in the Czech Republic no other Jerusalem artichoke varieties protected by law existed before 2014.The variety Zlata is a unique one. Comparing ten clones of Jerusalem artichoke it reached the highest tuber yield on average of the years 2008-2012. >From all other grown varieties and clones it also differs with flower formation already in summer months under our conditions. Flowering is regular and rich. Its importance could be also seen in the possibility of its using as a decorative and a melliferous crop.Description:Variety Zlata has a very high onset of tubers and reaches a high tuber yield – 48 t/ha on average of years. Tubers are especially usable for fodder and energetic use; with regard to the shape tubers are less suitable for consumer purposes. Aboveground part is exceptional due to its decorative appearance; it is a variety suitable for decorative purposes. In addition, flowers are sought after by bees, it is a melliferous variety. Despite of low yield, foliage could be used for fodder and energetic purposes. The foliage is low, with mean height of 1,8-2,0 m. Flowering is rich, already in summer months (in the latter half of July). It forms a really high number of flowers. Vegetation is often ended before foliage freezing.

### **Odůvodnění panelu:**

Odrůda topinamburu, která získala šlechtitelské osvědčení a cenu Zlatý klas. Je důležitou potravinou z hlediska dietologického, využitelná pro rekonvalescenty a staré osoby a je mimořádně vhodná pro děti, její přínos v potravinářství je nesporný.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Atlas of plutonic rocks and orthogneisses in the Bohemian Massif

obor: DB

Identifikátor: RIV/00025798: /10:00000261!RIV11-MZP-00025798

Id: 97

Předkladatel výsledku do Pilíře II.:

**IČO: 25798 Česká geologická služba**

Podíl předkladatele na výsledku: **100 %**

#### **Popis podílu předkladatele:**

100 % All information and data were compiled and evaluated by the CGS scientists. Tomáš Jarchovský and Govind S. Rajpoot have been former staff members of the CGS and therefore we claim 100% shares of the book

#### **Odůvodnění předkladatele:**

The Atlas of Plutonic Rocks and Orthogneisses in the Bohemian Massif represents a structured monograph on the research status of plutonic and orthogneiss bodies primarily in the Czech part of the Bohemian Massif for the follow-up research, and also for wider geological public, students and teaching at universities. The manuscript is divided into six volumes including the introduction according to the principal tectonostratigraphic units of the Bohemian Massif (Bohemicum, Moldanubicum, Saxothuringicum, Lugicum and Moravo-Silesicum-Brunovistulicum). In the Introduction are summarized regional characteristics of the plutonic intrusions from a point of view of their composition, age, 3-D shape, zonation, metallogeny and spatial distribution. The territorial volumes comprise structured geological parameters of the individual plutonic bodies and orthogneisses located within boundaries of the individual tectonostratigraphic units. The review on the individual plutons is organized as a database with a unified structure, giving basic characteristics on regional position, rock types, size and shape, age according to methods of the isotopic dating, lithology of country rocks, contact aureole, zonation, mineralization, heat production and principal references. Dendrograms represent hierarchic infrastructure of the magmatic bodies to show relationship among their individual members, phases and facies. They are accompanied by geological maps, classification diagrams and tables of the chemical composition based on 5000 chemical analyses including trace elements mostly from literature. They are summarized in tables of individual magmatic bodies showing their statistic parameters (mean, maximal, minimal content, quartiles of major oxides) and principal geochemical parameters (defining petrologic classifications) according to Chappell and White (1974), Ishihara (1977), Debon and Le Fort (1983a,b), Middlemost (1994), De La Roche (1980), Cox et al. (1979), Peccerillo and Taylor (1976). These parameters have been used for petrologic classification of the individual rock type root names and qualifiers. A list of used references is an integral part of the atlas. Atlas of Plutonic Rocks summarizes recent knowledge on plutonic rocks and orthogneisses and results of their research. This publication was published in English and has been highly appreciated by both domestic and international geoscientific community. The book is also used for teaching purposes at local and foreign universities. More information is available at <http://obchod.geology.cz/zbozi/25705/the-atlas-of-plutonic-rocks-and-orthogneisses-in-the-bohemian-massif/>

#### **Odůvodnění panelu:**

The atlas summarizes extensive and valuable work on the research status of plutonic and orthogneiss rocks that is exceptional among the evaluated results.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Boundaries of mantle–lithosphere domains in the Bohemian Massif as extinct exhumation channels for high-pressure rocks

obor: DC

Identifikátor: **RIV/67985530: /13:00379337!RIV13-AV0-67985530**

Id: 98

Předkladatel výsledku do Pilíře II.:

**IČO: 67985530 Geofyzikální ústav AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **100 %**

#### **Popis podílu předkladatele:**

Both authors are research worker of the Institute of Geophysics of the CAS

#### **Odůvodnění předkladatele:**

Five domains (microplates) have been recognized by seismic anisotropy in the mantle lithosphere of the Bohemian Massif, each of them bearing a consistent fossil olivine fabric formed before their Variscan assembly. The process consisted of at least three oceanic subductions, each followed by an underthrusting of the continental lithosphere. The findings support the bivergent subduction model of tectonic development of the central part of the BM.

#### **Odůvodnění panelu:**

Structural study of the Bohemian Massif based on the seismic anisotropy that was published in the top journal. It summarizes long-time original research of the authors.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Chemical stabilization of metals and arsenic in contaminated soils using oxides - A review

obor: DK

Identifikátor: **RIV/60460709:41330/13:55305!RIV14-GA0-41330**

Id: 99

Předkladatel výsledku do Pilíře II.:

**IČO: 60460709 Česká zemědělská univerzita v Praze, Fakulta životního prostředí**

Podíl předkladatele na výsledku: **66,6 %**

#### **Popis podílu předkladatele:**

0,666

#### **Odůvodnění předkladatele:**

The use of synthetic oxides and their precursors have been extensively studied for in situ stabilization of metals and arsenic in contaminated soils. This remediation option aims at reducing the available fraction of metal(loid)s, notably in the root zone, and thus lowering the risks associated with their leaching, ecotoxicity, plant uptake and human exposure. This work discusses mechanisms involved in the immobilization process and investigates results from laboratory and field experiments, including the subsequent influence on higher plants and aided phytostabilisation. This paper is the first contribution of this kind and provides important suggestions and strategies for future development of this perspective method, which is proven by the high number of citations.

#### **Odůvodnění panelu:**

Very good methodological article and critical review with many citations, published in a good journal.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Constructed Wetlands for Wastewater Treatment: Five Decades of Experience

obor: DJ

Identifikátor: RIV/25173154: /11:#0000240!RIV12-MSM-25173154

Id: 100

Předkladatel výsledku do Pilíře II.:

**IČO: 25173154 ENKI, o.p.s.**

Podíl předkladatele na výsledku: **20 %**

#### **Popis podílu předkladatele:**

The paper summarises 5 years of experiences with various constructed wetlands used for waste water treatment. Jan Vymazal used to work with ENKI, o.p.s. and later moved to the University of Life Sciences (Faculty of environment) in Prague.

#### **Odůvodnění předkladatele:**

The paper describes the development of constructed treatment wetlands technology during the last five decades across the world and special attention was paid to the specific features in all continents. The paper summarizes the use of various types of constructed wetlands for municipal, industrial and agricultural wastewaters as well as for mine drainage waters and landfill leachate. The paper also evaluates the applicability of constructed wetlands for particular wastewaters, various design models and treatment efficiency with respect to major pollutants. Also, the current pitfalls and problems of this technology are described together with present efforts aimed at treatment efficiency improvement.

#### **Odůvodnění panelu:**

"A" in previous year evaluation

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Discerning connectivity from dynamics in climate networks

obor: DG

Identifikátor: RIV/67985807: /11:00365726!RIV12-AV0-67985807

Id: 101

Předkladatel výsledku do Pilíře II.:

**IČO: 67985807 Ústav informatiky AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **100 %**

#### **Popis podílu předkladatele:**

The entire work has been done by the ICS CAS (the Institute of Computer Science of the Czech Academy of Sciences) team.

#### **Odůvodnění předkladatele:**

The study answers principal questions of constructing climate networks which are used as a mathematical abstraction of interactions of many intertwined physical processes influencing atmospheric dynamics and climate evolution. It is shown that an informed choice of a connectivity measure and properly inferred network links build climate networks reflecting climate phenomena such as El Nino, North Atlantic Oscillation, or external influences such as the variability of the solar activity.

#### **Odůvodnění panelu:**

The disclosed bias due to dynamical memory in climate markedly changed the pattern of teleconnections and allowed to observe previously hidden phenomena in climatology. Well cited paper.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Diversity of Rare Earth Deposits: The Key Example of China

obor: DB

Identifikátor: **RIV/62156489:43410/12:00191173!RIV13-MSM-43410**

Id: 102

Předkladatel výsledku do Pilíře II.:

**IČO: 62156489 Mendelova univerzita v Brně, Lesnická a dřevařská fakulta**

Podíl předkladatele na výsledku: **50 %**

#### **Popis podílu předkladatele:**

50 % - Jindrich Kynicky was invited as a world leader in REE deposit research into thematic issue of the Elements. Jindrich Kynicky prepared all the data and its draft interpretation and discussion. Jindrich Kynicky with his coauthors completed and finis

#### **Odůvodnění předkladatele:**

This paper assesses constraints the evolution of unique Rare Earth element (REE) mineralization and large deposits in China. It brings new information about the largest known REE deposits in the world and provide a unique perspective on both mantle dynamics and superlarge REE deposit evolution. Understanding evolution of economic REE deposits evolution is essential for a possible prediction and discovery for any next superlarge deposit (still not known out of China). Economic deposits of REE are particularly topical at the moment because the world has woken up to the fact that China dominates the market for elements (REE) that are used in many high technology and sensitive applications. There is therefore likely to be interest from readers in a paper dealing with behavior of REE in the rare earth deposits. This paper excellency is supported also by editors of Elements because this paper is the 3rd most cited in Elements journal history and whole thematic issue ""Rare Earth elements"" was 3 times awarded by readers as the best thematic issue in Elements with average 15 citations per paper and year.

#### **Odůvodnění panelu:**

Paper deals with REE deposit sites in China. Potential landmark publication on these important CRM type deposits. Very well cited in a highly ranked journal.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Drought evolution at various time scales in the lowland regions and their impact on vegetable crops in the Czech Republic

obor: DG

Identifikátor: **RIV/60460709:41210/12:56195!RIV13-MSM-41210**

Id: 103

Předkladatel výsledku do Pilíře II.:

**IČO: 60460709 Česká zemědělská univerzita v Praze, Fakulta agrobiologie, potravinových a přírodních zdrojů**

Podíl předkladatele na výsledku: **80 %**

#### Popis podílu předkladatele:

Application of new proposed methodology, statistical processed data, run of modelling data, know-how graphical interpretation of results, written paper, submitted process, revision of manuscript (by three reviewers) were done by Department of Agroecology

#### Odůvodnění předkladatele:

The paper is primarily focused on studying the exposure of vegetable crops to severe drought (wet) conditions. The response of field-grown vegetables is strongly coupled to the timing of adverse events, the sensitivity of the growth stage of the impacted crop and the management actions that are taken. Our study integrated a newly available historical yield dataset for all highly-marketable vegetables and daily secular climate dataset in the Czech Republic (CR). In addition, two multi-scalar drought indices, the Standardized Precipitation Index (SPI) and the Standardized Precipitation-Evapotranspiration Index (SPEI) were used to study secular drought evolution from 1901 to 2010 in the lowland regions of the CR. New aspects and additional results compared to other studies related to this issue in the CR have highlighted the links between vegetable production and multiscalar drought/wet episodes, and between multiscalar drought indices and soil moisture based on observed daily data. Also, a new multi-scalar drought index (SPEI) was tested for the first time in identifying drought impact in the CR. The multi-scalar drought approach is concerned with the time lag between the onset of water shortage and the identification of its effects on growth. Changes in the vegetable yield due to extreme drought (wet) have received less attention than yield losses of other agricultural crops, perhaps because they are more difficult to detect. Our results contribute to a growing number of studies on the impacts of droughts on vegetable yields using modern statistical models. Few examples of such studies exist, especially for vegetables in central European climate conditions. Our findings should be useful to better understand the productivity of vegetables with regard to climate change, including the increasing drought frequency, and to adopt appropriate strategies to mitigate the effects of drought on the quality of vegetable crops with minimal losses for farmers. This research was published in prestigious journal (Agricultural and Forest Meteorology, 5-Year Impact Factor: 4.118) due to its contribution to multiscalar drought theory in the agro-climatology field, practice in the agriculture field, as well as the uniqueness/originality of its ideas, and the quality of its arguments. This journal is ranked as interdisciplinary in the fields of Agronomy (rank 6/81), Forestry (rank 1/65), Meteorology & Atmospheric science (9/77).

#### Odůvodnění panelu:

Innovative index and clearly explained the usage and importance. Good journal and high citations.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Factors controlling the export of nitrogen from agricultural land in a large central European catchment during 1900–2010.

obor: DJ

Identifikátor: RIV/60077344: /13:00394494!RIV14-AV0-60077344

Id: 104

Předkladatel výsledku do Pilíře II.:

**IČO: 60077344 Biologické centrum AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **80 %**

#### Popis podílu předkladatele:

The study evaluates data on >50-year-long monitoring of the Vltava River, performed regularly in 3-week intervals. Consequently, it is based on an effort of numerous scientists and technicians belonging to two generations of hydrobiologists employed by In

#### Odůvodnění předkladatele:

This article is a representative of a series of our publications dealing with model analyses of element cycling in a large heterogeneous catchment, with complex land use. A newly developed method of balance analysis and modelling of pollutants in the catchment runoff allowed quantifying how natural and anthropogenic sources contributed to concentrations of nitrogen (N), sulphur and chloride compounds in the Vltava River, the Czech Republic, during 1900-2010. In the case of N, we quantified how and why its export from agricultural land reflected general socio-economic shifts from a market to planned economy in the early 1950s and back from a planned to a market economy in the 1990s, typical for the whole central European post-communist region. For example, the latter change resulted in an abrupt 50% reduction in N fertilization rates at otherwise relatively stable land-use practices. This large-scale “experiment” enabled disentangling and quantification of individual effects of N fertilization and drainage on N leaching. Our model is based on a two-step regression between annual N export and three independent variables: (i) annual average discharge in the first step and (ii) net anthropogenic nitrogen inputs (NANI) and proportion of drained agricultural land in the second step. Results show that N export was more related to mineralization of soil organic N pools due to drainage and tillage than to external N sources, i.e. NANI. The model, together with other reconstructed N sources in the catchment (leaching from forests, waste waters, and atmospheric deposition) and extrapolated back to 1900, explained 77% of the observed variability in N concentrations in the Vltava river during the 1900–2010 period.

#### Odůvodnění panelu:

Environmental chemistry paper focused on novel explanations of long-term export of nitrate in Czech surface waters published in a top journal, cited 16 times since 2013.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Multimodal Action and Selective Toxicity of Zerovalent Iron Nanoparticles against Cyanobacteria

obor: DJ

Identifikátor: **RIV/61989592:15310/12:33118831!RIV13-MSM-15310**

Id: 105

Předkladatel výsledku do Pilíře II.:

**IČO: 67985939 Botanický ústav AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **80 %**

#### **Popis podílu předkladatele:**

80 %. Prof. Maršálek is the first author of the published paper and head of department, where 80 % of all experimental work was realised. Also the text of the paper was prepared in the Institute of Botany - 80%. The partner - Palacky University - prepared

#### **Odůvodnění předkladatele:**

Cyanobacterial bloom formation is a worldwide problem. In this study we suggested a brand new method for blue-green development control. The method utilizes several different modes of action of NZVI including prevention of bloom development as well as destruction of cyanobacterial cells. At the end of the reaction process the environmentally friendly form of iron  $Fe^{3+}$ , which is naturally wide-spread, remains in the ecosystem. That is why the process is accepted as the „green technology“. The article was published in a very good journal (ranks 3 of 47 in JCR® Category ENGINEERING, ENVIRONMENTAL and 10 of 223 in ENVIRONMENTAL SCIENCES). Since last evaluation in 2014 the number of citations has increased significantly.

#### **Odůvodnění panelu:**

It is shown that treatment of water with nanoparticles prevents formation of dangerous cyanobacteria. Result important both for science and practical application.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Nomenclature of the tourmaline-supergroup minerals

obor: DB

Identifikátor: **RIV/00216224:14310/11:00050552!RIV12-GA0-14310**

Id: 106

Předkladatel výsledku do Pilíře II.:

**IČO: 216224 Masarykova univerzita, Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **20 %**

#### **Popis podílu předkladatele:**

20%Nomenclature of rock-forming mineral groups is highly respected task restricted only to top-scientists. These nomenclatures are grounded on perfect knowledge of crystal structure, variations in chemistry and geological environment and are the base for

#### **Odůvodnění předkladatele:**

Highly Cited Paper - This article is in the top 1% of most highly cited publications in the discipline (Web of Science- Essential Science Indicators) Times Cited: 100 (Web of Science)Nomenclature of rock-forming mineral groups is highly respected task restricted only to top-scientists. These nomenclatures are grounded on perfect knowledge of crystal structure, variations in chemistry and geological environment and are the base for further studies in our case for the tourmaline supergroup.

#### **Odůvodnění panelu:**

The result of international subcommittee on tourmaline led by Czech scientist. Very high citation rate.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Progress in observations and simulations of global change in the upper atmosphere

obor: DG

Identifikátor: RIV/68378289: /11:00359456!RIV12-AV0-68378289

Id: 107

Předkladatel výsledku do Pilíře II.:

**IČO: 68378289 Ústav fyziky atmosféry AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **20 %**

#### **Popis podílu předkladatele:**

Contribution of J. Lastovicka is 20%. Out of 7 sections he wrote sections 2 and 5.

#### **Odůvodnění předkladatele:**

The paper describes progress reached in investigations of long-term trends/global climate change in the upper atmosphere and ionosphere. It presents the state-of-the-art as in the end of 2010. Observational and model studies confirmed that in the past several decades, global cooling occurred in the mesosphere and thermosphere; the cooling and contraction of the upper atmosphere (decrease of thermospheric density) lowered the ionosphere and increased electron density in the E and F1 regions. Trends of other parameters, including the ionospheric F2 region, polar mesospheric clouds, and mesopause wave activity, were more controversial. The role of other, non-CO2 trend drivers, began to emerge from various partly controversial results.

#### **Odůvodnění panelu:**

Atmospheric sciences paper focused on global change was generated in US-Czech cooperation. Highly cited paper published in a respected geophysical journal.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Stability and inhibition of anaerobic processes caused by insufficiency or excess of ammonia nitrogen

obor: DJ

Identifikátor: **RIV/60461373:22320/12:43892033!RIV14-MSM-22320**

Id: 108

Předkladatel výsledku do Pilíře II.:

**IČO: 60461373 Vysoká škola chemicko-technologická v Praze, Fakulta technologie ochrany prostředí**

Podíl předkladatele na výsledku: **100 %**

#### **Popis podílu předkladatele:**

(100%) The entire result was created by researcher of the result submitter.

#### **Odůvodnění předkladatele:**

Ammonia nitrogen has a major impact on the process of anaerobic fermentation. It is one of the essential nutrients, attend the protolytic equilibria in the medium and can have both positive and negative effects on the process of methanization. Plenty of studies have focused on the role of ammonia in the fermentation, but the vast majority are concerned with its inhibitory effects. The uniqueness of this work lies in finding the optimal concentration of ammonia nitrogen for the safe conduct of methanization and a detailed description of its effect on the neutralization capacity as an essential parameter describing the process stability. Threshold concentration was found when the ammonia nitrogen does not inhibit but rather stimulate anaerobic bacteria. Furthermore, this optimum concentration was tested on several different inocula demonstrating the variability of microorganisms depending on the origin and the operating conditions. Publishing in a prestigious journal Applied Microbiology Biotechnology above, it was also shown that although many studies focused on a similar topic so far, with the smart choice of innovative and critical approach to the issue with the original conclusions can be achieved. Quality and benefits demonstrated by the publication acclaim in prestigious journals in the field (2012 IF = 3.689), the date of 02/2016 of 55 citations (Google Scholar) and 38 citations (WOS) respectively.

#### **Odůvodnění panelu:**

Very high citation rate. One of the highest rated papers under evaluation. Important both for science and practical implications.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Structural constraints on the evolution of the Central Asian Orogenic Belt in SW Mongolia

obor: DB

Identifikátor: RIV/00025798: /10:00000359!RIV11-MZP-00025798

Id: 109

Předkladatel výsledku do Pilíře II.:

**IČO: 25798 Česká geologická služba**

Podíl předkladatele na výsledku: **45 %**

#### **Popis podílu předkladatele:**

45 % Field data were measured and evaluated mainly by Jérémie Lehmann in the frame of his post-doc at the CGS. Our colleagues, Alfred Kroener and Michel Corsini contributed to acquisition of geochronological data and to certain degree to formulation of co

#### **Odůvodnění předkladatele:**

This paper provides structural characterization of 300 km long transect across the Central Asian Orogenic Belt (CAOB) in southwestern Mongolia, covering the Precambrian Dzabkhan continental domain with overthrust Neoproterozoic ophiolites in the north (Lake Zone), a Silurian-Devonian passive margin association (Gobi-Altai Zone) and oceanic domain (Trans-Altai Zone) in the center, and a continental area (South Gobi Zone) in the south. The tectonic model involves late Cambrian collapse of the thickened Lake Zone continental crust, leading to stretching of the lithosphere and followed by Silurian-Devonian formation of oceanic crust in the Trans-Altai domain. Subsequent emplacement of Devonian-Carboniferous and late Carboniferous magmatic arcs occurred on the Gobi-Altai and South Gobi Zone crusts during E-W shortening. Finally, the entire system was affected by N-S convergence from the Permian to Jurassic, leading to heterogeneous shortening of the orogenic domain. The model best fitting these observations is one of generalized westward drift of the Tuva-Mongol-Dzabkhan-Baydrag ribbon continents during the Silurian-Devonian, associated with westward-subduction of the Mongol-Okhotsk Ocean and sequential growth of syn-convergent magmatic arcs. Back-arc basins opened during this period in the area of the western Paleoasian Ocean. The present-day shape of the CAOB in southern Mongolia was probably formed during Permian to Mesozoic anticlockwise rotation and folding of the Tuva-Mongol-Dzabkhan-Baydrag continental ribbons, combined with a strike-slip (transpressional) reactivation of ancient transform boundaries in the Paleoasian oceanic domain. The sequence of tectonic events was tested against published paleomagnetic data, paleogeographic reconstructions and tectonic models, leading to a revised model for the accretion of juvenile crust to a continental margin in the CAOB of southern Mongolia.

#### **Odůvodnění panelu:**

Detailed complex highly-cited study in a good journal resulting in a new model.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Structure and stratigraphy of the Tepla-Barrandian Neoproterozoic, Bohemian Massif: A new plate-tectonic reinterpretation

**obor: DB**

**Identifikátor: RIV/00216208:11310/11:10105846!RIV12-MSM-11310**

**Id: 110**

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **83 %**

#### **Popis podílu předkladatele:**

83% |Charles University: 83%

#### **Odůvodnění předkladatele:**

"The subdivision of the TBU Neoproterozoic into formal lithostratigraphic units has long been considered as well established, and it has been widely adopted in both scientific papers and geologic maps. In this paper we describe a newly defined lithotectonic zonation and critically evaluate the stratigraphic relations among individual segments of the Teplá-Barrandian Neoproterozoic. Understanding the sedimentary record, stratigraphy, and large-scale structure of the Cadomian basement of the TBU is of prime importance not only for interpreting its geotectonic setting during the Cadomian orogeny but also for global stratigraphic correlations across the Avalonian-Cadomian belt and for the late Neoproterozoic to early Palaeozoic paleogeography of the Gondwana-derived Cadomian terranes."

#### **Odůvodnění panelu:**

State-of-the-art geological paper about part of the Bohemian Massif published it in a top geological journal (impact factor 8.2). Good number of citations.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### The use of hybrid constructed wetlands for wastewater treatment with special attention to nitrogen removal: A review of a recent development

obor: DJ

Identifikátor: **RIV/60460709:41330/13:60550!RIV14-MSM-41330**

Id: 111

Předkladatel výsledku do Pilíře II.:

**IČO: 60460709 Česká zemědělská univerzita v Praze, Fakulta životního prostředí**

Podíl předkladatele na výsledku: **100 %**

#### Popis podílu předkladatele:

1

#### Odůvodnění předkladatele:

An extensive survey of 60 hybrid constructed wetlands from 24 countries reported after 2003 revealed that hybrid constructed wetlands are primarily used on Europe and in Asia while in other continents their use is limited. The most commonly used hybrid system is a VF–HF constructed wetland which has been used for treatment of both sewage and industrial wastewaters. On the other hand, the use of a HF–VF system has been reported only for treatment of municipal sewage. Out of 60 surveyed hybrid systems, 38 have been designed to treat municipal sewage while 22 hybrid systems were designed to treat various industrial and agricultural wastewaters. The more detailed analysis revealed that VF–HF hybrid constructed wetlands are slightly more efficient in ammonia removal than hybrid systems with FWS CWs, HF–VF systems or multistage VF and HF hybrid CWs. All types of hybrid CWs are comparable with single VF CWs in terms of NH<sub>4</sub>-N removal rates. On the other hand, CWs with FWS units remove substantially more total nitrogen as compared to other types of hybrid constructed wetlands. However, all types of hybrid constructed wetlands are more efficient in total nitrogen removal than single HF or VF constructed wetlands. The hybrid systems were developed in the 1960s but their use increased only during the late 1990s and in the 2000s mostly because of more stringent discharge limits for nitrogen and also more complex wastewaters treated in constructed wetlands (CWs). The early hybrid CWs consisted of several stages of vertical flow (VF) followed by several stages of horizontal flow (HF) beds. During the 1990s, HF–VF and VF–HF hybrid systems were introduced. However, to achieve higher removal of total nitrogen or to treat more complex industrial and agricultural wastewaters other types of hybrid constructed wetlands including free water surface (FWS) CWs and multistage CWs have recently been used as well.

#### Odůvodnění panelu:

A critical review paper published in a top water journal focused on constructed wetlands built especially for nitrogen removal. Highly cited publication.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Trends in the Neutral and Ionized Upper Atmosphere

obor: DG

Identifikátor: RIV/68378289: /12:00377996!RIV13-AV0-68378289

Id: 112

Předkladatel výsledku do Pilíře II.:

**IČO: 68378289 Ústav fyziky atmosféry AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **80 %**

#### **Popis podílu předkladatele:**

Contribution of J. Lastovicka is 80%. US co-authors wrote out of 11 sections only section 9 (modeling) and contributed to sections 1 (Introduction) and 11 (Conclusions), and helped to improve English of the paper.

#### **Odůvodnění předkladatele:**

This paper is a comprehensive review of all aspects of long-term trends in the mesosphere, thermosphere and ionosphere. These long-term trends are primarily the upper atmosphere response to global climate change/increasing atmospheric concentration of greenhouse gases but there also some secondary but important other drivers. This all together with the global scenario of upper atmosphere trends and problems in methodology of trend studies are described in the paper, and directions of future investigations are determined. This is the only such a comprehensive review in the world's scientific literature.

#### **Odůvodnění panelu:**

Well done critical review, published in a top journal in the field;`well cited.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Two types of ultrapotassic plutonic rocks in the Bohemian Massif: coeval intrusions at different crustal levels

obor: DD

Identifikátor: **RIV/00216224:14310/10:00043941!RIV11-MSM-14310**

Id: 113

Předkladatel výsledku do Pilíře II.:

**IČO: 216224 Masarykova univerzita, Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **50 %**

#### **Popis podílu předkladatele:**

50%Authors from Masaryk University (Jaromir Leichmann, Jana Kotková - corresponding author) are responsible for the ideas and interpretation. The analyses were done in Geneva University by prof Schaltegger.

#### **Odůvodnění předkladatele:**

The paper brings first reliable geochronological data on two ultrapotassic plutons from eastern moldanubian zone as well as Hf isotopic data confirming major role of crustal component in the evolution of ultrapotassic magmas in general. Lithos is one of the best petrological journals with high impacts in geological sciences. Timing of formation of durbachites represented an unresolved issue in the european geology. We accepted this challenge and used high-precision U-Pb TIMS dating of zircon in two rock types of the magmatic suite, combined with CL-imaging of the internal zircon structure. The paper was cited 30 times during 5 years in highest-quality international journals

#### **Odůvodnění panelu:**

Interesting paper on the Bohemian massif presenting geochronology and Hf-isotope data on plutonic rocks in a well recognized journal. Well cited.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

Use of diagnostic ratios for studying source apportionment and reactivity of ambient polycyclic aromatic hydrocarbons over Central Europe

obor: DI

Identifikátor: **RIV/00216224:14310/11:00051590!RIV12-MZP-14310**

Id: 114

Předkladatel výsledku do Pilíře II.:

**IČO: 216224 Masarykova univerzita, Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **80 %**

### Popis podílu předkladatele:

80%The idea and the know-how very significantly belongs to Masaryk University.

### Odůvodnění předkladatele:

Diagnostic ratios have been applied in numerous studies, however, this work of authors from MU shows that they are mostly used wrongly or mis-interpreted. As such, it has been frequently cited in the Q1 environmental journals including Environmental Science & Technology, the best ranking (ACS) environmental journal.

### Odůvodnění panelu:

This paper is of high interest in environmental chemistry and has been published in one of the top journals of atmospheric sciences. Highly cited.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Sparsity - Graphs, Structures and Algorithms

obor: BA

Identifikátor: **RIV/00216208:11320/12:10126093!RIV13-GA0-11320**

Id: 115

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Matematicko-fyzikální fakulta**

Podíl předkladatele na výsledku: **67 %**

#### **Popis podílu předkladatele:**

67% |Participation of the faculty has been determined in accordance with the methodology

#### **Odůvodnění předkladatele:**

"An excellent research monograph on the boundary of mathematics and theoretical , computer science. It is the first systematic and unifying study of the concept , of sparsity in many different contexts, including not only graph theory but , also computational complexity and mathematical logic. The book grew out of an , invited talk at the ICM (International Congress of Mathematicians) which , already is undoubtedly the most selective mathematical event. It received more , than 40 citations and several very positive book reviews, e.g. by Andre Maximo , for Computing Reviews journal, where it was also included in the list of , Notable Books and Articles of 2012. The monograph also won the Charles , University Monographs Competition."

#### **Odůvodnění panelu:**

An important research monograph on the boundary of mathematics and theoretical computer science which received excellent reviews. It is the first systematic and unifying study of the concept of sparsity in many different contexts, including not only graph theory but also computational complexity and mathematical logic. It received more , than 40 citations and several very positive book reviews, e.g. by Andre Maximo for Computing Reviews journal, where it was also included in the list of Notable Books and Articles of 2012. The monograph also won the Charles University Monographs Competition.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Forcing with random variables and proof complexity

obor: BA

Identifikátor: RIV/67985840: /11:00369674!RIV12-AV0-67985840

Id: 116

Předkladatel výsledku do Pilíře II.:

**IČO: 67985840 Matematický ústav AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **50 %**

#### **Popis podílu předkladatele:**

50% The share of the Institute of Mathematics CAS on this monograph is 50 %. J. Krajíček was employed in the Institute of Mathematics CAS when he wrote the monograph and (in accordance with the data in RIV) the result was supported by the research plan AV

#### **Odůvodnění předkladatele:**

This result has been ranked „A“ in the previous round of evaluation. Since J. Krajíček was employed in the Institute of Mathematics CAS when the monograph was written, the Institute applies for a share according to Section VII.3 of Metodika 2013.

#### **Odůvodnění panelu:**

This result has been ranked „A“ in the previous round of evaluation. Since J. Krajíček was employed in the Institute of Mathematics CAS when the monograph was written, the Institute applies for a share according to Section VII.3 of Methodology 2013.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Logical foundations of mathematics and computational complexity : a gentle introduction

obor: BA

Identifikátor: RIV/67985840: /13:00393022!RIV14-AV0-67985840

Id: 117

Předkladatel výsledku do Pilíře II.:

**IČO: 67985840 Matematický ústav AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **100 %**

#### Popis podílu předkladatele:

100% The share of the Institute of Mathematics CAS on this monograph is 100 %.

#### Odůvodnění předkladatele:

Two major interrelated issues have occupied the attention of mathematicians during the twentieth century: the foundations of mathematics and computational complexity theory. A common basis for both areas is mathematical logic. This book, exactly as indicated by its title, deals with the main philosophical, historical, logical and mathematical aspects of the mentioned issues, in a quite approachable and attractive way. A specific way chosen by the author, respecting a necessary level of mathematical rigor and, at the same time, avoiding high logical formalism, makes it possible to easily read and understand the deepest and the most difficult mathematical concepts having appeared during the last century. Besides the description of central points through definitions, theorems, examples and argumentation, each chapter contains, as a separate part, very useful and valuable mathematical notes, and rich comments regarding historical and philosophical background. It would be hard to find any significant notion of contemporary logic and methodology that has not been processed successfully in the book. According to the MathSciNet reviewer „Pavel Pudlák's new book is a most unusual enterprise: in non-technical, yet by no means imprecise, terms it introduces the reader to the cosmos of mathematical logic, seen in particular through the lens of complexity. The subtitle of the book is 'A gentle introduction', and this describes the approach very well. I do not know of a similar endeavour. Saying that this book fills a gap is an understatement; it is a new kind of mathematical textbook of which we ought to have many more.”

#### Odůvodnění panelu:

An important and excellent book which received excellent reviews. The MathSciNet review says it all: "Saying that this book fills a gap is an understatement; it is a new kind of mathematical textbook of which we ought to have many more." This book deals with the main philosophical, historical, logical and mathematical aspects of the foundations of mathematics, computational complexity theory and mathematical logic in a quite approachable and attractive way. A specific way chosen by the author, respecting a necessary level of mathematical rigor and, at the same time, avoiding high logical formalism, makes it possible to easily read and understand the deepest and the most difficult mathematical concepts having appeared during the last century. Besides the description of central points through definitions, theorems, examples and argumentation, each chapter contains, as a separate part, very useful and valuable mathematical notes, and rich comments regarding historical and philosophical background. It would be hard to find any significant notion of contemporary logic and methodology that has not been processed successfully in the book.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Asymptotic behavior of dynamical systems in fluid mechanics

obor: BA

Identifikátor: RIV/67985840: /10:00349245!RIV11-AV0-67985840

Id: 118

Předkladatel výsledku do Pilíře II.:

**IČO: 67985840 Matematický ústav AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **50 %**

#### **Popis podílu předkladatele:**

50% The share of the Institute of Mathematics CAS on this monograph is 50 %. E. Feireisl is a core employee of the Institute.

#### **Odůvodnění předkladatele:**

This monograph deals with current topics of the mathematical theory of fluid motion. It emphasizes dynamical aspects of the problem and especially the long-time behaviour of solutions. The book contains completely new results about the behaviour of energy complete systems and about the structure of its attractors. The first part of the book is devoted to mathematical models of general compressible viscous and heat conducting fluids. The used mathematical theory is based on the modern notion of weak solutions with immediate applications in numerical analysis. The second part of the book develops the theory of incompressible fluids with complex rheology, where the tensor of viscosity depends on the velocity gradient in a nonlinear way. The book has a potential to attract readers from various disciplines, because it contains examples of practical usage of a number of new nontrivial mathematical approaches. It aims at researches working on partial differential equations, fluid mechanics, as well as for mathematically oriented PhD students. This is an excellent book covering the newest scientific results of great importance. The book is carefully organized and nicely written. With no doubts this book proofs that the authors are excellent followers of the tradition of modern methods of mathematical analysis founded by professors I. Babuška and J. Nečas.

#### **Odůvodnění panelu:**

Czech Academy of Sceinces, Institute of Mathematics. Participation: 0,5

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Asymptotic Behavior of Dynamical Systems in Fluid Mechanics

obor: BA

Identifikátor: **RIV/00216208:11320/10:10033354!RIV11-GA0-11320**

Id: 119

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Matematicko-fyzikální fakulta**

Podíl předkladatele na výsledku: **50 %**

#### **Popis podílu předkladatele:**

50% |Participation of the faculty has been determined in accordance with the methodology

#### **Odůvodnění předkladatele:**

"The book presents a review of recent results in the theory of infinite-dimensional dynamical dissipative systems, in particular with focus on fluid dynamics. It has been published in 2010 as a part of renowned, AIMS Series on Applied Sciences. It has so far received, around 20 citations from the field."

#### **Odůvodnění panelu:**

Charles University. Participation: 0,5, An excellent research monograph on topics in fluid dynamics, written by internationally leading experts in the field. This monograph is dedicated to a hot topic of analytic research with great importance for applications: the long-time behaviour of solutions to model equations for fluids. It is providing the mathematical tools dealing with the asymptotic behaviour in general and for the special systems in particular. Despite the fact that it is mainly oriented to researchers, it also offers chance to excellent young scientist to get a fast, but challenging introduction to analytic research at the front of science.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Krylov Subspace Methods: Principles and Analysis

obor: BA

Identifikátor: RIV/00216208:11320/13:10126674!RIV14-MSM-11320

Id: 120

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Matematicko-fyzikální fakulta**

Podíl předkladatele na výsledku: **67 %**

#### Popis podílu předkladatele:

67% |Participation of the faculty has been determined in accordance with the methodology

#### Odůvodnění předkladatele:

"Methods based on Krylov subspaces are generally regarded as one of the ten most important algorithmic discoveries of the twentieth century. The literature devoted to them is usually focused on the question of how to numerically solve the problem, i.e. is focused algorithmically. Presented monograph is characterized by trying to answer the questions about why the process leads to effective solutions or why it fails. It is therefore focused analytically. The effectiveness of the use of numerical method is usually associated with the deep internal structure of the problem, which may not be known. Finding the structure of the relationships is the basic method of the entire book. It shows a direct connection with difficult questions of the existence of short recurrences, convergence theory and the theory of numerical stability. The book contains results achieved by the authors in past twenty years which already have been recognized by a very significant awards (SIAG/LA Prize, Householder Prize), as well as results which are completely new. The book ends by formulation of fundamental open problems in the field. The significance of the monograph can be witnessed by the eight-page very positive review in the Bulletin of the American Mathematical Society in January 2015, [http://www1.karlin.mff.cuni.cz/~strakos/krylov/Bulletin\\_of\\_the\\_AMS\\_Mark\\_Embree.pdf](http://www1.karlin.mff.cuni.cz/~strakos/krylov/Bulletin_of_the_AMS_Mark_Embree.pdf). Reviewing books on numerical methods in BAMS is very rare."

#### Odůvodnění panelu:

This textbook on the graduate level is very substantial contribution to education and research focussing on the Krylov subspace methods. This method is getting more and more interesting in particular in solving complex systems of differential equations and optimization problems arising in science and technology. The mathematical approach, presented in this book, is highly appreciated, since it is emphasizes the basic concepts and open up a better access to the algorithmic methods. The fact that the authors have a broader perspective and are taking into account the demand and challenges of Computational Sciences is giving this book its special feature

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Deformation theory of algebras and their diagrams

obor: BA

Identifikátor: RIV/00216208:11320/12:10133234!RIV13-GA0-11320

Id: 121

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Matematicko-fyzikální fakulta**

Podíl předkladatele na výsledku: **50 %**

#### Popis podílu předkladatele:

50% |Participation of the faculty has been determined in accordance with the methodology

#### Odůvodnění předkladatele:

"This result has been already evaluated and marked "A" in evaluating another institution, MFF UK joins to the result, as the author works partially for MFF UK. This book brings together both the classical and current aspects of deformation theory. The presentation is mostly self-contained, assuming only basic knowledge of commutative algebra, homological algebra and category theory. The exposition begins by recalling Gerstenhaber's classical theory for associative algebras. The focus then shifts to a homotopy-invariant setup of Maurer-Cartan moduli spaces. As an application, Kontsevich's approach to deformation quantization of Poisson manifolds is reviewed. Then, after a brief introduction to operads, a strongly homotopy Lie algebra governing deformations of (diagrams of) algebras of a given type is described, followed by examples and generalizations."

#### Odůvodnění panelu:

This result has been already evaluated and marked "A" in evaluating another institution, MFF UK joins to the result, as the author works partially for MFF UK. This book brings together both the classical and current aspects of deformation theory. The presentation is mostly self-contained, assuming only basic knowledge of commutative algebra, homological algebra and category theory. An excellent book in the field of algebra from the respected author.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Smooth analysis in Banach spaces

obor: BA

Identifikátor: **RIV/00216208:11320/14:10284178!RIV15-GA0-11320**

Id: 122

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Matematicko-fyzikální fakulta**

Podíl předkladatele na výsledku: **50 %**

#### **Popis podílu předkladatele:**

50% |Participation of the faculty has been determined in accordance with the methodology

#### **Odůvodnění předkladatele:**

"This monograph is a result of more than 5 years of intensive work. It lays down the foundations of smooth analysis in infinite-dimensional spaces with focus on higher smoothness. It brings together essentially all known tools in this area. Some of the topics are treated for the first time in the book form. It contains many new or recent results and many new or streamlined proofs. We hope that it will serve as an important "go-to" source for researches in this field."

#### **Odůvodnění panelu:**

An important and excellent book in the area of functional analysis. It lays down the foundations of smooth analysis in infinite-dimensional spaces with focus on higher smoothness. It brings together essentially all known tools in this area. Some of the topics are treated for the first time in the book form. It contains many new or recent results and many new or streamlined proofs.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Weak-strong uniqueness property for the full Navier-Stokes-Fourier system

obor: BA

Identifikátor: RIV/67985840: /12:00376740!RIV13-AV0-67985840

Id: 123

Předkladatel výsledku do Pilíře II.:

**IČO: 67985840 Matematický ústav AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **60 %**

#### Popis podílu předkladatele:

60% The share of the Institute of Mathematics CAS on this paper is 60 %. E. Feireisl is a core employee and A. Novotný was part time employed in the Institute when the result was created.

#### Odůvodnění předkladatele:

This is an influential paper that already attracted a number of citations. It concerns the complete Navier-Stokes-Fourier system describing the motion of a general viscous, compressible and heat conducting fluid. In general, only the existence of weak solutions in a special function class is known. The weak strong uniqueness property proved in this paper shows that such a weak solution necessarily coincides with the strong solution as long as the latter exists. Such a result has numerous applications in particular in numerical analysis, where typically numerical solutions can be shown to converge to a weak solution rather than strong solution.

#### Odůvodnění panelu:

This paper is one of the basic contributions to the mathematical theory of fluids. The authors Feireisl and Novotný, top experts in the mathematical theory of fluids, are proofing in this outstanding paper, published in one of the best in journals in the field a basic result: Weak and strong solutions of the full Navier-Stokes-Fourier system, starting from the same initial values, coincide, as long as the latter exists. Strong solutions are unique in the class of weak solutions.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Banach space theory : the basis for linear and nonlinear analysis

obor: BA

Identifikátor: RIV/67985840: /11:00358155!RIV11-AV0-67985840

Id: 124

Předkladatel výsledku do Pilíře II.:

**IČO: 67985840 Matematický ústav AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **67 %**

#### Popis podílu předkladatele:

67% The share of the Institute of Mathematics CAS on this monograph is 67 %. M. Fabian, P. Hájek and V. Zizler were core employees in the Institute.

#### Odůvodnění předkladatele:

The book is a substantial text (over 800 pages long) that combines an introduction to the basic principles of functional analysis with more advanced topics that lead the reader to many frontiers of current research in Banach spaces. It is organized to help the reader proceed from the elementary part of the subject to more recent developments. Authors' aim was that the book can serve experts in related fields such as Optimization, Partial Differential Equations, Fixed Point Theory, Real Analysis, Topology, and Applied Mathematics, among others. The authors included a large number of exercises of several levels of difficulty, ranging from elementary ones to important results or examples, which illustrate delicate points in the theory and introduce the reader to additional lines of research. For the more advanced students and for researchers, the remarks and open problems are especially useful. According to the MathSciNet reviewer „... In almost every aspect it is a nice book invaluable both for learning the topic and as a reference. This is definitely a book that anyone interested in Banach space theory (or functional analysis) should have on his/her desk.“

#### Odůvodnění panelu:

Czech Academy of Sciences, Institute of Mathematics. Participation: 0,5 This is a substantial contribution in the area of functional analysis. The book is a substantial text (over 800 pages long) that combines an introduction to the basic principles of functional analysis with more advanced topics that lead the reader to the current research in Banach spaces. The book can serve experts in related fields such as Optimization, Partial Differential Equations, Fixed Point Theory, Real Analysis, Topology, and Applied Mathematics, among others. According to the MathSciNet reviewer „ In almost every aspect it is a nice book invaluable both for learning the topic and as a reference. This is definitely a book that anyone interested in Banach space theory or functional analysis should have on his/her desk.“

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### A theoretically supported scalable TFETI algorithm for the solution of multibody 3D contact problems with friction

obor: BA

Identifikátor: RIV/61989100:27240/12:86085073!RIV13-GA0-27240

Id: 125

Předkladatel výsledku do Pilíře II.:

**IČO: 61989100 Vysoká škola báňská - Technická univerzita Ostrava,  
Fakulta elektrotechniky a informatiky**

Podíl předkladatele na výsledku: **100 %**

#### Popis podílu předkladatele:

The result was submitted by the first author who proposed the algorithm in cooperation with T. Kozubek and proved its scalability, V. Vondrák and T. Kozubek prepared the parallel implementation and numerical experiments with A. Markopoulos and T. Brzoboha

#### Odůvodnění předkladatele:

(100%) The paper presents an algorithm for the solution of multibody contact problems of elasticity with friction, gives the proof of its numerical scalability, and demonstrates this result on the solution of a class of academic problems and on the analysis of the clutch joint of mining support. Let us recall that an algorithm is numerically scalable if it has asymptotically linear complexity. Such algorithms were known until recently only for linear problems, the problem to find such algorithm for the contact problems has been opened since the seventieth's until we recently found the solution for the frictionless problem. The solution of the problem with friction presented in the above paper is much more difficult than that for the frictionless problems. The result was achieved in the cooperation of the team which included mathematicians, computer scientists, and mechanical engineers and their students. The result was highly appreciated by the international community; it was the subject of invited plenary lectures at important international conferences (e.g., DDM20 San Diego, CMIC2015 Hannover), of invited lectures at top universities (ICES Texas University), and of awards for the participating students (Markopoulos was awarded the second place in both The Fourier Prize and The Babuška Prize). The algorithm enjoys also the parallel scalability up to ten thousands processors.

#### Odůvodnění panelu:

A very interesting paper on numerical mathematics with real world applications; highly cited. The paper presents an algorithm for the solution of multibody contact problems of elasticity with friction, gives the proof of its numerical scalability, and demonstrates this result on the solution of a class of academic problems and on the analysis of the clutch joint of mining support. The result was achieved in the cooperation of the team which included mathematicians, computer scientists, and mechanical engineers and their students.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Classification and Identification of Lie Algebras

obor: BA

Identifikátor: RIV/68407700:21340/14:00209725!RIV15-MSM-21340

Id: 126

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Fakulta jaderná a fyzikálně inženýrská**

Podíl předkladatele na výsledku: **50 %**

#### Popis podílu předkladatele:

50% - The monograph presents the culmination of a decade long collaboration of its two authors on the subject of structure of Lie algebras. It presents in a unified fashion three major topics: 1. Methods for identification of structure of Lie algebras (di

#### Odůvodnění předkladatele:

The monograph presents the culmination of a decade long collaboration of its two authors on the subject of structure of Lie algebras. It presents in a unified fashion three major topics: 1. Methods for identification of structure of Lie algebras (direct sum decomposition, Levi decomposition, ) based on an older work by the 2nd author, streamlined, improved and complemented by new sets of examples. In addition, an extensive practical introduction into computation of Casimir invariants, comparing various available approaches, is presented. 2. Methods for classification of particular classes of solvable and Levi decomposable Lie algebras in an arbitrary dimension, based on works published by both authors, together with results of several such classifications. 3. A newly constructed complete list of Lie algebras over the fields of real and complex numbers up to dimension 6, together with useful supplementary structural information suitable for the identification of any given algebra in the list. The list is ordered in a way to make identification easy, using only basis independent properties of the Lie algebras. Such identification oriented list is unique in the available literature. The approach to the classification of particular classes of solvable and Levi decomposable Lie algebras presented in the monograph became a source of inspiration to numerous follow up studies. Among those the papers by R. Campoamor-Stursberg and his collaborators, Wang Dengyin, and A. Shabanskaya & G. Thompson can be listed. The new, identification oriented, classification of low-dimensional Lie algebras is of substantial practical value. It is of particular importance to scientists employing Lie algebra analysis to differential equations, wave phenomena, general relativity or integrable systems, as was mentioned in the attached independent published reviews of the monograph.

#### Odůvodnění panelu:

The important and interesting research monograph which received very positive reviews. It is of particular importance to scientists employing Lie algebra analysis to differential equations, wave phenomena or general relativity. The book presents in a unified fashion three major topics: methods for identification of structure of Lie algebras, methods for classification of particular classes of solvable and Levi decomposable Lie algebras in an arbitrary dimension, and a newly constructed complete list of Lie algebras over the fields of real and complex numbers up to dimension six. The approach to the classification of particular classes of solvable and Levi decomposable Lie algebras presented in the monograph became a source of inspiration to numerous follow up studies.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### A multiferroic material to search for the permanent electric dipole moment of the electron

obor: BM

Identifikátor: **RIV/00216208:11320/10:10069983!RIV11-MSM-11320**

Id: 127

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Matematicko-fyzikální fakulta**

Podíl předkladatele na výsledku: **9 %**

#### Popis podílu předkladatele:

9% |Participation of the faculty has been determined in accordance with the methodology

#### Odůvodnění předkladatele:

"The article is devoted to the first-principles design and subsequent synthesis of a new material with the specific functionalities required for a solid-state-based search for the permanent electric dipole moment of the electron. Subsequent synthesis and characterization of  $\text{Eu}_{0.5}\text{Ba}_{0.5}\text{TiO}_3$  ceramics confirm the predicted desirable properties. This result has already been evaluated as A and MFF UK opts in."

#### Odůvodnění panelu:

Inherited from the evaluation 2014.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Brightly Luminescent Organically Capped Silicon Nanocrystals Fabricated at Room Temperature and Atmospheric Pressure

obor: BH

Identifikátor: **RIV/00216208:11320/10:10070172!RIV11-AV0-11320**

Id: 128

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Matematicko-fyzikální fakulta**

Podíl předkladatele na výsledku: **38 %**

#### Popis podílu předkladatele:

38% |Participation of the faculty has been determined in accordance with the methodology

#### Odůvodnění předkladatele:

"Silicon nanocrystals have been studied extensively due to their special properties including biocompatibility and compatibility with silicon-based technology. This paper concentrates on improvement of light emission properties of silicon nanocrystals and suggests an original successful way, taking place at room temperature and ambient pressure, to replace the silicon oxide shell of luminescent Si nanocrystals with capping involving organic residues. This result has already been evaluated as A and MFF UK opts in."

#### Odůvodnění panelu:

Inherited from the evaluation 2014.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Core/Shell Nanofibers with Embedded Liposomes as a Drug Delivery System

obor: BO

Identifikátor: **RIV/00216208:11110/12:12445!RIV13-MSM-11110**

Id: 129

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, 1. lékařská fakulta**

Podíl předkladatele na výsledku: **10 %**

#### Popis podílu předkladatele:

10% | 1st fac of medicine - 10 %

#### Odůvodnění předkladatele:

"The broader application of liposomes in regenerative medicine is hampered by their short half-life and inefficient retention at the site of application. These disadvantages could be significantly reduced by their combination with nanofibers. We produced 2 different nanofiber-liposome systems in the present study, that is, liposomes blended within nanofibers and core/shell nanofibers with embedded liposomes. Herein, we demonstrate that blend electrospinning does not conserve intact liposomes. In contrast, coaxial electrospinning enables the incorporation of liposomes into nanofibers. We report polyvinyl alcohol-core/poly- $\epsilon$ -caprolactone-shell nanofibers with embedded liposomes and show that they preserve the enzymatic activity of encapsulated horseradish peroxidase. The potential of this system was also demonstrated by the enhancement of mesenchymal stem cell proliferation. In conclusion, intact liposomes incorporated into nanofibers by coaxial electrospinning are very promising as a drug delivery system."

#### Odůvodnění panelu:

Inherited from the evaluation 2014.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Core/Shell Nanofibers with Embedded Liposomes as a Drug Delivery System

obor: BO

Identifikátor: **RIV/00216208:11130/12:7986!RIV13-MSM-11130**

Id: 130

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, 2. lékařská fakulta**

Podíl předkladatele na výsledku: **38 %**

#### **Popis podílu předkladatele:**

38% |38% reflects the role of our staff members in preparation of the study, collection of data and manuscript preparation.

#### **Odůvodnění předkladatele:**

"The broader application of liposomes in regenerative medicine is hampered by their short half-life and inefficient retention at the site of application. These disadvantages could be significantly reduced by their combination with nanofibers. We produced 2 different nanofiber-liposome systems in the present study, that is, liposomes blended within nanofibers and core/shell nanofibers with embedded liposomes. Herein, we demonstrate that blend electrospinning does not conserve intact liposomes. In contrast, coaxial electrospinning enables the incorporation of liposomes into nanofibers. We report polyvinyl alcohol-core/poly-?-caprolactone-shell nanofibers with embedded liposomes and show that they preserve the enzymatic activity of encapsulated horseradish peroxidase. The potential of this system was also demonstrated by the enhancement of mesenchymal stem cell proliferation. In conclusion, intact liposomes incorporated into nanofibers by coaxial electrospinning are very promising as a drug delivery system."

#### **Odůvodnění panelu:**

Inherited from the evaluation 2014.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Ferromagnetism vs. charge ordering in the $\text{Pr}_{0.5}\text{Ca}_{0.5}\text{MnO}_3$ and $\text{La}_{0.5}\text{Ca}_{0.5}\text{MnO}_3$ nanocrystals

obor: BM

Identifikátor: RIV/68407700:21340/10:00174218!RIV11-MSM-21340

Id: 131

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Fakulta jaderná a fyzikálně inženýrská**

Podíl předkladatele na výsledku: **25 %**

#### Popis podílu předkladatele:

25% - Rating A in H14  
<https://www.isvav.cz/h14/resultDetail.do?rowId=RIV%2F68407700%3A21340%2F10%3A00174218%21RIV11-MSM-21340> - The half-doped manganites  $\text{Pr}_{0.5}\text{Ca}_{0.5}\text{MnO}_3$  and  $\text{La}_{0.5}\text{Ca}_{0.5}\text{MnO}_3$  have been studied by neutron diffraction method. By means of the

#### Odůvodnění předkladatele:

We have investigated by means of neutron diffraction and magnetic measurements the particle size effects on the structure and low-temperature spin arrangement in so-called half doped manganites. The study shows that the  $\text{Mn}^{3+}/\text{Mn}^{4+}$  charge ordering and CE-type antiferromagnetic structure characteristic for bulk are completely suppressed when particle size is decreased down to 20 nm, and a ferromagnetic state is stabilized instead. The reason is not in a lower energy of the latter state, but in the hindering of displacive processes through which the charge ordering develops. The paper deals also with the problem of magnetic interactions in the surface layer of the particles. The results obtained are of general importance for the perovskite manganites. In particular, the room temperature crystal structures in the particle cores are found not to deviate from the bulk material, disproving thus former speculations about enormous structural distortions due to surface effects. Another issue is the changing character of charge carriers in the particle shell, which is at the root of the size-dependent reduction of magnetization observed commonly in manganites possessing ferromagnetic state.

#### Odůvodnění panelu:

Inherited from the evaluation 2014.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Formation of asteroid pairs by rotational fission

obor: BN

Identifikátor: RIV/67985815: /10:00355351!RIV11-AV0-67985815

Id: 132

Předkladatel výsledku do Pilíře II.:

IČO: 67985815 Astronomický ústav AV ČR, v. v. i.

Podíl předkladatele na výsledku: 0 %

#### Popis podílu předkladatele:

Our contribution to the result: Our Ondřejov team obtained abundant photometric data for a few tens asteroid pairs, with the 1.54-m telescope on La Silla and the 0.65-m telescope in Ondřejov. Then we applied the theory of rotational fission in interpreta

#### Odůvodnění předkladatele:

We studied rotational properties of asteroid pairs. We measured 35 pairs with our technique of time-resolved photometry. Most data were taken with the 1-m telescope at Wise Observatory, Israel, and the 1.54-m Danish telescope at La Silla, Chile. We derived their primary spin rates and mass ratios. We found a strong correlation between the square of primary spin frequency and the mass ratio ( $q$ ). We interpreted the data with a theory of rotation fission by D. Scheeres (2007). We have got a perfect match between the pairs' properties and the theory. Specifically, we found that the primaries of pairs with  $q \ll 0.2$  rotate rapidly, near their critical frequency. As  $q \rightarrow 0.2$ , the primary period grows long. This occurs as the total energy of the system approaches zero, requiring the secondary to extract an increasing fraction of energy from the primary's spin in order to escape. We did not find asteroid pairs with  $q > 0.2$ . Rotationally fissioned systems beyond this limit have insufficient energy to disrupt. We concluded that asteroid pairs are formed by the rotational fission of a parent asteroid into a proto-binary system, which subsequently disrupts under its own internal dynamics soon after formation. Our findings have contributed substantially to the growing knowledge on that asteroids are not inert giant rocks, but they are changing „little words“ that give birth to smaller asteroids. The non-catastrophic evolution mechanism can re-shape the whole asteroid population.

#### Odůvodnění panelu:

Inherited from the evaluation 2014.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Luminescence of nanodiamond driven by atomic functionalization: Towards novel detection principles

obor: BM

Identifikátor: RIV/61388971: /12:00376576!RIV13-AV0-61388971

Id: 133

Předkladatel výsledku do Pilíře II.:

**IČO: 61389005 Ústav jaderné fyziky AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **26 %**

#### Popis podílu předkladatele:

26 %, The paper on functionalization of nanodiamonds is a common work of several institutions. The Nuclear Physics Institute (NPI) was involved in the research as a base for ion beam modification of the commercially purchased nanodiamonds. The samples wer

#### Odůvodnění předkladatele:

In the paper is discussed how the surface chemistry can make the nanodiamond (ND) luminescence sensitive to chemical processes at the ND surface. The aim of the work was to test the nanodiamonds as sensors for monitoring of chemical environment - such as surface charges or pH level, cellular DNA/RNA hybridization, interaction with cell receptors, etc. The proposed method is based on the control of an electronic chemical potential at the ND surfaces. The surface potential can change the occupation of the introduced luminescent NV centers that exist in neutral or negative charge states with different photoluminescence wavelength properties. Due to Columbic interactions, chemically driven luminescence shifts up to 20 nm in depth is possible to observe. This allows construction of optical ND chemo-biosensors with sizes of about 40 nm that are easily visible in classical confocal microscopes. This can be interesting especially for drug-delivery research or for monitoring of chemical interactions that can occur in cells based on covalent or non-covalent interactions with charged molecules such as DNA and with various surface terminations. The possibility to use ND (with the NV centers produced by ion implantation) as biosensors was demonstrated on ND with hydrogenated and oxidized surfaces, which exhibit important differences in the surface chemical potential. It was also clarified why nanodiamonds have (in comparison with the bulk CVD diamond) advantage to be used as biosensors, as nanoparticles can significantly increase the photoluminescence shift magnitude.

#### Odůvodnění panelu:

Inherited from the evaluation 2014.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Luminescence of Nanodiamond Driven by Atomic Functionalization: Towards Novel Detection Principles

obor: BO

Identifikátor: RIV/68407700:21460/12:00184506!RIV13-MSM-21460

Id: 134

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Fakulta biomedicínského inženýrství**

Podíl předkladatele na výsledku: **40 %**

#### Popis podílu předkladatele:

40% - Rating A in H14  
<http://www.isvav.cz/h14/resultDetail.do?rowId=RIV%2F68407700%3A21460%2F12%3A00184506!RIV13-MSM-21460> - Contribution of Czech Technical University on the publication: 40 %. The proposed solution is mostly the original idea and work

#### Odůvodnění předkladatele:

"In this works authors describe a method how photoluminescence of diamond nanoparticles can be tuned by changes in the surface chemistry. Diamond nanoparticles (ND) can contain fluorescence point defect centres the nitrogen-vacancy center (NV). Photoluminescence of NV centers is extremely stable without any photobleaching and is in the region of red-infrared spectra. This makes ND an interesting alternative to commonly used fluorescence labels that suffer from photobleaching and instabilities. NV center can exist in two charge states (negative and neutral) with different optical and magnetic properties. NV<sup>-</sup> emits around 700 nm, while NV<sup>0</sup> emits around 590 nm. In this work we present a new method how to chemically control the charge state of the NV center that results in changes in the colour of the NV luminescence. This method opens a new possibilities for construction of optical nanosensors where luminescence is sensitive to environment. Moreover this method can be visible in classical confocal microscope. Besides the impact for the development of new sensors, this work was of a great importance to the field of quantum computing. However, the valued spin properties of NV centers are present only for the NV<sup>-</sup> center. This work contributes to the fundamental understanding of the mechanism of charge transfer between negative and neutral charge state of NV center that is important for the stabilization of NV centers close to the surface. The large diversity of citing articles (published in journals ranging from Applied physics letters, Advancer materials, Chemistry of materials, Nanoscale, to biomedical journals such as Nanomedicine-Nanotechnology Biol. and Medic., Biomaterials) suggests that this work is of high impact to the large variety of fields. This work was awarded as the best oral presentation on two international conferences - MRS Fall Meeting, Boston, European Diamond Conference, Budapest; details are in file ""PilirII\_184506-attachment-KV04.pdf""."

#### Odůvodnění panelu:

Inherited from the evaluation 2014.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Observation of a new particle in the search for the Standard Model Higgs boson with the ATLAS detector at the LHC

obor: BF

Identifikátor: **RIV/61989592:15310/12:33140596!RIV13-MSM-15310**

Id: 135

Předkladatel výsledku do Pilíře II.:

**IČO: 61989592 Univerzita Palackého v Olomouci, Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **0,3 %**

#### **Popis podílu předkladatele:**

Large collaboration structure

#### **Odůvodnění předkladatele:**

Observation of a new particle consistent with the Higgs boson with the ATLAS detector was the breakthrough in particle physics. It is the first spinless elementary particle ever discovered. Members of the collaboration from RCPTM contributed to the understanding of optical detection processes of the ATLAS detector.

#### **Odůvodnění panelu:**

Inherited from the evaluation 2014.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Observation of a new particle in the search for the Standard Model Higgs boson with the ATLAS detector at the LHC

obor: BF

Identifikátor: RIV/68407700:21670/12:00202645!RIV13-MSM-21670

Id: 136

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Ústav technické a experimentální fyziky ČVUT**

Podíl předkladatele na výsledku: **2 %**

#### Popis podílu předkladatele:

2% - Rating A in H14  
<http://www.isvav.cz/h14/resultDetail.do?rowId=RIV%2F68407700%3A21340%2F12%3A00202645!RIV13-MSM-21340> - The CTU is a founding member of the ATLAS collaboration at CERN. On the ATLAS project actively participate researchers from: Fac

#### Odůvodnění předkladatele:

Observation of a new particle consistent with the Higgs boson with the ATLAS detector was the breakthrough in particle physics. It is the first spinless elementary particle ever discovered. As a part of the Czech ATLAS team, experts from IPNP significantly contributed to the construction of the ATLAS detector, its maintenance and operation and data analysis. Members of the IPNP ATLAS team participated to the analyses of a Higgs boson decays to pairs of W bosons. In later stage decays to tau leptons have been investigated with the aim to confirm non-universal coupling of a new particle to leptons as predicted for the Higgs boson. The first paper is a Science description of the discovery for wider audience, the second one is a fully professional "discovery paper" with all the technical details. So Science paper is prestigious, but physicists will quote the Physics Letters B.

#### Odůvodnění panelu:

Inherited from the evaluation 2014.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Observation of a new particle in the search for the Standard Model Higgs boson with the ATLAS detector at the LHC

obor: BF

Identifikátor: **RIV/68407700:21260/12:00202645!RIV13-MSM-21260**

Id: 137

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Fakulta dopravní**

Podíl předkladatele na výsledku: **1 %**

#### Popis podílu předkladatele:

1% - Rating A in H14  
<http://www.isvav.cz/h14/resultDetail.do?rowId=RIV%2F68407700%3A21340%2F12%3A00202645!RIV13-MSM-21340> - The CTU is a founding member of the ATLAS collaboration at CERN. On the ATLAS project actively participate researchers from: Fac

#### Odůvodnění předkladatele:

Observation of a new particle consistent with the Higgs boson with the ATLAS detector was the breakthrough in particle physics. It is the first spinless elementary particle ever discovered. As a part of the Czech ATLAS team, experts from IPNP significantly contributed to the construction of the ATLAS detector, its maintenance and operation and data analysis. Members of the IPNP ATLAS team participated to the analyses of a Higgs boson decays to pairs of W bosons. In later stage decays to tau leptons have been investigated with the aim to confirm non-universal coupling of a new particle to leptons as predicted for the Higgs boson. The first paper is a Science description of the discovery for wider audience, the second one is a fully professional “discovery paper” with all the technical details. So Science paper is prestigious, but physicists will quote the Physics Letters B.

#### Odůvodnění panelu:

Inherited from the evaluation 2014.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Observation of a new particle in the search for the Standard Model Higgs boson with the ATLAS detector at the LHC

obor: BF

Identifikátor: **RIV/68407700:21220/12:00202645!RIV13-MSM-21220**

Id: 138

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Fakulta strojní**

Podíl předkladatele na výsledku: **1 %**

#### Popis podílu předkladatele:

1% - Rating A in H14  
<http://www.isvav.cz/h14/resultDetail.do?rowId=RIV%2F68407700%3A21340%2F12%3A00202645!RIV13-MSM-21340> - The CTU is a founding member of the ATLAS collaboration at CERN. On the ATLAS project actively participate researchers from: Fac

#### Odůvodnění předkladatele:

Observation of a new particle consistent with the Higgs boson with the ATLAS detector was the breakthrough in particle physics. It is the first spinless elementary particle ever discovered. As a part of the Czech ATLAS team, experts from IPNP significantly contributed to the construction of the ATLAS detector, its maintenance and operation and data analysis. Members of the IPNP ATLAS team participated to the analyses of a Higgs boson decays to pairs of W bosons. In later stage decays to tau leptons have been investigated with the aim to confirm non-universal coupling of a new particle to leptons as predicted for the Higgs boson. The first paper is a Science description of the discovery for wider audience, the second one is a fully professional “discovery paper” with all the technical details. So Science paper is prestigious, but physicists will quote the Physics Letters B.

#### Odůvodnění panelu:

Inherited from the evaluation 2014.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Observation of a new particle in the search for the Standard Model Higgs boson with the ATLAS detector at the LHC

obor: BF

Identifikátor: RIV/68407700:21340/12:00202645!RIV13-MSM-21340

Id: 139

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Fakulta jaderná a fyzikálně inženýrská**

Podíl předkladatele na výsledku: **1 %**

#### Popis podílu předkladatele:

1% - Rating A in H14  
<http://www.isvav.cz/h14/resultDetail.do?rowId=RIV%2F68407700%3A21340%2F12%3A00202645!RIV13-MSM-21340> - The CTU is a founding member of the ATLAS collaboration at CERN. On the ATLAS project actively participate researchers from: Fac

#### Odůvodnění předkladatele:

Observation of a new particle consistent with the Higgs boson with the ATLAS detector was the breakthrough in particle physics. It is the first spinless elementary particle ever discovered. As a part of the Czech ATLAS team, experts from IPNP significantly contributed to the construction of the ATLAS detector, its maintenance and operation and data analysis. Members of the IPNP ATLAS team participated to the analyses of a Higgs boson decays to pairs of W bosons. In later stage decays to tau leptons have been investigated with the aim to confirm non-universal coupling of a new particle to leptons as predicted for the Higgs boson. The first paper is a Science description of the discovery for wider audience, the second one is a fully professional “discovery paper” with all the technical details. So Science paper is prestigious, but physicists will quote the Physics Letters B.

#### Odůvodnění panelu:

Inherited from the evaluation 2014.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

Slobodian, P.; Říha, P.; Lengálová, A.; Svoboda, P.; Sába, P.

Multi-wall carbon nanotube networks as potential resistive gas sensors for organic vapor detection. Carbon 49 (2011), 2499-2507.

obor: BK

Identifikátor: RIV/67985874: /11:00359583!RIV12-AV0-67985874

Id: 140

Předkladatel výsledku do Pilíře II.:

IČO: 67985874 Ústav pro hydrodynamiku AV ČR, v. v. i.

Podíl předkladatele na výsledku: 20 %

### Popis podílu předkladatele:

20 %The contribution involves the analysis of tests of entangled carbon nanotube networks as adsorption mats selective to organic solvent vapors of different polarities. Moreover, the material testing with cycling character was proposed as well as the met

### Odůvodnění předkladatele:

Even if carbon nanotubes were used in indication of chemical gases, the fabricated sensors were expensive and difficult to produce. However, the practice requires simpler and cheaper ways to sense gaseous substances. Our contribution introduces such resistive gas sensors prepared in a simple way from multiwall carbon nanotubes in their pristine and oxidized form. The tests have shown that the prepared sensors were capable to detect chemical vapors in the air. The sensor electrical resistance variation as a response to physisorption and desorption of vapors during testing cycles was reversible and reproducible with high sensitivity. Oxidation of carbon nanotubes even improved the response of sensors to organic solvents due to oxygen functional groups bonded to nanotubes surface and encapsulated inside nanotubes. Selection of solvents covering a broad range of polarities (defined by Hansen solubility parameters) enabled to reveal network properties which are very suitable for the application as cheap and easy to prepare micro-sized vapor sensors and switches.

### Odůvodnění panelu:

Inherited from the evaluation 2014.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Systematic study of Mn-doping trends in optical properties of (Ga,Mn)As

obor: BM

Identifikátor: **RIV/00216208:11320/10:10062065!RIV11-AV0-11320**

Id: 141

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Matematicko-fyzikální fakulta**

Podíl předkladatele na výsledku: **29 %**

#### Popis podílu předkladatele:

29% |Participation of the faculty has been determined in accordance with the methodology

#### Odůvodnění předkladatele:

"Semiconductor spintronics is based on ferromagnetic semiconductors with (Ga,Mn)As as broadly studied material. This paper aims at showing generic effects of doping on optical properties of (Ga,Mn)As. It is a systematic study of optical properties of (Ga,Mn)As epilayers spanning the wide range of accessible MnGa dopings. The results are consistent with the description of ferromagnetic (Ga,Mn)As based on the microscopic valence band theory. This result has already been evaluated as A and MFF UK opts in."

#### Odůvodnění panelu:

Inherited from the evaluation 2014.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

Systematic study of Mn-doping trends in optical properties of (Ga,Mn)As

obor: BM

Identifikátor: **RIV/00216208:11310/10:10062065!RIV11-MSM-11310**

Id: 142

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **6 %**

### Popis podílu předkladatele:

6% |Charles University, Fac Sci 6

### Odůvodnění předkladatele:

"f"

### Odůvodnění panelu:

Inherited from the evaluation 2014.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Two-photon polarization microscopy reveals protein structure and function

obor: BO

Identifikátor: **RIV/60076658:12640/11:43882316!RIV12-MSM-12640**

Id: 143

Předkladatel výsledku do Pilíře II.:

**IČO: 60076658 Jihočeská univerzita v Českých Budějovicích,  
Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **43 %**

#### **Popis podílu předkladatele:**

43% "The laboratory of J. Lazar was central to the project. Josef Lazar- conceived the idea- developed the mathematical model confirming the validity of the initial idea- implemented the technique on a highly customizable microscope in Nove Hrad- develop

#### **Odůvodnění předkladatele:**

Our paper describes the principle, implementation and applications of the technique of two-photon polarization microscopy (2PPM), developed by our laboratory. This technique allows sensitive observations of changes in shapes of protein molecules, directly in living cells and organisms. Because many protein molecules change shape during their function, 2PPM allows observations of physiological activity of many important proteins. The 2PPM technique is now being used for monitoring and studies of molecular mechanisms of a wide range of molecular processes taking place in cells, such as G-protein signaling or changes in electrical voltage on the cell membrane.

#### **Odůvodnění panelu:**

Inherited from the evaluation 2014.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Achieving high-quality single-atom nitrogen doping of graphene/SiC(0001) by ion implantation and subsequent thermal stabilization

obor: BM

Identifikátor: RIV/68378271: /14:00436452!RIV15-AV0-68378271

Id: 144

Předkladatel výsledku do Pilíře II.:

IČO: 68378271 Fyzikální ústav AV ČR, v. v. i.

Podíl předkladatele na výsledku: 88 %

#### Popis podílu předkladatele:

Members of Nanosurf Lab performed most of the work. We devised ion-implantation method of substitutional nitrogen dopants in graphene. We performed most of the experimental (STM, NEXASF) and theoretical (total energy DFT and STM calculations) analysis. J.

#### Odůvodnění předkladatele:

Graphene doping is very hot topic of fundamental interest and with large potential applications. We developed a novel ion-implantation method for single-atom substitutional nitrogen dopants in graphene. We analyze them by means of atomically resolved STM and photoemission measurements supported by theoretical calculations. The dopant concentration is gradually increased and a new, meta configuration of dopants is found. The method provides promising way to achieve high-quality doped graphene.

#### Odůvodnění panelu:

New method of controlled implantation of nitrogen atoms into graphene is worked out to tune it properties for applications in nanoelectronics. The doping takes place under UHV, but remains stable in ambient conditions. The results are analysed by scanning tunnelling microscope and characterized by density functional theory and Quantum Monte Carlo method. The study opens a new significant area and makes a crucial step for applications in nanoelectronics.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### An antidamping spin–orbit torque originating from the Berry curvature

obor: BM

Identifikátor: RIV/68378271: /14:00434245!RIV15-AV0-68378271

Id: 145

Předkladatel výsledku do Pilíře II.:

**IČO: 68378271 Fyzikální ústav AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **67 %**

#### Popis podílu předkladatele:

The team members were responsible for the conceptual side of the work, prepared materials for the experiments, and performed theory analyses.

#### Odůvodnění předkladatele:

The drawback of current magnetic memories is that in order to reverse the north and south poles of the magnet, i.e. flip the zero to one or vice versa, the magnetic bit has to be coupled to an electro-magnet or to another permanent magnet. If instead one could flip the poles by an electric field without involving another magnet, a new generation of memories can be envisaged combining the merits of both charge and spin-based devices. This work reports a discovery of a new physical phenomenon that allows to manipulate the state of a magnet by electric fields.

#### Odůvodnění panelu:

A new physical phenomenon is reported that enables to switch poles of magnets directly by an electric field, which can enable to devise a new generation of magnetic memory elements. This phenomenon, namely antidamping spin-orbit torque identified in spin-orbit coupled magnetic systems, plays a similar role as the intrinsic spin Hall effect and might be of comparable strength. The established results are completed by an intuitive picture of the phenomenon as well as its microscopic modelling. The study provides a notable progress in existing field and leads to valuable new research.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Applications of quantum Monte Carlo methods in condensed systems

obor: BE

Identifikátor: RIV/68378271: /11:00361349!RIV12-AV0-68378271

Id: 146

Předkladatel výsledku do Pilíře II.:

**IČO: 68378271 Fyzikální ústav AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **67 %**

#### **Popis podílu předkladatele:**

Both authors (one from FZU - Kolorenc) contributed equally to all stages of preparation and writing the review.

#### **Odůvodnění předkladatele:**

Quantum Monte Carlo methods represent a powerful and broadly applicable computational tool for finding accurate solutions of the stationary Schrödinger equation for atoms, molecules and solids. The paper is an invited review of the last ten years of development of the diffusion Monte Carlo method with emphasis on its applications to the electronic structure of solids and other extended systems. The paper has attracted over 40 citations in the four years since its publication.

#### **Odůvodnění panelu:**

Quantum Monte Carlo methods represent a powerful and broadly applicable computational tool for finding accurate solutions of the stationary Schrödinger equation for atoms, molecules and solids. The paper is an invited review of the last ten years of development of the diffusion Monte Carlo method with emphasis on its applications to the electronic structure of solids and other many-particle systems. The authors won this opportunity because of their significant contribution in this field. The review is highly-cited having a clear significant impact on the research field.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Centrality dependence of the charged-particle multiplicity density at midrapidity in Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV

obor: BF

Identifikátor: RIV/61389005: /11:00374460!RIV13-AV0-61389005

Id: 147

Předkladatel výsledku do Pilíře II.:

IČO: 61389005 Ústav jaderné fyziky AV ČR, v. v. i.

Podíl předkladatele na výsledku: 5 %

#### Popis podílu předkladatele:

5 %, Contribution of scientists from the Nuclear Physics Institute (NPI) ASCR on the presented paper consists first in responsibility for calibration, maintenance and operation of the Inner Tracking System - basic detector used for the charged-particle mu

#### Odůvodnění předkladatele:

The charged-particle multiplicity density at midrapidity represents a key observable to characterize the properties of the matter created in ultra-relativistic heavy ion collisions. The study of the dependence of the charged particle density on colliding system, center-of-mass energy and collision geometry is important to understand the relative contributions to particle production of hard scattering and soft processes, and may provide insight into the partonic structure of the projectiles. Contrary to early expectation dating back to early 1990 the matter found at RHIC and at LHC is strongly and not weakly interacting and explosive character of its expansion produces too small freeze-out volumes and much smaller number of final state hadrons than originally conceived. Theoretical descriptions of particle production in nuclear collisions fall into two broad categories: two component models combining perturbative QCD processes with soft interactions, and saturation models with various parametrizations for the energy and centrality dependence of the saturation scale. It turns out that predictions for most observables, both for soft and hard probes, demand some parameter fixing which can be related to the charged multiplicity at mid-rapidity. A lower bound comes from the models in which the multiplicity in nuclear collisions is expected to be proportional to the number of participant nucleons. An upper limit can be set by the proportionality to the number of binary nucleon-nucleon collisions, as expected both in models of particle production which suppose a dominance of hard, perturbative processes, and in soft models of particle production in absence of shadowing corrections. Basic result of the paper is the finding that the centrality dependence is similar to that observed at lower collision energies and that theoretical descriptions that include a moderation of the multiplicity evolution with centrality are favored by the data.

#### Odůvodnění panelu:

The article presents one of the first results of the ALICE experiment installed at LHC in CERN. It showed a good performance of the huge ALICE detection complex and enabled the basic comparison of the measurement of the interactions of lead beams at the energy of 2.7 TeV with several theoretical models and the setting of their parameters. The NPI ALICE group participated in the operation of the inner tracker detector with which the charged particle multiplicity was determined. They further performed detector simulations and data processing. The study is well cited, and the NPI is on the third place in the list of participating institutions.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Experimental observation of the optical spin transfer torque

obor: BH

Identifikátor: RIV/68378271: /12:00385603!RIV13-GA0-68378271

Id: 148

Předkladatel výsledku do Pilíře II.:

IČO: 68378271 Fyzikální ústav AV ČR, v. v. i.

Podíl předkladatele na výsledku: 48 %

#### Popis podílu předkladatele:

Joint laboratory of opto-spintronics of the team and of Charles University in Prague was responsible for all aspects of the work including the basic concept, sample growth and fabrication, experiments, and theory.

#### Odůvodnění předkladatele:

Angular momentum transfer from a spin-polarized electrical current to magnetization in a ferromagnet is the so called spin-transfer-torque phenomenon. It allows to write information in the latest generation of magnetic random access memories. This work reports the observation of an optical variant of the phenomenon, the so called optical spin-transfer-torque, in which magnetization is excited in a magnetic semiconductor by polarized photo-carriers at timescales which are several orders of magnitude shorter than in the electrically induced effect.

#### Odůvodnění panelu:

The authors report experimental observation of the optical spin transfer torque in a (Ga,Mn)As ferromagnetic semiconductor, building thus the bridge between two realms of spintronics research activities – the electrically driven magnetization aimed to a new generation of memory devices or tunable oscillators and the optical excitation of magnetic systems by laser pulses enabling realization of ultrafast spintronic devices. They demonstrated experimentally a phenomenon predicted theoretically a few years earlier. In the pump-and-probe experiments the spin angular momentum of photo-carriers generated by absorption of circularly polarized laser pulses is transferred to coherent spin precession - collective magnetization - excited in (Ga,Mn)As. The whole process is carefully quantitatively analyzed by two independent methods. This frequently cited result is of fundamental nature, yet it has a potential for future utilization in data-storage devices.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Exploiting dimensionality and defect mitigation to create tunable microwave dielectrics

obor: BM

Identifikátor: RIV/68378271: /13:00398671!RIV14-MSM-68378271

Id: 149

Předkladatel výsledku do Pilíře II.:

**IČO: 68378271 Fyzikální ústav AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **20 %**

#### Popis podílu předkladatele:

We performed THz and IR measurements and explained anomalously low microwave dielectric loss in Sr<sub>7</sub>Ti<sub>6</sub>O<sub>19</sub> thin films. American colleagues made the theory of strain-induced ferroelectric phase transition in this material, grew the thin films and performed

#### Odůvodnění předkladatele:

Scientists from Institute of Physics with American colleagues theoretically predicted, physically prepared and experimentally characterized layered perovskite system Sr<sub>n+1</sub>Ti<sub>n</sub>O<sub>3n+1</sub> with n=1-6. Although this system is non-ferroelectric in the bulk crystals or ceramics, their thin films become ferroelectric under tensile strain and their critical temperatures (T<sub>c</sub>) increase with n. Owing to this their permittivity and tunability increase. The best properties were obtained in Sr<sub>7</sub>Ti<sub>6</sub>O<sub>19</sub>, where high tunability and exceptionally low dielectric losses were observed. Sr<sub>7</sub>Ti<sub>6</sub>O<sub>19</sub> has one order of magnitude better microwave properties than widely used Ba<sub>1-x</sub>Sr<sub>x</sub>TiO<sub>3</sub>. Dielectric losses are usually caused by structural defects, which are always present in the materials. Authors found out that unique layered nanostructure of Sr<sub>n+1</sub>Ti<sub>n</sub>O<sub>3n+1</sub> „absorbs“ defects and therefore it exhibits low dielectric losses.

#### Odůvodnění panelu:

New approach to optimize layered perovskite systems based on Sr-Ti-O<sub>3</sub> for use as electronically tunable filters, antennas, resonators and phase shifters has been suggested and experimentally verified. The paraelectric system in bulk samples becomes ferroelectric in thin layers under tensile strain. Changing the film structure its dielectric properties, especially in the microwave region, can be optimized for relevant use and tuned by applied electric field. The structural defects that typically increase the dielectric losses and thus making a figure of merit worse are restrained by the specific layered structure. The scientific level of the paper is very high and the results are promising for design and improvement of modern technical applications.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Kitaev-Heisenberg Model on a Honeycomb Lattice: Possible Exotic Phases in Iridium Oxides $A_2\text{IrO}_3$

obor: BM

Identifikátor: **RIV/00216224:14310/10:00044328!RIV11-MSM-14310**

Id: 150

Předkladatel výsledku do Pilíře II.:

**IČO: 216224 Masarykova univerzita, Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **50 %**

#### **Popis podílu předkladatele:**

50% Main findings of the paper are obtained by numerical simulations devised and performed by the first author at Masaryk University.

#### **Odůvodnění předkladatele:**

By suggesting a possible realization of a spin-liquid phase in real materials, this paper initiated a large interest of the community and founded an entirely new line of research in the field of strongly frustrated magnetism. Highly Cited Paper - This article is in the top 1% of most highly cited publications in the discipline (Web of Science-Essential Science Indicators) Times Cited: 215 (Web of Science)

#### **Odůvodnění panelu:**

In the paper possible magnetic states in iridium oxides as the Néel state and spin-liquid phase are analyzed and a new stripy antiferroelectric phase established. The results are quite motivated for other research in the field, namely for frustrated magnetism, as it is evidenced by an enormous number of citations. This influential and highly cited study opens a new significant area of research and makes a notable progress in the corresponding field.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Measurement of the depth of maximum of extensive air showers above 1018 eV

obor: BF

Identifikátor: RIV/68378271: /10:00355260!RIV11-AV0-68378271

Id: 151

Předkladatel výsledku do Pilíře II.:

IČO: 68378271 Fyzikální ústav AV ČR, v. v. i.

Podíl předkladatele na výsledku: 8 %

#### Popis podílu předkladatele:

FZU group has contributed to the design and building of the fluorescence telescopes, to their operation and to monitoring of the system performance. During several years Jan Ridky headed all international groups that were responsible for the operation o

#### Odůvodnění předkladatele:

The Pierre Auger Observatory studies cosmic rays with extreme energies about 6 orders of magnitude larger than the energy of proton beams at LHC. This paper describes measurement of depths of shower maximum based on data from the fluorescence detector system. Showers induced by light primary particles reach their maximum at smaller depths than showers initiated by heavy nuclei. This way the composition of primary cosmic rays can be constrained. The results show that starting from energy of  $10^{18.3}$  eV the average shower depth decreases with energy compared to the prediction for light primary particles (protons). Also size of shower-to-shower fluctuations yields similar result. Light primary particles induce large fluctuations of depths of shower maxima while showers induced by heavy nuclei fluctuate much less. Again above the energy of  $10^{18.3}$  eV the size of fluctuations decreases. At energy of  $10^{19.2}$  eV the measured value even agrees with prediction of hadronic interaction models for iron nuclei. If our current knowledge of hadronic interaction models is not too far from reality, the composition of cosmic rays with energy above  $10^{18.3}$  eV has to change. As the energy increases, the primary cosmic rays contain more and more heavy elements and at the highest energies the majority of cosmic rays is heavy or has at least intermediate mass. The result was extensively discussed in the community of cosmic ray physicists, because protons were so far expected to be responsible for the highest energy cosmic rays. If on the other hand we insist on the original hypothesis that the ultra-high energy cosmic rays are really protons, then the character of hadronic interactions has to change dramatically at high energies. For example the interaction cross-section must rapidly increase in that case. The presented unique result and its consequences thus stimulated many other scientific works and it can represent an important break-through in the field of cosmic ray physics.

#### Odůvodnění panelu:

The article presents new results of the Pierre Auger Observatory in Argentina about the development of air showers initiated by cosmic muons of extremely high energies. The main device, which was used for data taking, is the fluorescence detector. It was constructed and operated with a large contribution of the team from the submitter institution, which has been involved in the Auger international collaboration for many years. Two Czech physicists analysed data and contributed considerably in the preparation of this significant paper.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Multiple soft-mode vibrations of lead zirconate

obor: BM

Identifikátor: RIV/68378271: /14:00431548!RIV15-AV0-68378271

Id: 152

Předkladatel výsledku do Pilíře II.:

IČO: 68378271 Fyzikální ústav AV ČR, v. v. i.

Podíl předkladatele na výsledku: 91 %

#### Popis podílu předkladatele:

J. Dec (external) provided sample, J. Drahokoupil helped with X-ray orientation of the sample. I.E. (external) helped with symmetry analysis. The experiment, mode assignment and theoretical modelling were well done in our Department of Dielectrics. J.H.

#### Odůvodnění předkladatele:

For the first time, six symmetry independent optical modes were measured in the single-domain PbZrO<sub>3</sub>. Analysis of the temperature dependences allowed to clear out the roll trilinear coupling term in the antiferroelectric transition of this model compound.

#### Odůvodnění panelu:

For the first time, six symmetry independent optical modes were established in the single-domain PbZrO<sub>3</sub>. The combined experimental and theoretical study yields insight into the phase transition mechanism in this model compound. This significant and well-cited result can help to discover new perspective antiferroelectrics as well as to model the behavior of properties of the current PbZrO<sub>3</sub>-based materials under temperature changes.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Physics of Solar Prominences: I-Spectral Diagnostics and Non-LTE Modelling

obor: BN

Identifikátor: RIV/67985815: /10:00354901!RIV11-AV0-67985815

Id: 153

Předkladatel výsledku do Pilíře II.:

**IČO: 67985815 Astronomický ústav AV ČR, v.v.i.**

Podíl předkladatele na výsledku: **0 %**

#### Popis podílu předkladatele:

The review is a joint effort of the ISSI team (International Space Science Institute, Bern), led by a young scientist N. Labrosse from Glasgow University. Three senior scientists (Heinzel, Vial, and Schmieder) have provided their long-term experience in t

#### Odůvodnění předkladatele:

Solar prominences represent an important aspect of the solar activity and their understanding is crucial for solar physics itself and for Sun-Earth connection studies. The paper reviews latest achievements in the physics of solar prominences and focuses on the non-equilibrium (non-LTE) spectroscopy and spectral diagnostics. We first describe the spectral inversion techniques that have been used to infer the plasma parameters important for the general properties of the prominence plasma in both its cool core and the hotter prominence-corona transition region. Then we review studies devoted to the observation of bulk motions of the prominence plasma and to the determination of prominence mass. However, a simple inversion of spectroscopic data usually fails when the lines become optically thick at certain wavelengths. Therefore, complex non-LTE models become necessary. We thus present the basics of non-LTE radiative transfer theory and the associated multi-level radiative transfer problems. The main results of one- and two-dimensional models of prominences and their fine-structures are presented. We then discuss the energy balance in various prominence models. Finally, we outline the outstanding observational and theoretical questions, and the directions for future progress in our understanding of solar prominences.

#### Odůvodnění panelu:

This extensive review summarizes the current knowledge about solar prominences. The result provides a very important contribution of the Czech co-authors to the topics of radiation transfer.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Room-temperature antiferromagnetic memory resistor

obor: BM

Identifikátor: RIV/68378271: /14:00434235!RIV15-AV0-68378271

Id: 154

Předkladatel výsledku do Pilíře II.:

IČO: 68378271 Fyzikální ústav AV ČR, v. v. i.

Podíl předkladatele na výsledku: 35 %

#### Popis podílu předkladatele:

The team members were responsible for the conceptual side of the work, performed experiments and theory analyses

#### Odůvodnění předkladatele:

Antiferromagnetic materials are magnetic inside, however, their microscopic magnetic moments sitting on individual atoms alternate between two opposite orientations. This antiparallel moment configuration in antiferromagnets, instead of the parallel configuration in ferromagnets, makes the magnetism in antiferromagnets invisible on the outside. It implies that if information was stored in an antiferromagnetic memory it would be insensitive to and would not produce disturbing magnetic fields. This work demonstrates that it is possible to use antiferromagnets to store information.

#### Odůvodnění panelu:

This important study demonstrates for the first time that it is possible to use antiferromagnetic material to store information. The material, FeRh resistor, is ferromagnetic 100K above the room temperature, where the Fe moments can be aligned by the magnetic field and cooling down the room temperature under field ensures the writing of information. A microscopy theory modeling confirms that this effect is based on a classical spintronic effect, discovered more than 150 years ago in ferromagnets. The authors used modelling to show that spintronic effect known for ferromagnets is also presented in antiferromagnets. The presented findings offer new available magnetic materials for devices with properties, which cannot be achieved with ferromagnets.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Spin-dependent phenomena and device concepts explored in (Ga,Mn)As

obor: BM

Identifikátor: RIV/68378271: /14:00435705!RIV15-AV0-68378271

Id: 155

Předkladatel výsledku do Pilíře II.:

**IČO: 68378271 Fyzikální ústav AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **53 %**

#### Popis podílu předkladatele:

The team members have led numerous studies presented in the review as well as the work on the review itself. In this research area the team was active in the whole range of studies starting from the preparation of world-class materials, fabrication of nan

#### Odůvodnění předkladatele:

Over the past two decades, the research of ferromagnetic semiconductors, with (Ga,Mn)As as a prime example, has led to a deeper understanding of relativistic spin-dependent phenomena in magnetic systems. The work presents a comprehensive review of this active field of condensed matter physics.

#### Odůvodnění panelu:

This extensive review of basic material properties of ferromagnetic semiconductor (Ga, Mn)As contributes to deeper understanding of relativistic spin-dependent phenomena in magnetic systems. Special focus is on the spin-orbit coupling induced effects and also the interaction of spin with electrical current, light, and heat is included. Many studies concerning the relativistic phenomena in (Ga,Mn)As may become directly relevant to room-temperature magnetic systems with strong spin-orbit coupling and may therefore lead to new technological applications, independent of the existing limits of the Curie temperature in the ferromagnetic semiconductors. The result provides an important contribution of the Czech co-authors to the topics of the ferromagnetic semiconductor (Ga, Mn)As.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Architectural switch in plant photosynthetic membranes induced by light stress

obor: BO

Identifikátor: RIV/60077344: /12:00391198!RIV13-AV0-60077344

Id: 156

Předkladatel výsledku do Pilíře II.:

**IČO: 60077344 Biologické centrum AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **16,7 %**

#### Popis podílu předkladatele:

H.K. designed research; M.H., S.T., C.K., M.V.T., and H.K. performed research; M.H., S.T., C.K., M.V.T., and H.K. analyzed data; and M.H. and H.K. wrote the paper.

#### Odůvodnění předkladatele:

In this study, unique combinations of confocal laser scanning microscopy (CLSM) and mathematical image analysis were used to study structural changes of the grana arrangement in intact protoplasts induced by high-light (HL) treatment. These structural studies were complemented by compositional analysis of isolated stroma lamellae and protein diffusion measurements by FRAP on isolated grana thylakoids. The results reveal that high light stress induced two main structural changes that work synergistically to improve the accessibility between damaged PSII in grana and its repair machinery in stroma lamellae: lateral shrinkage of grana diameter and increased protein mobility in grana thylakoids. The architectural switch of the thylakoid membrane system is an elegant way of enhancing the multiple diffusion-dependent reactions involved in the PSII repair cycle.

#### Odůvodnění panelu:

Unique combinations of confocal laser scanning microscopy and mathematical image analysis were used to discover response of plant photosystem to light stress. The results reveal that high light stress induced structural changes work synergistically to trigger and improve reparation mechanisms essential for plant survival. The paper was published in a high-ranked journal and its importance is substantiated by high number of citations.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Continuous variable quantum key distribution with modulated entangled states

obor: BH

Identifikátor: RIV/61989592:15310/12:33140115!RIV13-GA0-15310

Id: 157

Předkladatel výsledku do Pilíře II.:

**IČO: 61989592 Univerzita Palackého v Olomouci, Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **57,1 %**

#### Popis podílu předkladatele:

The paper contains jointly novel theoretical and experimental results. The theory was done by the group in Olomouc, and the experiment was performed by the team in Lyngby who employed a highly specialized home-made experimental equipment that is not avail

#### Odůvodnění předkladatele:

Quantum key distribution is the first direct application of quantum states of light. In this work, we present both the theoretical proposal and the first experimental test of optimal quantum key distribution with modulated Gaussian entangled states of light. In the theoretical proposal, we proved that any Gaussian entanglement can substantially improve the performance of quantum key distribution as compared to the standard protocol based on coherent states. This is surprising since the entangled states are more fragile and sensitive to losses and decoherence than coherent states. Moreover, we found an optimal quantum encoding of modulated entangled states for a given channel and maximum available quantum squeezing. Further, we clarified how much the quantum squeezing prolongs a distance at which secure key can be transmitted. We experimentally verified the optimal Gaussian encoding for quantum key distribution with entangled states and demonstrated that the quantum squeezing provides a useful and robust resource for quantum communication which can substantially increase the distance of Gaussian quantum key distribution.

#### Odůvodnění panelu:

This result presents an important contribution to extending the distance of secure communication by inventing a continuous variable quantum key distribution protocol that uses modulated entangled states of light. It opens a new way of establishing secure communication using quantum key distribution, which helps to make quantum communication more practical. It is a very important contribution for the further development of the field and sets the basis for new thinking in the field

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Decoherence and Disorder in Quantum Walks: From Ballistic Spread to Localization

obor: BE

Identifikátor: RIV/68407700:21340/11:00182110!RIV12-MSM-21340

Id: 158

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Fakulta jaderná a fyzikálně inženýrská**

Podíl předkladatele na výsledku: **50 %**

#### Popis podílu předkladatele:

50% - The work is the result of our collaboration with one of our German partners. The German partner realized the actual experiment. The CTU team contributed to the design of the experiment, carried out the theoretical part, and contributed to the analysis

#### Odůvodnění předkladatele:

We have investigated the impact of decoherence and static disorder on the dynamics of quantum particles moving in a periodic lattice. Our experiment relies on the photonic implementation of a one-dimensional quantum walk. The pure quantum evolution is characterized by a ballistic spread of a photon's wave packet along 28 steps. By applying controlled time-dependent operations we simulated three different environmental influences on the system, resulting in a fast ballistic spread, a diffusive classical walk, and Anderson localization, which was realized for the first time in a discrete quantum walk architecture. As demonstrated by the high number of citations (83 as of June 2015 according to the WoS), the paper has significantly stimulated the research in the fields of quantum walks, decoherence and Anderson localization. The work was cited by numerous papers published in prestigious journals such as L. Sansoni et al., Phys. Rev. Lett. 108, 010502 (2012), A. Aspuru-Guzik, P. Walther, Nature Physics 8, 285 (2012) or A. Crespi et al., Nature Photonics 7, 322 (2013). In addition, the design of the experiment was used in the book K. Manouchehri, J. Wang, Physical implementation of quantum walks, Springer-Verlag Berlin Heidelberg (2014), as one of the reference experiments of quantum walks based on linear optics.

#### Odůvodnění panelu:

Authors presented the role of disorder and fluctuations for dynamics of quantum particles in a periodic lattice using the photonic implementation of a one-dimensional quantum walk, i.e. the first experimental realization of quantum walks with controlled dynamics by means of evolution of the particle's wavepacket in an environment with static and/or dynamic disorder. The high flexibility of the method allows not only the study of further decoherence phenomena in quantum walks but also to simulate specific physical scenarios of interest for the solid state and biophysics community. This well-cited result has significantly stimulated the research in the fields of quantum walks, decoherence and Anderson localization.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Direct observation of half-metallicity in the Heusler compound Co<sub>2</sub>MnSi

obor: BM

Identifikátor: RIV/49777513:23640/14:43922493!RIV15-MSM-23640

Id: 159

Předkladatel výsledku do Pilíře II.:

**IČO: 49777513 Západočeská univerzita v Plzni, Nové technologie -  
výzkumné centrum**

Podíl předkladatele na výsledku: **30 %**

#### **Popis podílu předkladatele:**

30%, The paper contains two parts: experimental (50%) and theoretical one (50%). Doc. Minar is the main author of the theory together with two others co-authors.

#### **Odůvodnění předkladatele:**

"The publication of Jourdan et al. was recently published in the Nature Communications which is a member of the prestigious nature publishing group. Nature communications has quite high impact factor of 10.742. This manuscript was published on 30.5.2014 and found quite high interest which is reflected in 11 scientific citations (see

[http://scholar.google.de/scholar?start=0&hl=de&as\\_sdt=0,5&sciodt=0,5&cites=10742952352484503708&scips c= \)](http://scholar.google.de/scholar?start=0&hl=de&as_sdt=0,5&sciodt=0,5&cites=10742952352484503708&scips c= )) and among them 5 in impact journals. Quite high interest of the scientific community is also shown by the 4130 views of its webpage (<http://www.nature.com/ncomms/2014/140530/ncomms4974/metrics>). Shortly after the publication of this paper several popular scientific articles and press releases appeared (see above link). In Czech republic this paper was presented in the newspaper of Westbohemian University and in the well known popular scientific magazine „Vesmír“. It is important to note that both main authors of this paper (M. Jourdan (Uni Mainz) main author of for the experimental part and J. Minar main author of the theoretical part of this work) has been invited to present this work on several seminars and important international conferences. Among other we would like to mention: J. Minar: 3.6. 2014, CEA Seminar, Solei (Pariz); 30.6.-2.7. 2014 Strong electron correlation effects in complex d- and f-based magnetic materials for technological applications FZU, Praha; 6.-10.9 2015, Psi\_k 2015 San Sebastian, Spain. M. Jourdan: 3.-7.11. 2014, 59th Annual Magnetism& Magnetic Materials Conference (MMM), Honolulu, USA; 9.-13.8.2015, SPIE NanoScience + Engineering, San Diego, USA. This papers was published in the journal Nature Communications with IF 10.742 (2013), according to WoS: 30 citation."

#### **Odůvodnění panelu:**

Ferromagnetic thin films of Heusler compounds are supposed to be highly relevant for spintronic applications owing to their predicted half-metallicity, that is, 100% spin polarization at the Fermi energy. The authors significantly contributed to experimental evidence of this property investigating epitaxial thin films of Co<sub>2</sub>MnSi compound by spin-integrated high energy X-ray and ultraviolet-photoemission spectroscopy. All experimental results are compared with advanced band structure and photoemission calculations including surface related effects. Excellent agreement is obtained with calculations, which show a highly spin polarized bulklike surface resonance ingrained in a half metallic bulk band structure. The authors also predicted possible improvement of properties by optimization of the thin films growth. This well-cited result has also gained a significant interest at international conferencies.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Ion Kinetics in the Solar Wind: Coupling Global Expansion to Local Microphysics

obor: BN

Identifikátor: RIV/68378289: /12:00381437!RIV13-AV0-68378289

Id: 160

Předkladatel výsledku do Pilíře II.:

**IČO: 68378289 Ústav fyziky atmosféry AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **20 %**

#### Popis podílu předkladatele:

The paper was written by an international team with main contributions from Lorenzo Matteini (Universita di Firenze) and Petr Hellinger (Astronomical institute and Institute of Atmospheric Physics, CAS). Contribution of IAP (Petr Hellinger and Pavel Travn

#### Odůvodnění předkladatele:

The solar wind constitutes a natural laboratory for studying properties and basic phenomena in weakly collisional astrophysical plasmas with in situ direct measurements. The paper reviews the properties of fundamental ion kinetic processes, such as kinetic instabilities, Coulomb collisions, parametric instabilities of Alfvén wave and their influence on the microscopic and macroscopic radial evolution of the solar wind plasma. This review paper (in the journal Space Science Reviews with the current impact factor 6.283) attracted a considerable attention (34 non-autocitations on the Web of Science).

#### Odůvodnění panelu:

This authoritative review presents examples of the ion kinetic processes in the solar wind and it focuses on the role of the solar wind expansion that induces changes in the characteristic wave and particle scales. The authors summarize recent results from the hybrid expanding box simulation model that is currently under development. These simulation results are compared with observations by many authors. High number of citations emphasizes the importance of the result.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Laser-driven proton acceleration enhancement by nanostructured foils

obor: BL

Identifikátor: RIV/68378271: /12:00390057!RIV13-GA0-68378271

Id: 161

Předkladatel výsledku do Pilíře II.:

**IČO: 68378271 Fyzikální ústav AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **42 %**

#### Popis podílu předkladatele:

The authors from IP-CAS proposed and designed the experiment, carried out the acceleration of protons and analysis of the experimental data. The first/corresponding author is from IP-CAS. Co-authors from the Czech Technical University in Prague fabricated

#### Odůvodnění předkladatele:

This work presents the first experimental demonstration of application of a new nanostructure of thin plastic foils which allows enhancing the laser-driven proton beam acceleration. In particular, the presence of a monolayer of polystyrene nanospheres on the target front side has significantly enhanced the absorption of the incident 100 TW laser beam, leading to a consequent increase in the maximum proton energy and beam charge. The cutoff energy increased by about 60% for the optimal spheres' diameter of 535 nm in comparison to the planar foil. The total number of protons with energies higher than 1 MeV was increased approximately 5 times. Experimental results were interpreted and discussed by means of particle-in-cell simulations.

#### Odůvodnění panelu:

The authors have demonstrated experimentally that proper nanostructuring of the laser target foil surface can significantly improve the efficiency of the proton beam generation. Thus, e.g. the presence of a monolayer of polystyrene nanospheres on the target front side resulted in increasing both the maximum proton energy by about 60% and the beam charge of protons with energies above 1 MeV approximately 5 times in comparison to the planar foil for the optimal sphere diameter of 535 nm, i.e. comparable with the laser beam wave length. The importance of this result for theory as well as for applications is stressed out by high number of citations.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Laser-Driven Proton Acceleration Enhancement by Nanostructured Foils

obor: BL

Identifikátor: RIV/68407700:21340/12:00201808!RIV13-MSM-21340

Id: 162

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Fakulta jaderná a fyzikálně inženýrská**

Podíl předkladatele na výsledku: **27 %**

#### Popis podílu předkladatele:

27% - The result described in this paper is the proof-of-principle demonstration of our theoretical proposal described in the paper New Journal of Physics, vol. 13, art. no. 053028 (2011). Based on this paper, our theoretical group (O. Klimo, J. Pšikal an

#### Odůvodnění předkladatele:

Laser-irradiated solid targets can serve as microscopic intense sources of collimated energetic ion beams, which are interesting for applications, such as proton imaging, isochoric heating and hadron therapy. This paper demonstrates for the first time that the efficiency of ion beam generation can be improved manifold by using a special microstructure on the laser irradiated side of the target. The microstructure consists of monolayer of polystyrene micro-spheres and it is deposited on the surface of a thin plastic foil. The structure helps to increase laser absorption and energy coupling to high energy electrons and subsequently to fast ions with cutoff energy increase of 60% and 5 times higher efficiency. This challenging experiment has been performed on the state-of-the-art high-power laser system with ultrahigh contrast and it opens new direction in ion beam improvement by using optimized target design on the micrometer scale.

#### Odůvodnění panelu:

The authors have demonstrated experimentally that proper nanostructuring of the laser target foil surface can significantly improve the efficiency of the proton beam generation. Thus, e.g. the presence of a monolayer of polystyrene nanospheres on the target front side resulted in increasing both the maximum proton energy by about 60% and the beam charge of protons with energies above 1 MeV approximately 5 times in comparison to the planar foil for the optimal sphere diameter of 535 nm, i.e. comparable with the laser beam wave length. The importance of this result for theory as well as for applications is stressed out by high number of citations.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Photons Walking the Line: A Quantum Walk with Adjustable Coin Operations

obor: BE

Identifikátor: RIV/68407700:21340/10:00163912!RIV11-MSM-21340

Id: 163

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Fakulta jaderná a fyzikálně inženýrská**

Podíl předkladatele na výsledku: **38 %**

#### Popis podílu předkladatele:

38% - The work is the result of our collaboration with one of our German partners. The German partner realized the actual experiment. The CTU team contributed to the design of the experiment, carried out the theoretical part, and contributed to the analysis

#### Odůvodnění předkladatele:

We presented the first robust implementation of a coined quantum walk over five steps using only passive optical elements. By employing a fiber network loop we keep the amount of required resources constant as the walker's position Hilbert space is increased. We observed a non-Gaussian distribution of the walker's final position, thus characterizing a faster spread of the photon wave packet in comparison to the classical random walk. The walk is realized for many different coin settings and initial states, opening the way for the implementation of a quantum-walk-based search algorithm. The design of the experiment proved to be extremely flexible and its modifications lead to experimental studies of decoherence and Anderson localization in quantum walks (A. Schreiber, K. N. Cassemiro, V. Potoček, A. Gabris, I. Jex and C. Silberhorn, Phys. Rev. Lett 106, 180403 (2011)) and the first experimental realization of a 2D quantum walk (A. Schreiber, A. Gabris, P. P. Rohde, K. Laiho, M. Štefaňák, V. Potoček, C. Hamilton, I. Jex and C. Silberhorn, Science 336, 55 (2012)). The experiment has stimulated the research in the field of quantum walks and their application in quantum information processing both on the theoretical and experimental level. The paper has attracted significant attention in the field of quantum information which is demonstrated by the high number of citations (148 as of June 2015 according to the WoS). Among others, the paper was cited by A. Peruzzo et al., Science 329, 1500 (2010), A. Regensburger et al., Nature 488, 167 (2012), A. Aspuru-Guzik, P. Walther, Nature Physics 8, 285 (2012) or T. Kitagawa et al., Nature Communications 3, 882 (2012). The paper was extensively commented on in the book K. Manouchehri, J. Wang, Physical implementation of quantum walks, Springer-Verlag Berlin Heidelberg (2014) as one of the reference experiments of quantum walks.

#### Odůvodnění panelu:

The authors have presented the first robust implementation of a coined quantum walk over five steps using only passive optical elements. The walk is realized for many different coin settings and initial states, opening the way for the implementation of a quantum-walk-based search algorithm. The design of the experiment proved to be extremely flexible and its modifications lead to experimental studies of decoherence and Anderson localization in quantum walks. This is obviously a seminal result in the field of quantum information. The paper has gained a high number of citations in excellent journals demonstrating that it has attracted a lot of attention in the quantum-information community and it holds a promise to affect the field significantly.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### The fluorescence detector of the Pierre Auger Observatory

obor: BF

Identifikátor: RIV/68378271: /10:00354511!RIV11-AV0-68378271

Id: 164

Předkladatel výsledku do Pilíře II.:

**IČO: 68378271 Fyzikální ústav Akademie věd ČR, v. v. i.**

Podíl předkladatele na výsledku: **8 %**

#### Popis podílu předkladatele:

The article was created under the leadership of the Prague group and includes the activities of all international institutions collaborating on the Fluorescence detector. To publish such a reference paper was one of the ambitions of J. Ridky who served as

#### Odůvodnění předkladatele:

This long paper concisely describes all the components of the fluorescence detector of the Pierre Auger Observatory including its optical system, the design of the camera, the electronics, and the systems for relative and absolute calibrations. The operation and the monitoring of the detector are discussed and the detector performance and precision of the shower reconstruction is evaluated. The Pierre Auger Observatory measures the atmospheric showers produced by nuclear interactions of the primary cosmic particle with air nuclei. For the first time the observatory combines two measurement techniques – that of surface array covering 3000 km<sup>2</sup> of Argentinian pampa and of fluorescence telescopes. Thus the precision of the shower reconstruction is much better than in previous experiments. The paper is the major reference to the current largest system of fluorescence telescopes ever built.

#### Odůvodnění panelu:

The Pierre Auger Observatory is a hybrid detector for ultra-high energy cosmic rays. It combines a surface array to measure secondary particles at ground level together with a fluorescence detector to measure the development of air showers in the atmosphere above the array. The Auger Observatory has opened a new chapter in cosmic ray physics because of both the large number of recorded high energy air showers and the quality of the hybrid measurements. Enormous number of citations proves the importance of the paper and a great significance for the relevant scientific community. The Pierre Auger Observatory is a hybrid detector for ultra-high energy cosmic rays. It combines a surface array to measure secondary particles at ground level together with a fluorescence detector to measure the development of air showers in the atmosphere above the array. The Auger Observatory has opened a new chapter in cosmic ray physics because of both the large number of recorded high energy air showers and the quality of the hybrid measurements. Enormous number of citations proves the importance of the paper and a great significance for the relevant scientific community.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

**Aqueous-phase chemistry and bactericidal effects from an air discharge plasma in contact with water: Evidence for the formation of peroxynitrite through a pseudo-second-order post-discharge reaction of H<sub>2</sub>O<sub>2</sub> and HNO<sub>2</sub>**

**obor: BL**

**Identifikátor: RIV/61389021: /14:00435983!RIV15-AV0-61389021**

**Id: 165**

Předkladatel výsledku do Pilíře II.:

**IČO: 61389021 Ústav fyziky plazmatu AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **100 %**

### **Popis podílu předkladatele:**

This work was carried out at IPP CAS 100 %

### **Odůvodnění předkladatele:**

This paper describes mechanisms of peroxynitrite (ONOOH) formation in water being treated by an air discharge plasma and its aqueous-phase post-discharge chemistry in plasma treated water. Previously, the formation of peroxynitrite was proposed by many authors, however, its experimental evidence was rather limited. Half-life of ONOOH is typically less than 1 s in acidic solutions, which implies its very low steady-state concentrations possibly present in plasma-treated water and hence explains the difficulty to detect ONOOH directly in plasma-treated water. In this work, for the first time, the formation of ONOOH in plasma-treated water was experimentally proved and the rate constant for the formation of peroxynitrite by the pseudo-second-order reaction of H<sub>2</sub>O<sub>2</sub> and HNO<sub>2</sub> in plasma-treated water was quantitatively determined. Evidence on the post-discharge formation of NO<sub>2</sub>, NO and OH radicals and NO<sup>+</sup> ions in plasma treated water mediated by peroxynitrite was given based on the detection of specific hydroxylated and nitrated products of phenol used as the chemical probe. Strong bactericidal effects of ONOOH in water treated by air plasma has been demonstrated. This paper was selected in the Highlights of 2014 collection of excellent works published in journal Plasma Sources Sci. Technol. based on outstanding research and impact on the low-temperature plasmas community. In Web of Science this paper currently ranks to the category of Highly Cited Paper as it received enough citations to place in the top 1% of the academic field of Physics based on a highly cited threshold for the field and publication year.

### **Odůvodnění panelu:**

This is an important result on the post-discharge formation of NO<sub>2</sub>, NO and OH radicals and NO<sup>+</sup> ions in plasma treated water mediated by peroxynitrite (100% by authors from the nominating institution). It facilitates notable progress in the existing field and has been very well accepted by the community, which is reflected in a high number of citations.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### The unusual gamma-ray burst GRB 101225A from a helium star/neutron star merger at redshift 0.33

obor: BF

Identifikátor: RIV/68378271: /11:00371960!RIV12-AV0-68378271

Id: 166

Předkladatel výsledku do Pilíře II.:

IČO: 68378271 Fyzikální ústav Akademie věd ČR, v. v. i.

Podíl předkladatele na výsledku: 10 %

#### Popis podílu předkladatele:

GRB 101225A was observed by multiple, both ground base and space based telescopes. For GRB observations, the earliest data, which can show variability of the source, are the most important. One of such early data points were acquired by Spanish CAHA obser

#### Odůvodnění předkladatele:

Gamma Ray Bursts, or GRBs, are the most powerful explosions in know universe. GRB 101225A, also known as the ""Christmas burst"", was a cosmic explosion first detected by NASA's Swift observatory on Christmas Day2010. The gamma-ray emission lasted at least 28 minutes, which is unusually long. Follow-up observations of the burst's afterglow by the Hubble Space Telescope and ground-based observatories were unable todetermine the object's distance using spectroscopic methods. In papers published in the journal Nature, two different groups of astronomers proposed different theories about the event's origin. Sergio Campana's group proposes that the event was caused by a comet crashing onto a neutron star within our own galaxy. Christina Thöne's group, where Petr Kubánek was member, prefers a more conventional supernova mechanism, involving a merger between a helium star and a neutron star at a distance of about 5.5 billion light years from Earth. Both explanations present a novel mechanism for the GRB origin, points out how few we know about classifications of GRBs events.

#### Odůvodnění panelu:

Gamma-ray bursts are supposed to be generated by massive stellar deaths and they are often associated with supernovae. The paper reports observations of the unusual burst that was exceptionally long-lived and was followed by a bright X-ray transient with a hot thermal component and an unusual optical counterpart. The paper discusses possible sources of this burst. Large number of citations supports the classification as the excellent result.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Spontaneous Current-layer Fragmentation and Cascading Reconnection in Solar Flares. I. Model and Analysis

obor: BN

Identifikátor: RIV/67985815: /11:00364790!RIV12-AV0-67985815

Id: 167

Předkladatel výsledku do Pilíře II.:

**IČO: 67985815 Astronomický ústav AV ČR, v.v.i.**

Podíl předkladatele na výsledku: **0 %**

#### Popis podílu předkladatele:

Contribution of the Department of Solar Physics of the Astronomical Institute is dominant: idea and the adaptive high-resolution MHD code that is essential for the result was developed at the Astronomical Institute (MB). The same is true for analysis (MB)

#### Odůvodnění předkladatele:

Magnetic reconnection is commonly considered to be a mechanism of solar flares. There is a fundamental question of how the magnetic energy is transferred from large, accumulation scales to plasma scales where its actual dissipation takes place. In order to investigate this transfer over a broad range of scales, we address this question by means of a high-resolution MHD simulation. The simulation results indicate that the magnetic-energy transfer to small scales is realized via a cascade of consecutively smaller and smaller flux ropes (plasmoids), analogous to the vortex-tube cascade in fluid dynamics. Both tearing and "fragmenting coalescence" processes are equally important for the consecutive fragmentation of the magnetic field and associated current density into smaller elements. At the later stages, a dynamic balance between tearing and coalescence processes reveals a steady scaling typical of cascading processes. The spontaneous current-layer fragmentation and the formation of multiple channelized dissipative/acceleration regions embedded in the current layer appear to be intrinsic to the cascading process. The multiple small-scale current sheets may also facilitate the acceleration of a large number of particles. The structure, distribution, and dynamics of the embedded potential acceleration regions in a current layer fragmented by cascading reconnection are studied and discussed. The result is essential in application of theory of magnetic reconnection to solar flares but exceeds the frame of solar physics and represents a contribution to the general theory of magnetic reconnection and MHD turbulence.

#### Odůvodnění panelu:

Magnetic reconnection is one of principal processes in in the magnetized plasma. The paper presents results of the high-resolution MHD simulations indicating that the magnetic-energy transfer to small scales is realized via a cascade of consecutively smaller and smaller flux ropes, analogous to the vortex-tube cascade in fluid dynamics. The results are important for astrophysics, geophysics as well as for the fusion devices. The number of citation stresses out the importance of the paper.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

**Electrocatalytic monitoring of metal binding and mutation-induced conformational changes in p53 at picomole level.**

**obor: BO**

**Identifikátor: RIV/68081707: /11:00373453!RIV12-AV0-68081707**

**Id: 168**

Předkladatel výsledku do Pilíře II.:

**IČO: 68081707 Biofyzikální ústav AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **0 %**

### **Popis podílu předkladatele:**

The work was done in the frame of European Community FP6 funding. The authors from the Institute designed research, performed research, analyzed data and wrote the paper (the first and corresponding authors were from the Department). Sir A. Fersht's labor

### **Odůvodnění předkladatele:**

We developed an innovative electrochemical method for monitoring conformational transitions in proteins using constant current chronopotentiometric stripping (CPS) with dithiothreitol-modified mercury electrodes. The method was applied to study the effect of oncogenic mutations on the DNA-binding domain of the tumor suppressor p53. The CPS responses of wild type and mutant p53 showed excellent correlation with structural and stability data and provided additional insights into the differential dynamic behavior of the proteins. Further, we were able to monitor the loss of an essential zinc ion resulting from mutation (R175H) or metal chelation.

### **Odůvodnění panelu:**

The paper deals with new method that can be applied to study the oncogenic mutations on the DNA. The well-cited results may have wide applications in protein science.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Piezo-electric control of the mobility of a domain wall driven by adiabatic and non-adiabatic torques

obor: BM

Identifikátor: RIV/68378271: /13:00397449!RIV14-MSM-68378271

Id: 169

Předkladatel výsledku do Pilíře II.:

**IČO: 68378271 Fyzikální ústav AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **43 %**

#### Popis podílu předkladatele:

The team members were responsible for the conceptual side of the work, performed selected experiments and theory analyses.

#### Odůvodnění předkladatele:

The rich internal degrees of freedom of magnetic domain walls make them an attractive complement to electron charge for exploring new concepts of storage, transport and processing of information. This work exploits the tunable internal structure of a domain wall in a perpendicularly magnetized GaMnAsP/GaAs ferromagnetic semiconductor and demonstrates devices in which piezoelectrically controlled magnetic anisotropy yields up to 500% mobility variations for an electrical-current-driven domain wall.

#### Odůvodnění panelu:

This study provides a principle experimental analysis of the mobility of current-driven domain walls in GaMnAsP/GaAs ferromagnetic semiconductor controlled in situ by a piezoelectric stressor, which can change the wall mobility up to 500%. The results point to a research direction towards spin-based storage, transport and processing of information.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Serine phosphorylation and proline isomerization in RNAP II CTD control recruitment of Nrd1

obor: BO

Identifikátor: **RIV/00216224:14740/12:00057508!RIV13-GA0-14740**

Id: 170

Předkladatel výsledku do Pilíře II.:

**IČO: 216224 Masarykova univerzita, Středoevropský technologický institut**

Podíl předkladatele na výsledku: **90 %**

#### Popis podílu předkladatele:

90%This work was fully accomplished at Masaryk university.

#### Odůvodnění předkladatele:

In 2012 the groups of Dr. Stefl and Dr. Vanacova published important discovery, which concerns the timing of protein-protein interactions which are crucial for proper transcription and regulation of eukaryotic genes. The results were published in the Genes&Development journal. In detail, they revealed, that the association of the RNA binding factor Nrd1p, which is crucial for the transcription termination and processing of noncoding RNAs, is dictated by the combination of phosphorylation and isomerization of proline residues in the C-terminal domain of RNA Polymerase II. This interplay between covalent and noncovalent modifications, which is regulated by kinases/phosphatases and isomerisases, plays a key role in the dynamic exchange of processing factors during the transcription cycle.

#### Odůvodnění panelu:

The results are important for understanding the protein-protein interactions which are crucial for proper transcription and regulation of eukaryotic genes. The results are published in prestigious journal and highly cited.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Controlling birefringence in dielectrics

obor: BH

Identifikátor: **RIV/00216224:14310/11:00052405!RIV12-MSM-14310**

Id: 171

Předkladatel výsledku do Pilíře II.:

**IČO: 216224 Masarykova univerzita, Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **30 %**

#### **Popis podílu předkladatele:**

30% Know-how very significantly belongs to Masaryk University. Tomas Tyc from Masaryk University provided the necessary know-how of how to design the refractive index profile, which was of a key importance for the functionality of the optical devices propo

#### **Odůvodnění předkladatele:**

The method described in the paper was later used by other authors [V. Smolyaninova et al, Phys. Rev. B 87, 075406 (2013)] to experimentally demonstrate the first-ever birefringent transformation optics device. Birefringence, from the very essence of the word itself, refers to the splitting of light rays into two parts. In natural birefringent materials, this splitting is a beautiful phenomenon, resulting in the perception of a double image. In optical metamaterials, birefringence is often an unwanted side effect of forcing a device designed through transformation optics(1-6) to operate in dielectrics. One polarization is usually implemented in dielectrics, and the other is sacrificed(7,8). Here we show, with techniques beyond transformation optics, that this need not be the case, that both polarizations can be controlled to perform useful tasks in dielectrics, and that rays, at all incident angles, can even follow different trajectories through a device and emerge together as if the birefringence did not exist at all. A number of examples are shown, including a combination Maxwell fisheye/Luneburg lens that performs a useful task and is achievable with current fabrication materials.

#### **Odůvodnění panelu:**

New methodology based on transformation optics for design of useful optical devices is presented. It is a quite contemporary subject showing that both polarizations produced by birefringence can be fully controlled and that rays, at all incident angles, can even follow different trajectories through a device and emerge together as if the birefringence did not exist at all. The intended devices can be fabricated using current fabrication materials. This result may have significant impact in future as it may significantly improve properties of metamaterials and/or other materials used in advanced optics.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Origin of the low-mass electron pair excess in light nucleus-nucleus collisions

obor: BG

Identifikátor: RIV/61389005: /10:00355992!RIV11-MSM-61389005

Id: 172

Předkladatel výsledku do Pilíře II.:

**IČO: 61389005 Ústav jaderné fyziky AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **10 %**

#### Popis podílu předkladatele:

10 % Crucial part of HADES for identification of proton spectator emitted forward in studied d+p collisions is FW designed, installed and operated by Czech team in collaboration with our Russian colleagues. Also TOF subdetector was developed, installed an

#### Odůvodnění předkladatele:

We report measurements of electron pair production in elementary p+p and d+p reactions at 1.25 GeV/u with the HADES spectrometer. For the first time, the electron pairs were reconstructed for n+p reactions by detecting the proton spectator from the deuteron breakup. We find that the yield of electron pairs with invariant mass  $M_{e+e^-} > 0.15$  GeV/c<sup>2</sup> is about an order of magnitude larger in n+p reactions as compared to p+p. A comparison to model calculations demonstrates that the production mechanism is not sufficiently described yet. The electron pair spectra measured in C+C reactions are compatible with a superposition of elementary n+p and p+p collisions, leaving little room for additional electron pair sources in such light collision systems.

#### Odůvodnění panelu:

The article presents an interesting and unexpected results of the measurement of the HADES spectrometer installed at the GSI Helmholtz Zentrum. The group of the submitter institution has been participated for long time in the construction of the spectrometer which is a complex detection apparatus, in the operation of the experiments and data processing. The group contribution to the article results is important since the Czech group members were responsible for running of two crucial subdetectors, for data analysis and for preparing the publication.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### The holographic optical micro-manipulation system based on counter-propagating beams

obor: BH

Identifikátor: RIV/68081731: /11:00350886!RIV11-AV0-68081731

Id: 173

Předkladatel výsledku do Pilíře II.:

**IČO: 68081731 Ústav přístrojové techniky AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **80 %**

#### Popis podílu předkladatele:

80% - The whole setup was built in the laboratories of the submitter and the experiments were run there as well. The foreign authors together with PZ came with the idea to build and run such an experiment. The foreign authors participated personally only a

#### Odůvodnění předkladatele:

The present a world-wide unique system employing a dynamic diffractive optical element to control properties of two counter-propagating beams overlapping within a sample chamber. This system allows us to eliminate optical aberrations along both beam pathways in situ and arbitrarily switch between various numbers of laser beams and their spatial profiles (i.e. Gaussian, Laguerre-Gaussian, Bessel beams, etc.) without mechanical modification of the system. This approach represents the most flexible optical micromanipulation system which has been ever presented. It is able to manipulate both high and low index particles in water or air, particle delivery over hundreds of micrometers in an optical conveyor belt and the formation of colloidal structures by optical binding. Furthermore a novel class of applications were demonstrated - optical three-dimensional mixers created by particles spiraling in counter-propagating interfering optical vortices together with a new tool for optical tomography or localized spectroscopy enabling sterile contactless rotation and reorientation of a single optically trapped living cell.

#### Odůvodnění panelu:

The paper describes the most flexible optical micromanipulation system which has been ever presented. It is able to manipulate particles in water or air, it can deliver particle over hundreds of micrometers or form colloidal structures by optical binding. Usefulness of the system is proven by a relatively high number of citations.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Towards energy efficient nanobubble generation with fluidic oscillation

obor: BK

Identifikátor: RIV/61388998: /11:00361204!RIV12-AV0-61388998

Id: 174

Předkladatel výsledku do Pilíře II.:

**IČO: 61388998 Ústav termomechaniky AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **50 %**

#### **Popis podílu předkladatele:**

50% in Institute of Thermomechanics of the CAS The team of Prof. Zimmerman and his PhD student H. Bandulasena at the University of Sheffield was instrumental in the use of Tesař's fluidic oscillators to show how to produce inexpensive nanobubbles. It w

#### **Odůvodnění předkladatele:**

Nanobubbles were until recently an enigma. Their very existence, which has been doubted, is now demonstrated - but their practical uses because of their high const are limited to high value applications, such as medical imaging and controlled drug delivery. If were nanobubbles available, their usage — ranging from bioreactors to dispersal of ozone, through flotation separations and enhanced chemical reactions by reactive separation — would be widespread. Tesař's development of fluidic oscillators at ÚT CAS has recently shown a feasible and efficient way to nanobubble production and was demonstrated in the laboratory of Prof. Zimmerman.

#### **Odůvodnění panelu:**

The paper describes a feasible and efficient generator of nanobubbles that can have important applications. Taken into account that the paper is related to applied research, the number of citation is very high implying thus significance of the result with significant Czech contribution.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A CAPTURE OF TROJANS BY JUMPING JUPITER

obor: BN

Identifikátor: **RIV/00216208:11320/13:10173976!RIV14-GA0-11320**

Id: 175

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Matematicko-fyzikální fakulta**

Podíl předkladatele na výsledku: **50 %**

### **Popis podílu předkladatele:**

50% |Participation of the faculty has been determined in accordance with the methodology

### **Odůvodnění předkladatele:**

"Using a new model of giant planet's instability, we, model capture of trans-Neptunian planetesimals into the, Jupiter's Trojan clouds. Our approach has, for the first time,, a potential to explain asymmetry between the L4 and L5, populations."

### **Odůvodnění panelu:**

Formation of the solar system is still an open problem. This paper provides important contribution to the problem explaining the asymmetry of populations of small bodies captured in Neptunian L4 and L5 points. The importance of this interesting and important contribution to the field of planetary-instability simulations is underlined by a high citation response..

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Higher-order chromatin structure in DSB induction, repair and misrepair.

obor: BO

Identifikátor: RIV/68081707: /10:00345098!RIV11-MSM-68081707

Id: 176

Předkladatel výsledku do Pilíře II.:

**IČO: 68081707 Biofyzikální ústav AV ČR, v. v. i.**

Podíl předkladatele na výsledku: 0 %

#### Popis podílu předkladatele:

Created exclusively by the team from the Institute.

#### Odůvodnění předkladatele:

The article is a highly-cited requested review that develops our invited lecture at the "ESF EMBO Symposium: Spatio Temporal Radiation Biology" (Spain, 2009). We discuss our results on how the DNA damage, repair, and misrepair depend on higher-order chromatin structure. This relationship was recognized only recently and we present here our new model that attempts to explain how chromosomal translocations do form in the context of different chromatin environments.

#### Odůvodnění panelu:

This highly-cited review not only recapitulates the current knowledge in the reviewed field, but it adds substantial new aspects to the dominant theory of the genome repairing. It goes beyond the 'standard' review article as it also provides suggestions and possible future directions.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Evidence for the spin-0 nature of the Higgs boson using ATLAS data

obor: BG

Identifikátor: RIV/68378271: /13:00424709!RIV14-AV0-68378271

Id: 177

Předkladatel výsledku do Pilíře II.:

IČO: 68378271 Fyzikální ústav Akademie věd ČR, v. v. i.

Podíl předkladatele na výsledku: 3 %

#### Popis podílu předkladatele:

Institute of Physics ASCR is one of the founding members of the ATLAS Collaboration. The collaboration was founded in 1992. Currently, it consists out of about 3000 researchers from 175 research institutions from 38 countries. Detector ATLAS, constructed

#### Odůvodnění předkladatele:

New data obtained by experiment ATLAS enabled detailed investigation of properties of new boson discovered in 2012 by the ATLAS and CMS Collaborations in proton-proton collisions at Large Hadron Collider (LHC) at CERN. The new particle with mass about 125 GeV was excellent candidate for long sought Higgs boson. This particular paper focuses on the particle's spin (J) and parity (P). The results are compatible with spin zero and positive parity ( $JP=0^+$ ) and are in agreement with the Standard Model expectations for Higgs boson. Alternative hypothesis studied in this paper, namely some specific  $JP=0^-; 1^+; 1^-; 2^+$  models, were excluded at confidence level above 97.8%. The data thus provide evidence for the spin-0 nature of the Higgs boson, with positive parity being strongly preferred. Higgs mechanism allows to construct selfconsistent quantum field theory of electroweak forces with massive mediators of electroweak force, intermediate bosons W and Z. Other fundamental elementary particles, like electrons or quarks, obtain their masses through the interaction with the Higgs field as well. Spin-0 for particle involved in the Higgs mechanism is one of the fundamental prediction of the theory. This result is strong support for the Standard Model of particle physics, including the presence of the Higgs vacuum field. The existence and properties of the newly discovered particle may also have consequences beyond the Standard Model itself. Thanks to the experimental confirmation by ATLAS and CMS, the Nobel Prize in Physics 2013 was awarded to P. Higgs and F. Englert "for the theoretical discovery of mechanism that contributes to our understanding of the origin of mass of subatomic particles, and which recently was confirmed through the discovery of the predicted fundamental particle, by the ATLAS and CMS experiments at CERN's Large Hadron Collider".

#### Odůvodnění panelu:

The basic result of the ATLAS collaboration confirming that the resonance discovered in ATLAS and CMS experiments in 2012 is Higgs boson, i.e. that it has spin 0 and positive parity. The Institute of Physics contributed significantly to the construction of the ATLAS detection complex. The Institute put a lot of effort during last 15 years to develop several crucial detection part which played important role during the data taking and the boson discovery. The institute team included physicists, technicians and PhD students. This is a highly-cited result, where the participation of the team from the submitting institution is certainly not marginal.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Wavefront sensing reveals optical coherence

obor: BH

Identifikátor: **RIV/61989592:15310/14:33150011!RIV15-MSM-15310**

Id: 178

Předkladatel výsledku do Pilíře II.:

**IČO: 61989592 Univerzita Palackého v Olomouci, Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **89 %**

#### Popis podílu předkladatele:

The dominant part of this collaborative research was done at the premises of Palacky University. Particularly, the theoretical part continues the long-term research program of the the group at Palacky University oriented to quantum tomography and Maximum

#### Odůvodnění předkladatele:

Wavefront sensing is a set of techniques that provide efficient means to ascertain the shape of an optical wavefront, or detect its deviation from an ideal reference. Owing to its wide dynamical range and high optical efficiency, the Shack–Hartmann wavefront sensor is presently the most commonly used of all wavefront sensors. Here we show that it can actually perform a simultaneous measurement of position and angular spectrum of the incident radiation and, therefore, when combined with tomographic techniques previously developed for quantum information processing, the Shack–Hartmann wavefront sensor is instrumental in reconstructing all coherence properties of the signal. We confirm these predictions with an experimental characterization of partially coherent vortex beams, a case that cannot be treated with standard tools. This seems to indicate that classical methods employed hitherto do not fully exploit the potential of the registered data. This successful application of quantum information techniques to image processing may have far reaching consequences in digital optics, digital holography and 3D imaging. This novel approach allows the retrieval of more precise information and contemplation of the ultimate limits for image processing. Since almost any diagnostics procedure that is carried out in scientific disciplines that include biology or chemistry hinges upon some optical method, new trends in image processing will surely influence these related fields as well.

#### Odůvodnění panelu:

The authors reveal that the presently most widely used Shack-Hartman wavefront sensor actually performs simultaneous measurement of position and angular spectrum of the incident radiation and, therefore, when combined with tomographic techniques previously developed for quantum information processing, it can be instrumental in reconstructing complete coherence properties of the signal. Simply put, they show in a very nice way how classical devices can be made better by quantum inspired methods. This result can open a new research direction for wavefront measurements

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Anomalous Hall effect

obor: BM

Identifikátor: RIV/68378271: /10:00354454!RIV11-AV0-68378271

Id: 179

Předkladatel výsledku do Pilíře II.:

IČO: 68378271 Fyzikální ústav AV ČR, v. v. i.

Podíl předkladatele na výsledku: 33 %

#### Popis podílu předkladatele:

The team has been active over the past decade in exploring the effect both theoretically and experimentally in a variety of material systems. A co-author from the team on this review made a key contribution to the manuscript.

#### Odůvodnění předkladatele:

The anomalous Hall effect occurs in solids with broken time-reversal symmetry, typically in a ferromagnetic phase, as a consequence of spin-orbit coupling. The effect was discovered more than 100 years ago but remains one of the most extensively discussed and utilized phenomena in magnetism and relativistic condensed matter physics. This comprehensive review focuses on recent developments that have provided a more complete framework for understanding the anomalous Hall effect and have, in many instances, replaced controversy by clarity.

#### Odůvodnění panelu:

This is a detailed and timely review of recent development concerning the anomalous Hall effect, which occurs in solids with broken time reversal symmetry, typically in ferromagnetic phases. The authors are very active in this field and are responsible for its contemporary understanding. Their original research has concerned of both experimental and theoretical aspects of the field and both these aspects are critically treated in the paper. Besides, new prospects and challenges are outlined. The paper gained enormous number of citations having a clear significant impact on the research field.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Experimental Eavesdropping Based on Optimal Quantum Cloning

obor: BH

Identifikátor: **RIV/61989592:15310/13:33144624!RIV14-MSM-15310**

Id: 180

Předkladatel výsledku do Pilíře II.:

**IČO: 61989592 Univerzita Palackého v Olomouci, Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **56 %**

#### Popis podílu předkladatele:

Both theory and experiment have been performed at Palacky University in Olomouc, as documented also by the affiliations of both corresponding authors.

#### Odůvodnění předkladatele:

This work elegantly interconnects two areas of quantum information processing: quantum cryptography and quantum cloning. It is shown how quantum cloning can efficiently be used to eavesdrop on quantum cryptographic communication.

#### Odůvodnění panelu:

The authors performed the proof-of-principle experiment that suggest that even in the presence of single photon sources and perfect detectors the quantum key distribution could be successfully attacked by a probe similar to their optimal quantum cloner if too high quantum bit error rates or losses are tolerated. Their results are valuable both from the fundamental and the practical points of view as they present a way how to establish the security limits for an important part of quantum key distribution devices. This is an important new route for current research in this field.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Experimental Eavesdropping Based on Optimal Quantum Cloning

obor: BH

Identifikátor: RIV/68378271: /13:00399241!RIV14-GA0-68378271

Id: 181

Předkladatel výsledku do Pilíře II.:

**IČO: 68378271 Fyzikální ústav AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **44 %**

#### Popis podílu předkladatele:

Both theory and experiment have been performed at the Joint Laboratory of Optics of PU and IP AS CR, 2/5 of the team affiliating to IP AS CR.

#### Odůvodnění předkladatele:

This work elegantly interconnects two areas of quantum information processing: quantum cryptography and quantum cloning. It is shown how quantum cloning can efficiently be used to eavesdrop on quantum cryptographic communication.

#### Odůvodnění panelu:

The authors performed the proof-of-principle experiment that suggest that even in the presence of single photon sources and perfect detectors the quantum key distribution could be successfully attacked by a probe similar to their optimal quantum cloner if too high quantum bit error rates or losses are tolerated. Their results are valuable both from the fundamental and the practical points of view as they present a way how to establish the security limits for an important part of quantum key distribution devices. This is an important new route for current research in this field.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### On the Road from Formamide Ices to Nucleobases: IR-Spectroscopic Observation of a Direct Reaction between Cyano Radicals and Formamide in a High-Energy Impact Event

obor: BO

Identifikátor: RIV/61388955: /12:00389600!RIV14-AV0-61388955

Id: 182

Předkladatel výsledku do Pilíře II.:

**IČO: 61388955 Ústav fyzikální chemie J. Heyrovského AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **50 %**

#### Popis podílu předkladatele:

Overall contribution from J. Heyrovský Institute of Physical Chemistry (JHI) is 50%; S. Civiš (JHI) is the corresponding author of the publication. Know-how of the experimental part was provided by co-authors from JHI; know-how of the theoretical part was

#### Odůvodnění předkladatele:

The Department of Spectroscopy at J. Heyrovský Institute of Physical Chemistry has scrutinized the chemical composition of formamide ices mixed with a FeNi meteorite material treated with a large laser induced dielectric breakdown plasma created in nitrogen buffer gas. Present effort has been aimed at capturing the first steps of those chemical transformations, which may lead to the formation of nucleobases during the impact of an extraterrestrial icy body to an early Earth atmosphere. Such a formamide-based synthesis of nucleic acids is considered as a non-aqueous scenario for the emergence of biomolecules from inorganic matter. High-resolution FT-IR spectroscopy combined with quantum chemical calculations was used to analyze the volatile fraction of the products formed during such an event. The study has provided a brand new insight into a long-standing enigma related to the survival of primitive life during the late-heavy bombardment period that most likely erased any type of life forms from the Earth, because it suggests that the building blocks of life-giving molecules could be re-created inside the body of the impact, or during or on the plasma exposed surface during the high-energy impact event. Our article has also been selected as one of the Highlights in the Journal of the American Chemical Society (JACS).

#### Odůvodnění panelu:

The authors used both experimental and theoretical approach to show a possibility of emergence of biomolecules from inorganic matter in the early Earth atmosphere. They treated composition of FeNi meteorite material and formamide ices with laser-induced dielectric breakdown plasma to imitate an impact of an icy extraterrestrial body containing formamide. The study proved photochemically activated synthesis of nucleobases. This Article was identified by the JACS Editorial Board as Spotlights on Recent JACS Publications.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### On the Road from Formamide Ices to Nucleobases: IR-Spectroscopic Observation of a Direct Reaction between Cyano Radicals and Formamide in a High-Energy Impact Event

obor: BO

Identifikátor: RIV/68378271: /12:00389600!RIV14-GA0-68378271

Id: 183

Předkladatel výsledku do Pilíře II.:

**IČO: 68378271 Fyzikální ústav AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **25 %**

#### Popis podílu předkladatele:

Both LIDB plasma generation and characterization were carried out at the PALS facility belonging to the Department of Radiation and Chemical Physics at IP-ASCR. Co-authors from IPCh-ASCR and IBp-ASCR made the chemical part of the work. The first author is

#### Odůvodnění předkladatele:

This Article was identified by the JACS Editorial Board as Spotlights on Recent JACS Publications. In the study, we scrutinized the chemical composition of formamide ices mixed with an FeNi meteorite material treated with laser-induced dielectric breakdown plasma created in nitrogen buffer gas. These experiments aimed to capture the first steps of those chemical transformations that may lead to the formation of nucleobases during the impact event. Using the high-power laser brings the plasma parameters close to conditions of a real high-energy-density phenomenon playing a role in the chemical evolution.

#### Odůvodnění panelu:

The authors used both experimental and theoretical approach to show a possibility of emergence of biomolecules from inorganic matter in the early Earth atmosphere. They treated composition of FeNi meteorite material and formamide ices with laser-induced dielectric breakdown plasma to imitate an impact of an icy extraterrestrial body containing formamide. The study proved photochemically activated synthesis of nucleobases. This Article was identified by the JACS Editorial Board as Spotlights on Recent JACS Publications.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

Anomalous quartic  $W W \gamma \gamma$ ,  $Z Z \gamma \gamma$ , and trilinear  $WW \gamma \gamma$  couplings in two-photon processes at high luminosity at the LHC

obor: BF

Identifikátor: RIV/68378271: /10:00356763!RIV11-MSM-68378271

Id: 184

Předkladatel výsledku do Pilíře II.:

IČO: 68378271 Fyzikální ústav Akademie věd ČR, v. v. i.

Podíl předkladatele na výsledku: 50 %

### Popis podílu předkladatele:

The publication is a summary of a dissertation thesis of O. Kepka. The author was the main developer of Monte-Carlo program FPMC, in which processes  $pp \rightarrow ppWW$ ,  $ppZZ$  can be generated. The author then carried out the complete phenomenological study to measur

### Odůvodnění předkladatele:

Due to electroweak symmetry breaking, the couplings between three and four electroweak bosons are connected and fixed in the Standard Model (SM). While cubic boson interactions are already well constrained experimentally, quartic gauge boson couplings are not. Deviations from the SM values would indicate a presence of new physics. We have proposed a method to probe quartic gauge boson couplings ( $\gamma\gamma \rightarrow WW$ ,  $\gamma\gamma \rightarrow ZZ$ ) in exclusive processes with novel forward proton tagging devices, which are considered as upgrades of today's large experiments at the Large Hadron Collider. Forward proton tagging devices, installed hundreds of meters from the main interaction point of ATLAS or CMS and only a few millimeters from the passing proton beams, can select events in which light is emitted off the scattered protons. Using these events, a precise measurements of various final states produced via two-photon exchanges can be made, including the production of electroweak bosons. We showed that this novel technique can give much more precise constraints of anomalous quartic gauge boson couplings than those obtained with conventional methods. Thanks to the series of more involved studies with closer-to-reality experimental conditions that followed this pioneer paper, the process was included in technical design reports of the forward detectors in ATLAS/CMS. It is a flagship physics process of the forward physics program to be carried out at high luminosity at the LHC.

### Odůvodnění panelu:

This is clearly a very important result, where the main author of the publication is from the Institute of Physics. He developed the method to measure processes,  $\gamma\gamma \rightarrow WW$ ,  $\gamma\gamma \rightarrow ZZ$ . The article results were one of the main motivation for the construction of the AFP detector which will be installed in the ATLAS detector complex at CERN. The Institute of Physics is the main coordinator for the construction of this detector the various components of which have been tested and are ready to be included in the ATLAS during the next running accelerator shutdown.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

Is the controversy over femtosecond magneto-optics really solved?

obor: BM

Identifikátor: **RIV/00216208:11320/11:10103781!RIV12-MSM-11320**

Id: 185

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Matematicko-fyzikální fakulta**

Podíl předkladatele na výsledku: **50 %**

### Popis podílu předkladatele:

50% |Participation of the faculty has been determined in accordance with the methodology

### Odůvodnění předkladatele:

"This article reacts to an incorrect approach to treat magnetic systems under strong nonequilibrium caused by an action of femtosecond laser pulse, and shows the failure of such approach. Rules for a correct theoretical description of this kind of nonequilibrium problems are presented there."

### Odůvodnění panelu:

The authors address quite actual issue, quenching of the magnetization of ferromagnetic metals in the femtosecond region. They criticize a recent solution of this phenomenon by other authors, especially a possibility to solve this issue by probing the magnetization using the magneto-optic Kerr effect under femtosecond pulse and bring own explanation of experimental results gained by that probing. It is evident that the issue is quite essential and its solution will attract attention of other physicists as it is proved by number of citations gained so far.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Nuclear Spin Effect on Recombination of $H(3)(+)$ Ions with Electrons at 77 K

obor: BL

Identifikátor: **RIV/00216208:11320/11:10108228!RIV12-GA0-11320**

Id: 186

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Matematicko-fyzikální fakulta**

Podíl předkladatele na výsledku: **100 %**

#### Popis podílu předkladatele:

100% |Participation of the faculty has been determined in accordance with the methodology

#### Odůvodnění předkladatele:

"The paper deals with determination of the rate coefficients for binary recombination of para- $H3^+$  and ortho- $H3^+$  ions at 77 K using by monitoring plasma decays at different populations of para- $H3^+$ . To measure the densities of the two lowest rotational states of  $H3^+$ , absorption spectroscopy was applied."

#### Odůvodnění panelu:

The authors succeeded to determine experimentally the effective rate of recombination with electrons of both nuclear spin modifications of the  $H3^+$  ions which differ substantially at very low temperatures (77K). The importance of this achievement is stressed by the fact that just these ions dominate in various types of astrophysically relevant plasmas. The key novelty in the study is based on the in situ determination of the composition of the decaying plasma with respect to para and ortho states of the  $H3^+$  ions. The result is important not only for astrophysics but for the basic quantum theory as well. The number of citation is highly above the average for this field.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Measurements of Higgs boson production and couplings in diboson final states with the ATLAS detector at the LHC

obor: BG

Identifikátor: RIV/68378271: /13:00425184!RIV14-AV0-68378271

Id: 187

Předkladatel výsledku do Pilíře II.:

**IČO: 68378271 Fyzikální ústav Akademie věd ČR, v. v. i.**

Podíl předkladatele na výsledku: **3 %**

#### Popis podílu předkladatele:

Institute of Physics ASCR is one of the founding members of the ATLAS Collaboration. The collaboration was founded in 1992. Currently, it consists out of about 3000 researchers from 175 research institutions from 38 countries. Detector ATLAS, constructed

#### Odůvodnění předkladatele:

New data obtained by the experiment ATLAS enabled detailed investigation of properties of new boson discovered in 2012 by the ATLAS and CMS Collaborations in proton-proton collisions at Large Hadron Collider at CERN. This particular paper focuses on Higgs boson production and couplings in the diboson final states. In Standard model, the couplings of Higgs boson are fully specified once the Higgs boson mass is known. It is in the nature of Higgs mechanism and in the nature of interactions of fermionic particle fields (like electrons or quarks) with Higgs field, that the coupling to the Higgs boson is proportional to the mass of the particle. The presented results are consistent with the Standard Model expectations for Higgs boson. They represent important and strong confirmation of Higgs mechanism in the Standard Model, including the presence of the Higgs vacuum field. The existence and properties of the newly discovered particle may also have consequences beyond the Standard Model itself. Thanks to the experimental confirmation by ATLAS and CMS, the Nobel Prize in Physics 2013 was awarded to P. Higgs and F. Englert “for the theoretical discovery of mechanism that contributes to our understanding of the origin of mass of subatomic particles”.

#### Odůvodnění panelu:

After the discovery of Higgs boson at the CERN Large Hadron Collider (LHC) (reported by the ATLAS and CMS collaborations in 2012), new data on production and coupling of Higgs bosons are reported. It is shown that the established data are consistent with the Standard Model expectations for Higgs boson. The enormous number of citations confirms the high importance of the presented result.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### 3D modeling of filtration process via polyurethane nanofiber based nonwoven filters prepared by electrospinning process

obor: CI

Identifikátor: RIV/46900098: /11:#0000024!RIV12-MPO-46900098

Id: 188

Předkladatel výsledku do Pilíře II.:

**IČO: 70883521 Univerzita Tomáše Bati ve Zlíně, Fakulta technologická**

Podíl předkladatele na výsledku: **95 %**

#### **Popis podílu předkladatele:**

95 %- Morphological characterization of the utilized nanofiber based filter,- development of a new approach for realistic 3D nanofiber filter model construction from scanning electron microscopy images,- development, testing and validation of the novel ga

#### **Odůvodnění předkladatele:**

Novel modeling approach for gas filtration through polymeric nanofiber based filters prepared by electrospinning process utilizing a realistic 3D structure model has been introduced and tested for the first time. The model considers slip/transition/free molecular flow regime, Brownian diffusion, particle-polymeric fiber interactions, aerodynamic slip at the fiber surface and sieve. It has been revealed that the change of the particle-fiber friction coefficient has one of the highest effects on the filtration efficiency, especially for nanoparticles having diameter less than about 200 nm. The proposed modeling tools can be used for fundamental understanding of gas filtration through polymeric nanofiber based filters prepared by electrospinning process as well as for their production, optimization and enhancement with respect to the specific application. Importance of the work is supported by the following facts: 1. It is the eighth the most cited chemical engineering science article since 2011 (March 15, 2016): <http://www.journals.elsevier.com/chemical-engineering-science/most-cited-articles/2>. The paper has received Chemical Engineering Science Award - Top Cited Papers for 2011 and 2012. 3. Number of citations (without self-citations) according to Web of Science (March 15, 2016): 74

#### **Odůvodnění panelu:**

Exceptional A; very rational study. In contrast to previous approaches, a realistic structural picture is provided based on scanning electron microscopy-based three-dimensional structure of a nanofiber polyurethane filter mat, which served as the basis for the generation of theoretical models for the filtration process and the parameters influencing it. Guidelines for rational three-dimensional filter design can be derived.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### A novel putative auxin carrier family regulates intracellular auxin homeostasis in plants

obor: CE

Identifikátor: RIV/61389030: /12:00380744!RIV13-AV0-61389030

Id: 189

Předkladatel výsledku do Pilíře II.:

**IČO: 61389030 Ústav experimentální botaniky AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **30 %**

#### Popis podílu předkladatele:

This work was based on broad international collaboration. Co-authors from the Institute of Experimental Botany of the AS CR (Kubeš, Rolčík, Dobrev, Zažímalová, and Petrášek) contributed with characterization of kinetics of auxin accumulation in the PILS-o

#### Odůvodnění předkladatele:

This paper follows our previous co-authored article by Mravec et al. (Nature 459:1136, 2009) where intracellular localization of the PIN5 auxin transporter was identified. Here, so far unknown PILS (PIN-LIKES) family of putative auxin transporters was discovered and characterized. Similar to PIN5, proteins from the PILS family localize to the endoplasmic reticulum, and changes in their expression result in changes in spectrum of auxin metabolites in cells, thus determining the accessibility of free auxin for the nuclear auxin signalling pathway. Altogether, this is disclosure of new players in regulation of cellular homeostasis of key plant signalling compound auxin. This is the “Highly cited paper” according to Web of Science („As of September/October 2015, this highly cited paper received enough citations to place it in the top 1% of its academic field based on a highly cited threshold for the field and publication year. Data from Essential Science Indicators<sup>SM</sup>“).

#### Odůvodnění panelu:

The article describes a novel auxin transporter, called PIN-LIKES (PILS), required for auxin-dependent regulation of plant growth. PILS represent new players in regulation of cellular homeostasis of key plant signaling compound auxin. Obtained results are significant, novel and have been published in a high quality journal (Nature). This work was based on broad international collaboration and contribution of IEB 30%.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Biodegradable star HPMA polymer-drug conjugates: biodegradability, distribution and anti-tumor efficacy

obor: CD

Identifikátor: RIV/61389013: /11:00363631!RIV12-AV0-61389013

Id: 190

Předkladatel výsledku do Pilíře II.:

**IČO: 61389013 Ústav makromolekulární chemie AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **0 %**

#### Popis podílu předkladatele:

Researchers of IMC constructed the concept of polymer-doxorubicin conjugates, performed the synthesis of polymers and conjugates and performed the deep physico-chemical characterization of the samples of tumors, blood, muscle and liver collected during th

#### Odůvodnění předkladatele:

Novel biodegradable star-shaped polymer–doxorubicin conjugates designed for passive tumor targeting were designed, synthesized and their physico-chemical characterization, drug release, biodegradation, biodistribution and in vivo anti-tumor efficacy were described. The core of the conjugates formed by poly(amidoamine) (PAMAM) dendrimers was grafted with semitelechelic N-(2-hydroxypropyl)methacrylamide (HPMA) copolymers bearing doxorubicin (Dox) attached by hydrazone bonds, which enabled intracellular pH-controlled drug release. The controlled synthesis facilitated the preparation of biodegradable polymer conjugates in a broad range of molecular weights (200–1000 g/mol) while still maintaining low polydispersity. The polymer grafts were attached to the dendrimers through either stable amide bonds or enzymatically or reductively degradable spacers, which enabled intracellular degradation of the high-molecular-weight polymer carrier to excretable products. The presented star-shaped polymer conjugates showed highly enhanced accumulation within the solid tumor, which was more than 50 times higher than that of free drug and also significantly higher, 5-7 times, than the accumulation of previously described polymer drug delivery systems. Moreover, we have observed superior anti-tumor efficacy during the treatment of inoculated solid-tumors and autochthonous, chemically induces, tumors. The precisely defined structure, controlled molecular weight, drug release, degradation profiles and superior therapeutic efficacy of the star-shaped polymer conjugates suggest that they may have the potential to be efficient anticancer nanomedicines.

#### Odůvodnění panelu:

A complex study on the development of a novel doxorubicin-releasing polymer - nanodrug based on a dendrimer module. pH-controlled intracellular hydrolysis-based activation (intratumoral action). Promising results of antitumoral activity realized on mice model. Significant progress in the field of smart drugs with high potential for application.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### CAVER 3.0: A Tool for the Analysis of Transport Pathways in Dynamic Protein Structures

obor: CE

Identifikátor: **RIV/00216224:14310/12:00057117!RIV13-AV0-14310**

Id: 191

Předkladatel výsledku do Pilíře II.:

**IČO: 216224 Masarykova univerzita, Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **80 %**

#### **Popis podílu předkladatele:**

80% Know-how is based on work of the authors from the Masaryk University (Faculty of Science and Faculty of Informatics).

#### **Odůvodnění předkladatele:**

Highly Cited Paper - This article is in the top 1% of most highly cited publications in the discipline (Web of Science- Essential Science Indicators) Times Cited: 146 (Web of Science) The article describes a new version of the software tool for analysis of tunnels in protein structures. CAVER is the world-leading program for this purpose with >5,500 registered users and >57,000 downloads. CAVER 3.0 is the first software which allows analysis of tunnels in ensembles of structures from molecular dynamic simulations and NMR analysis. The software was cited 146 times including several papers in Nature and Science.

#### **Odůvodnění panelu:**

The paper describes a new version of freely available software tool for analysis of tunnels in protein structures. CAVER 3.0 is the first software which allows analysis of tunnels in ensembles of structures from molecular dynamic simulations and NMR analysis. CAVER 3.0 implements new algorithms for the calculation and clustering of pathways. The tool was applied for the analysis of molecular dynamics simulation of the microbial enzyme haloalkane dehalogenase DhaA, and estimated the importance of all previously published DhaA tunnels, including the tunnels closed in DhaA crystal structures. The software tool represents an excellent contribution by Czech scientists to analysis of transport pathways in dynamic protein structures.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Crystal structure of a monomeric retroviral protease solved by protein folding game players

obor: CE

Identifikátor: RIV/61388963: /11:00369853!RIV12-AV0-61388963

Id: 192

Předkladatel výsledku do Pilíře II.:

**IČO: 61388963 Ústav organické chemie a biochemie AV ČR, v.v.i.**

Podíl předkladatele na výsledku: **16,7 %**

#### Popis podílu předkladatele:

IOCB cloned, expressed, purified M-PMV protease and its mutant and performed original structural study using NMR, which was taken as a model for Foldit players. Polish laboratory performed crystallization and solution of X ray structure. American laborato

#### Odůvodnění předkladatele:

Retroviral proteases (PR) are key enzyme for virus infectivity and their inhibitors represent one of the targets for clinically used drugs. PRs are synthesized as a part of protein precursors and mechanism of their activation is still poorly understood. Knowledge of protease folding is therefore crucial for understanding to activation process. Mason Pfizer Monkey (MPMV) represents suitable model for investigation of proteolytic processing of protein precursors in retroviruses. Our previous data indicated unusual folding of Mason Pfizer Monkey (MPMV) virus protease in a form of monomer. Although structures of many retroviral proteases have been reported, solution of MPMV PR structure resisted to attempts, which utilized all available programs and existing crystallographic models (full dimers and individual subunits). The mr-rosetta algorithm, which has an outstanding record of success with difficult structures also failed to produce a solution using the existing models. This daunting protein-folding problem was therefore presented as a challenge to players of internet game Foldit, which is based on Rosetta algorithm and was developed in Baker's laboratory. This game represents one of the first examples of "crowd" science. The model of M-PMV protease monomer was the first real-world model for game players, who generated over one million models in less than three weeks, starting from the NMR coordinates from our previous publication. One of the game player's solutions, when submitted to MR calculations in mr-rosetta, did produce a plausible crystal structure that could be easily refined to an R factor of 0.169 with excellent geometry. This paper was announced by different world media, including Czech newspapers, it resulted in radio and TV dialogs in the USA, Poland and Czech Republic, it served as an inspiration for book story. The story highly contributed to development of networked science and to interest of general public in protein folding and structure.

#### Odůvodnění panelu:

The paper reports on crystal structure of a monomeric retroviral protease. This paper is also remarkable in using the multiplayer online protein folding game Foldit. The final structure represents key achievement in understanding the mechanisms underlying the actions of these proteins and may provide new insights into design of retroviral drugs. Top journal, high number of citations.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Effective Purification of Biogas by Condensing-Liquid Membrane (2010)

obor: CI

Identifikátor: RIV/67985858: /10:00355044!RIV11-AV0-67985858

Id: 193

Předkladatel výsledku do Pilíře II.:

**IČO: 67985858 Ústav chemických procesů AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **100 %**

#### Popis podílu předkladatele:

The team from E. Hála Laboratory of Separation Processes of the Institute of Chemical Process Fundamentals of Czech Academy of Science contributes to this article by the idea, which is patented, measuring of the transport properties and writing the article

#### Odůvodnění předkladatele:

This article describes a new idea of effective purification of biogas by condensing-liquid membrane. This article was published in journal, which belongs to top 25% journals in Chemical Science and this work belongs within top 25% most cited articles in 2011.

#### Odůvodnění panelu:

Exceptional. With depleting fossil resources, biogas gains importance as an alternative fuel. To make it useful for high-end energy production it must be separated from varying amounts of coproduced CO<sub>2</sub> and corrosive gas like H<sub>2</sub>S. The paper reports a new membrane separation methodology using a "condensing-liquid membrane". The membrane is kept at a low temperature and water from the biogas feed condenses and removes the unwanted separated adsorbents from the surface of the membrane thus refreshing it continuously. In this way it may be possible to enrich raw biogas to natural gas quality and methane content.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Functionalization of Graphene: Covalent and Non-Covalent Approaches, Derivatives and Applications

obor: CF

Identifikátor: RIV/61989592:15310/12:33142838!RIV13-MSM-15310

Id: 194

Předkladatel výsledku do Pilíře II.:

**IČO: 61989592 Univerzita Palackého v Olomouci, Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **53,8 %**

#### Popis podílu předkladatele:

All authors extensively contributed to writing this review, prof. Zbořil coordinated the project, suggested the concept and communicated with the editorial office as a corresponding author.

#### Odůvodnění předkladatele:

This work is a comprehensive review on functionalization of graphene covering covalent as well as non-covalent approaches to functionalized graphene. Up to now the review was cited more than 200 times.

#### Odůvodnění panelu:

This review presents hot topic the in the field of functionalization graphene. Authors discuss attachment of organic functionalities to graphene and preparation different type of graphene derivatives. Authors discuss different type of noncovalent interaction of graphene and his derivatives by different types of atoms, ions and molecules in the light of last knowledges. The work also covers possibility in application of the graphene derivatives. The excellent results obtained by authors summarize and discuss the fundamental knowledges concerning functionalization and possibility of application graphene derivatives.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Hierarchical Hybrid Organic–Inorganic Materials with Tunable Textural Properties Obtained Using Zeolitic-Layered Precursor

obor: CF

Identifikátor: RIV/61388955: /14:00425113!RIV15-AV0-61388955

Id: 195

Předkladatel výsledku do Pilíře II.:

**IČO: 61388955 Ústav fyzikální chemie J. Heyrovského AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **100 %**

#### Popis podílu předkladatele:

This is largely the contribution of the Department of Synthesis and Catalysis as far as the idea, synthesis, modification and part of characterization is concerned. External co-workers contributed to the MAS NMR and HRTEM study and their interpretation as

#### Odůvodnění předkladatele:

This is a pioneering study of synthesis and characterization of organic-inorganic hybrid pillared materials starting from top-down synthesis of IPC-IP layers having UTL structure and assembled with different organic or inorganic layers. We have succeeded for the first time to transform chemically and selectively crystalline three-dimensional zeolite into individual layers. Further manipulation of these layers including swelling in a controllable way resulted in materials with different distance between individual layers. The swollen materials were further pillared with organic molecules having triethoxy-silyl groups providing stable organic pillars covalently bonded to IPC-IP layers. Combination of high resolution adsorption, transmission electron microscopy and solid state NMR enabled detailed characterization of the structure and properties of these materials.

#### Odůvodnění panelu:

This excellent article reports about the synthesis, characterization and study of the newly designed organic-inorganic hybrid pillared materials. The formation of porous materials containing organic linkers or polyhedral oligomeric siloxane covalently bonded to zeolite layers in the interlayer space was confirmed by a variety of characterization techniques (N<sub>2</sub>/Ar sorption analysis, XRD, <sup>29</sup>Si and <sup>13</sup>C NMR, TEM). Results obtained by authors enrich the knowledges this currently expanding field of the new hybrid organic/inorganic materials.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Labelling of nucleosides and oligonucleotides by solvatochromic 4-aminophthalimide fluorophore for studying DNA–protein interactions

obor: CC

Identifikátor: RIV/61388963: /12:00382144!RIV13-AV0-61388963

Id: 196

Předkladatel výsledku do Pilíře II.:

**IČO: 61388963 Ústav organické chemie a biochemie AV ČR, v.v.i.**

Podíl předkladatele na výsledku: **50 %**

#### **Popis podílu předkladatele:**

Dominant role of IOCB (1st and \* author from IOCB). M. Hocek conceived the idea and supervised the research. All chemistry and most biochemistry was done by J. Riedl. BFU contributed by expression of p53 and Prof. Ernsting by measurement of fluorescence s

#### **Odůvodnění předkladatele:**

Novel nucleoside triphosphates bearing solvatochromic fluorophore aminophthalimide group were prepared and their polymerase incorporations to DNA was developed. The resulting labeled DNA probes containing the solvatochromic fluorophore were used for sensing DNA-protein interactions through 2-3 fold enhancement of fluorescence upon binding of protein to DNA. The probes have promising potential in general sensing of DNA-protein interactions.

#### **Odůvodnění panelu:**

"Edge" article in top journal Chemical Science, highly cited (42x), where the first and corresponding authors are from IOCB. 50 % contribution from IOCB, but only one author from abroad, clearly documents leading role of the authors from IOCB. The novel labeled DNA probes containing the solvatochromic fluorophore were used for sensing DNA-protein interactions through 2-3 fold enhancement of fluorescence upon binding of protein to DNA. The probes have promising potential in general sensing of DNA-protein interactions.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Molecular Mechanisms of Ion-Specific Effects on Proteins

obor: CF

Identifikátor: RIV/61388963: /12:00377908!RIV13-AV0-61388963

Id: 197

Předkladatel výsledku do Pilíře II.:

**IČO: 61388963 Ústav organické chemie a biochemie AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **50 %**

#### **Popis podílu předkladatele:**

Molecular dynamics simulations of ion-peptide interactions were made by IOCB.

#### **Odůvodnění předkladatele:**

In order to show that various phenomena that follow Hofmeister ordering have various physical origins the binding of anions such as thiocyanate, iodide, chloride, and sulfate to an elastin-like polypeptide has been investigated. Using modeling results it has been determined that the thiocyanate and iodide interacted strongly with a hybrid site consisting of the backbone's amide nitrogen and the adjacent  $\alpha$ -carbon. The ions' binding strength followed the Hofmeister series. However, this simple picture becomes significantly more complicated when ions encounter full-sized proteins' many side chains and their hydrophobic and hydrophilic (polar and, in particular, charged) areas. A unifying theory of the Hofmeister phenomena may ultimately not be possible as the chemistry is rich and interesting, but Hofmeister encompasses a multitude of effects.

#### **Odůvodnění panelu:**

This is an excellent paper addressing the binding energetics and mechanisms of interaction of various anions to polypeptide backbone shedding light on the phenomena behind the Hoffmeister series. The author combine experimental (NMR) and theoretical (MD) tools. The participation of the submitter institution is not high but tolerable.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Multicompartment lipid cubic nanoparticles with high protein upload: millisecond dynamics of formation

obor: CF

Identifikátor: RIV/61389013: /14:00428446!RIV15-GA0-61389013

Id: 198

Předkladatel výsledku do Pilíře II.:

**IČO: 61389013 Ústav makromolekulární chemie AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **0 %**

#### Popis podílu předkladatele:

Researchers of IMC conditioned the samples of the lipid/protein complexes, performed high-resolution small-angle X-ray measurements, analyzed the data and wrote a major part of the publication

#### Odůvodnění předkladatele:

Membranes produced by dynamically assembled lipid/protein architectures, are crucial for both physiological functions and the design of therapeutic nanotechnologies. For the first time we report on the dynamics of lipid membrane/neurotrophic BDNF protein complexes formation and ordering in nanoparticles, with the purpose of innovation in nanostructure-based neuroprotection and biomimetic nanoarchitectonics. The kinetic pathway of membrane states associated with rapidly occurring nonequilibrium self-assembled lipid/protein nanoarchitectures was determined by millisecond time-resolved small-angle X-ray scattering (SAXS) at high resolution. The neurotrophin binding and millisecond trafficking along the flexible membranes induced an unusual overlay of channel-network architectures including two coexisting cubic lattices epitaxially connected to lamellar membrane stacks. These time-resolved membrane processes, involving intercalation of discrete stiff proteins in continuous soft membranes, evidence stepwise curvature control mechanisms. The obtained three-phase liquid-crystalline nanoparticles of neurotrophic composition put forward important advancements in multicompartment soft-matter nanostructure design.

#### Odůvodnění panelu:

Advanced methodology - cryo-electron microscopy and SAXS - applied to elucidation of the effect of shape of membrane on its interaction with proteins. Important for explanation of physiological processes and design of novel nano-therapeutic drug carriers. Published in a prestigious journal.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Rational Design of Chemical Ligands for Selective Mitochondrial Targeting

obor: CE

Identifikátor: **RIV/00216208:11110/13:10189210!RIV14-MSM-11110**

Id: 199

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, 1. lékařská fakulta**

Podíl předkladatele na výsledku: **22 %**

#### Popis podílu předkladatele:

22% | 1st fac med - 22 %

#### Odůvodnění předkladatele:

"Specific intracellular targeting by small molecules represents modern approach for diagnosis and targeted therapy of various diseases. The significance of our research revealed absolutely novel group of fluorescent compounds based on pentamethinium salts selectively interacting with cardiolipin. Their preference for this phospholipid, exclusively found only in the inner membrane of mitochondria, resulted in selective intracellular localization in these organelles (Bioconjugate Chem, 2013). Thus, we have invented fully new, very specific fluorescent mitochondrial probes based on pentamethinium salts, which, in contrast to the commercially available ones, have higher photostability, selectivity, lower cytotoxicity and their synthesis is cost-effective. These probes, applicable for live cells, have remarkable potential and will serve for the study of mechanism of mitochondrial dysfunction, for in vivo imaging, diagnostics of neurodegenerative diseases and some of them also for therapy. Moreover, these probes are of significant potential for the commercial market. Bioconjugate Chemistry is a top-ranking journal in the field CHEMISTRY, ORGANIC (rank no. 9 of 57)."

#### Odůvodnění panelu:

"A" from the previous evaluation

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Rational Design of Chemical Ligands for Selective Mitochondrial Targeting

obor: CE

Identifikátor: **RIV/00216208:11310/13:10189210!RIV14-MSM-11310**

Id: 200

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **11 %**

#### Popis podílu předkladatele:

11% |Faculty of Science 11%

#### Odůvodnění předkladatele:

"Specific intracellular targeting by small molecules represents modern approach for diagnosis and targeted therapy of various diseases. The significance of our research revealed absolutely novel group of fluorescent compounds based on pentamethinium salts selectively interacting with cardiolipin. Their preference for this phospholipid, exclusively found only in the inner membrane of mitochondria, resulted in selective intracellular localization in these organelles (Bioconjugate Chem, 2013). Thus, we have invented fully new, very specific fluorescent mitochondrial probes based on pentamethinium salts, which, in contrast to the commercially available ones, have higher photostability, selectivity, lower cytotoxicity and their synthesis is cost-effective. These probes, applicable for live cells, have remarkable potential and will serve for the study of mechanism of mitochondrial dysfunction, for in vivo imaging, diagnostics of neurodegenerative diseases and some of them also for therapy. Moreover, these probes are of significant potential for the commercial market. Bioconjugate Chemistry is a top-ranking journal in the field CHEMISTRY, ORGANIC (rank no. 9 of 57)."

#### Odůvodnění panelu:

"A" from the previous evaluation

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Role of Gold(I) alpha-Oxo Carbenes in the Oxidation Reactions of Alkynes Catalyzed by Gold(I) Complexes

obor: CC

Identifikátor: **RIV/00216208:11310/14:10281757!RIV15-MSM-11310**

Id: 201

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **100 %**

#### Popis podílu předkladatele:

100% |Charles University 100%

#### Odůvodnění předkladatele:

"This paper addresses one of the hot topics in gold catalysis which is oxidation of alkynes. It was suggested that the oxidation leads primarily to gold(I) alpha-oxo carbenes and subsequent reactivity can be derived from their structure. Our experiments showed that the gold(I) alpha-oxo carbenes actually do not exist as isolated species. The primarily formed beta-gold(I) vinyloxy pyridinium complexes (the oxidant was pyridine N-oxid) readily undergo rearrangement, dependent on their substituents, to either gold(I) alpha-oxo carbenoids (a synthetic surrogate of the alpha-oxo carbenes) or pyridine adducts of gold(I) enone complexes in the condensed phase. For the first time, we have used isotopic labeling to differentiate intramolecular and intermolecular reactions. The conclusions are based on the experimental results obtained by several methods and on theoretical calculations. The paper attracted considerable attention of synthetic chemists working in the field of gold catalysis as documented by its citations."

#### Odůvodnění panelu:

An influential paper resolving the question concerning reaction intermediates in gold-mediated oxidation of alkynes. The authors used a cavalry of experimental techniques to trap and identify the long-sought intermediates. The paper was published in one of the best chemistry journals and obtained over 20 citations in less than two years.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Selective Activation of Alkanes by Gas-Phase Metal Ions

obor: CC

Identifikátor: **RIV/00216208:11310/10:10062554!RIV11-GA0-11310**

Id: 202

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **50 %**

#### Popis podílu předkladatele:

50% |Charles University 50%

#### Odůvodnění předkladatele:

"This review shows the great contribution of gas-phase chemistry to the understanding of the C-H activation of hydrocarbons. It became one of the basic texts in the field as documented by meanwhile 200 citations. It also triggered some follow-up papers that tackled challenges specified in the review."

#### Odůvodnění panelu:

Many citations, very high-impact journal, 100% Czech product which describes the development and the state-of-art of experimental and theoretical methods for the investigation of model reactions for alkane activation in the gas phase the presented, microscopic models can assist in the investigation of large-scale technical processes.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Stabilization and Structure Calculations for Noncovalent Interactions in Extended Molecular Systems Based on Wave Function and Density Functional Theories

obor: CF

Identifikátor: **RIV/61989592:15310/10:10215909!RIV11-MSM-15310**

Id: 203

Předkladatel výsledku do Pilíře II.:

**IČO: 61989592 Univerzita Palackého v Olomouci, Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **28,6 %**

#### Popis podílu předkladatele:

All authors extensively contributed to writing of this review. The first three authors contributed equally to this work and should be considered co-first authors, i.e. doc. Jurečka is co-first author. Prof. Hobza, who has two affiliations, contributed to

#### Odůvodnění předkladatele:

In this work we reviewed a current status of theoretical methods, which are used for analysis of noncovalent complexes. This work was cited more than 250 times.

#### Odůvodnění panelu:

Excellent comprehensive review on recent state in the area of chemical modelling, compilation of progress from the author's group from the recent five years - they published about 100 papers covering the subject. It facilitates orientation among the quickly appearing treatments, and emphasize vital importance of accurate reference calculations. Very high number of citations and prestigious journal justify highest evaluation of this paper.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Two-photon polarization microscopy reveals protein structure and function

obor: CE

Identifikátor: RIV/68407700:21340/11:00209253!RIV14-MSM-21340

Id: 204

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Fakulta jaderná a fyzikálně inženýrská**

Podíl předkladatele na výsledku: **10 %**

#### Popis podílu předkladatele:

10% - Rating A in H14  
<https://www.isvav.cz/h14/resultDetail.do?rowId=RIV%2F68407700%3A21340%2F11%3A00209253%21RIV14-MSM-21340> - The CTU autor actively participated on the research leading to the paper as a student during the course of his bachelor stud

#### Odůvodnění předkladatele:

Research result brief description: A new kind of optical microscope will allow visualizing many processes inside living cells that have, until now, been impossible to observe. The new technology builds on an advanced type of an optical microscope called a two-photon microscope. In a two-photon microscope, the biological sample is being illuminated by a powerful infrared laser in a way that allows three-dimensional localization of fluorescent molecules. Fluorescent molecules are often used for visualization of otherwise colorless biological molecules. The current improvement lies in modifying the properties of the laser beam so that the light waves alternately oscillate in various directions. This modification allows using a two-photon microscope not only to visualize where the fluorescent molecules are, but also how they are oriented. It shows that orientation of a fluorescent label attached to particular protein can be used to deduct information about structure of the protein molecules, in living cells and tissues. Since the structure of protein molecules often does not stay constant, but changes when a protein molecule is carrying out a particular task inside a cell, the new kind of microscope allows detecting whether a particular molecular process is taking place. Publication in prestigious journal Nature Methods with IF: 23.565 (According to the Journal Citation Reports of WoS - median IF of the journal Subject Category CE – Biochemistry is IF: 2,399). According to the WoS and SCOPUS databases it has been cited since its publication in period from 2011 till June 2014 13 times (WoS) respectively 11 times (SCOPUS).

#### Odůvodnění panelu:

"A" from the previous evaluation

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

**A global assessment of invasive plant impacts on resident species, communities and ecosystems: the interaction of impact measures, invading species' traits and environment**

**obor: EF**

**Identifikátor: RIV/00216208:11310/12:10129458!RIV13-MSM-11310**

**Id: 205**

**Předkladatel výsledku do Pilíře II.:**

**IČO: 216208 Univerzita Karlova v Praze, Přírodovědecká fakulta**

**Podíl předkladatele na výsledku: 25 %**

### **Popis podílu předkladatele:**

25% |Charles University 25%

### **Odůvodnění předkladatele:**

"It was nominated by the Institute of Botany, AS CR, for the last evaluation, and classified in the category A. Invasive species pose risk to native biodiversity worldwide; to cope with the consequences of plant invasions we need to know which species are likely to cause profound changes in ecosystems of invaded areas. We conducted the first global overview of how often and under which circumstances plant invasions cause significant impacts on resident species, communities and ecosystems. The study based on 287 publications that addressed the impact of 167 invasive plant species showed that invasive plants exert consistent significant impacts on some measured outcomes, whereas for others, such as species richness, diversity and soil resources, the significance of impacts is determined by interactions between species traits and the biome invaded. Invasive plants are far more likely to cause significant impacts on species richness on islands rather than mainland. Species with certain biological traits, however, cause significant impacts regardless of the type of habitat or geographical region invaded. The study is the first global analysis of ecological impacts of invasive plants, and by relying on the most comprehensive database to date and considering impacts at various levels of biological organization, invading species' traits, and invaded ecosystems, it made it possible to disentangle the complexity of the context dependency of impacts. By using a pioneering statistical approach for this kind of data, data mining based on vote counting rather than traditional meta-analysis, it provided locally relevant information to managers and means to predict impact of invasive species."

### **Odůvodnění panelu:**

The result received A grade during the last evaluation.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### A common red algal origin of the apicomplexan, dinoflagellate, and heterokont plastids

obor: EB

Identifikátor: **RIV/60076658:12310/10:00011804!RIV11-MSM-12310**

Id: 206

Předkladatel výsledku do Pilíře II.:

**IČO: 60076658 Jihočeská univerzita v Českých Budějovicích,  
Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **29 %**

#### **Popis podílu předkladatele:**

29% The study was conceived in the laboratories of Miroslav Oborník and Julius Lukeš (IP-BC), who contributed characterization of the plastid organelle, description of the end of the linear molecule, analysis of the transcriptomics data and other aspects.

#### **Odůvodnění předkladatele:**

The discovery of a nonphotosynthetic plastid in malaria and other apicomplexan parasites has sparked a contentious debate about its evolutionary origin. Molecular data have led to conflicting conclusions supporting either its green algal origin or red algal origin, perhaps in common with the plastid of related dinoflagellates. This distinction is critical to our understanding of apicomplexan evolution and the evolutionary history of endosymbiosis and photosynthesis; however, the two plastids are nearly impossible to compare due to their nonoverlapping information content. Here we describe the complete plastid genome sequences and plastid-associated data from two independent photosynthetic lineages represented by *Chromera velia* and an undescribed alga CCMP3155 that we show are closely related to apicomplexans. Our phylogenetic analyses also support their close relationship to plastids of heterokont algae, indicating they all derive from the same endosymbiosis. Altogether, these findings support a relatively simple path of linear descent for the evolution of photosynthesis in a large proportion of algae and emphasize plastid loss in several lineages. PNAS is a prestigious journal with high IF (9.6), the article has been already cited more than 180 times.

#### **Odůvodnění panelu:**

The result received A grade during the last evaluation.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### A tick salivary protein targets cathepsin G and chymase and inhibits host inflammation and platelet aggregation

obor: EC

Identifikátor: **RIV/60076658:12310/11:43882823!RIV12-MSM-12310**

Id: 207

Předkladatel výsledku do Pilíře II.:

**IČO: 60076658 Jihočeská univerzita v Českých Budějovicích,  
Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **6 %**

#### **Popis podílu předkladatele:**

6% In this work we characterized tick salivary serpin IRS-2 from European vector of Lyme boreliosis and tick borne encephalitis - tick Ixodes ricinus. We published biochemical characterization as well as its functional properties in several in vitro and in vivo experiments.

#### **Odůvodnění předkladatele:**

In this work we characterized tick salivary serpin IRS-2 from European vector of Lyme boreliosis and tick borne encephalitis - tick Ixodes ricinus. We published biochemical characterization as well as its functional properties in several in vitro and in vivo experiments. IRS-2 was shown to be an anti-inflammatory and anti-platelet effector. Moreover, in collaboration with Institute of Organic Chemistry and Biochemistry in Prague, the crystal structure of IRS-2 was solved and published in the paper as the first disclosed crystal structure of parasitic serpin. The image of the protein structure was highlighted on the cover page of the journal issue, pointing at the significance of the work. Functional characterization of tick salivary proteins can lead to a development of new drugs or anti-tick vaccine targets.

#### **Odůvodnění panelu:**

The result received A grade during the last evaluation.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

**Autonomous regulation of the insect gut by circadian genes acting downstream of juvenile hormone signaling**

**obor: ED**

**Identifikátor: RIV/60076658:12310/13:43885320!RIV14-MSM-12310**

**Id: 208**

Předkladatel výsledku do Pilíře II.:

**IČO: 60076658 Jihočeská univerzita v Českých Budějovicích,  
Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **15 %**

### **Popis podílu předkladatele:**

All experimental works were performed in the Laboratory of Molecular Chronobiology at the Institute of Entomology, 33% Biology Centre ASCR. About 95% of research was financed from two grants (GACR 204/08/P579 and GAAV IAA500960802) given to D. Doležel at

### **Odůvodnění předkladatele:**

Study published in relatively recognized journal, addressing tissue-autonomous role of circadian genes. This work is also important in establishing our insect, *Pyrrhocoris apterus*, as a new model of chronobiology. PNAS is a prestigious journal with high IF (9.6).

### **Odůvodnění panelu:**

The result received A grade during the last evaluation.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Conversion of the chill susceptible fruit fly larva (*Drosophila melanogaster*) to a freeze tolerant organism

obor: EG

Identifikátor: **RIV/60076658:12310/12:43883594!RIV13-MSM-12310**

Id: 209

Předkladatel výsledku do Pilíře II.:

**IČO: 60076658 Jihočeská univerzita v Českých Budějovicích,  
Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **30 %**

#### **Popis podílu předkladatele:**

30% Publication was created in cooperation between employees of the Biology Centre CAS and a student of the Faculty of Science, University of South Bohemia.

#### **Odůvodnění předkladatele:**

We described laboratory technique for transformation of the tropical fruit fly, *Drosophila melanogaster* into an organism capable of survival in frozen state. The technique involves temperature acclimation, feeding on augmented diet and specific freezing protocol.

#### **Odůvodnění panelu:**

The result received A grade during the last evaluation.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Tetrapyrrole Synthesis of Photosynthetic Chromerids Is Likely Homologous to the Unusual Pathway of Apicomplexan Parasites

obor: EB

Identifikátor: **RIV/60076658:12310/11:43882693!RIV12-AV0-12310**

Id: 210

Předkladatel výsledku do Pilíře II.:

**IČO: 60076658 Jihočeská univerzita v Českých Budějovicích,  
Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **21 %**

#### **Popis podílu předkladatele:**

21% We obtained the sequences, performed phylogenetic analysis, targeting predictions and biochemical experiment with labeled aminoacids. We wrote the article.

#### **Odůvodnění předkladatele:**

We mapped the synthesis of tetrapyrroles in the closest known phototrophic relative to apicomplexan parasites, coral associated alga *Chromera velia*. We showed that although *C. velia* is a phototroph, the ALA is synthesized by heterotrophic pathway. *C. velia* thus appears to be the only known phototroph synthesizing chlorophyll from glycine and not from glutamate. Plant Cell is an article with very high IF in the field and the article is well cited.

#### **Odůvodnění panelu:**

The result received A grade during the last evaluation.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

Hyperprolinemic larvae of the drosophilid fly, *Chymomyza costata*, survive cryopreservation in liquid nitrogen

obor: EG

Identifikátor: **RIV/60076658:12310/11:43882917!RIV12-MSM-12310**

Id: 211

Předkladatel výsledku do Pilíře II.:

**IČO: 60076658 Jihočeská univerzita v Českých Budějovicích,  
Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **17 %**

### **Popis podílu předkladatele:**

17% Publication was created in cooperation between employees of the Biology Centre CAS and a student of the Faculty of Science, University of South Bohemia

### **Odůvodnění předkladatele:**

We described physiological principles underlying the exceptional capacity for survival of cryogenic conditions (liquid nitrogen) in the larvae of drosophilid fly, *Chymomyza costata*.

### **Odůvodnění panelu:**

The result received A grade during the last evaluation.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Patterning by heritage in mouse molar row development

obor: EA

Identifikátor: **RIV/00216208:11310/10:10080417!RIV11-MSM-11310**

Id: 212

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **20 %**

#### **Popis podílu předkladatele:**

20% | Charles University 20%

#### **Odůvodnění předkladatele:**

"It is known from paleontology studies that two premolars have been lost during mouse evolution. During mouse mandible development, two bud-like structures transiently form that may represent rudimentary precursors of the lost premolars. However, the interpretation of these structures and their significance for mouse molar development are highly controversial because of a lack of molecular data. This study highlights how rudiments of lost structures can stay integrated and participate in morphogenesis of functional organs and help in understanding their evolution. The work was published in a prestigious journal and is already included in the list of excellent results (M2013) on behalf of other institutions."

#### **Odůvodnění panelu:**

The result received A grade during the last evaluation.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

**Bordetella adenylate cyclase toxin mobilizes its  $\beta 2$  integrin receptor into lipid rafts to accomplish translocation across target cell membrane in two steps**

**obor: EE**

**Identifikátor: RIV/00216208:11310/10:10001182!RIV11-MSM-11310**

**Id: 213**

**Předkladatel výsledku do Pilíře II.:**

**IČO: 216208 Univerzita Karlova v Praze, Přírodovědecká fakulta**

**Podíl předkladatele na výsledku: 20 %**

### **Popis podílu předkladatele:**

20% |Charles University 20%

### **Odůvodnění předkladatele:**

"The adenylate cyclase toxin-hemolysin (CyaA, ACT) is a key virulence factor of *Bordetella pertussis*, a gramnegative pathogenic bacterium responsible for whooping cough. CyaA belongs to the RTX (Repeats-in-Toxin) protein group with cytotoxic pore-forming activity. CyaA may target many types of cells where it perturbs their physiology by several mechanisms. Translocation of its adenylatcyclase (AC) domain in the cytosol of target cell yields steep elevation of cAMP concentration which triggers or deregulates numerous signaling pathways. In this paper we show that the penetration of the AC domain across cell membrane proceeds in two steps. After binding of CyaA to its integrin receptor, the penetration starts by membrane insertion of a toxin 'translocation intermediate' that transiently permeabilizes cells for influx of extracellular calcium ions. This promotes relocation of the toxin-receptor complex into specific lipid microdomains within cell membrane - lipid rafts. The cholesterol-rich lipid environment in lipid rafts promotes translocation of the AC domain across cell membrane. The mechanism of CyaA penetration into cells sets a new paradigm for membrane translocation of toxins of the RTX family. The findings important for understanding of pathogenesis of whooping cough and in vaccinology were obtained in a competitive area of research (IF=7.56), under supervision of Peter Šebo from the Institute of Microbiology AV ČR. R. Fišer from the Charles University contributed by development of the essential methodology and performing the experiments. The work was published in a prestigious journal and is already included in the list of excellent results (M2013) on behalf of other institutions."

### **Odůvodnění panelu:**

The result received A grade during the last evaluation.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Successful invaders co-opt pollinators of native flora and accumulate insect pollinators with increasing residence time

obor: EF

Identifikátor: **RIV/00216208:11310/11:10107620!RIV12-MSM-11310**

Id: 214

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **25 %**

#### Popis podílu předkladatele:

25% | Charles University 25%

#### Odůvodnění předkladatele:

"When studying determinants of invasiveness of plant species, it needs to be taken into account that the relationships between plants and organisms at other trophic levels result from centuries of mutual interactions. Pollination mode is one of the most important mutualistic relationships. Our study shows that alien flora introduced to Central Europe contained a higher proportion of insect-pollinated species than did the Central European native flora and hosted a higher diversity of pollinators per species. However, the frequency of pollination modes in the introduced alien flora gradually changed during the process of naturalization, becoming more similar to that of native species, and eventually, the naturalized species that became invasive did not differ in their frequency of pollination modes from native species. The results further suggest a remarkable role of the pollination mode in successful invasions; self-pollination tends to support spread of invasive species more than any other mode of pollination. Moreover, groups of plants that have been provided with longer time to sample a wider range of habitats than recently arriving alien species have formed more associations with native pollinator species occurring in those habitats. Published in a prestigious journal Ecological Monographs (IF 7.443 for the year of publication), that only selects about 25-30 papers a year to publish, the study is the first in invasion literature to investigate shifts of plant-pollinator interactions on a time scale of millennia, by using a study system in which the relationships were being newly formed following the introduction of plants to central Europe from other regions. By February 2016, the paper yielded 42 Google Scholar and 29 WoS citations. It was nominated by the Institute of Botany, AS CR, for the last evaluation, and classified in the category A."

#### Odůvodnění panelu:

The result received A grade during the last evaluation.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Ecological and evolutionary significance of genomic GC content diversity in monocots

obor: EF

Identifikátor: **RIV/00216224:14310/14:00074400!RIV15-GA0-14310**

Id: 215

Předkladatel výsledku do Pilíře II.:

**IČO: 216224 Masarykova univerzita, Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **90 %**

#### Popis podílu předkladatele:

90% This paper is the result of the long-term research of the Plant Biosystematics Group at the Masaryk University which is exclusive author of all genomic data, conducted analyses, new statistical approaches, and discussed ideas and conclusions. The three

#### Odůvodnění předkladatele:

This paper is the result of the long-term research of the Plant Biosystematics Group at the Masaryk University which is exclusive author of all genomic data, conducted analyses, new statistical approaches, and discussed ideas and conclusions. Genomic DNA base composition (GC content) is predicted to significantly affect genome functioning and species ecology. Although several hypotheses have been put forward to address the biological impact of GC content variation in microbial and vertebrate organisms, the biological significance of GC content diversity in plants remains unclear because of a lack of sufficiently robust genomic data. Using flow cytometry, we report genomic GC contents for 239 species representing 70 of 78 monocot families and compare them with genomic characters, a suite of life history traits and climatic niche data using phylogeny-based statistics. GC content of monocots varied between 33.6% and 48.9%, with several groups exceeding the GC content known for any other vascular plant group, highlighting their unusual genome architecture and organization. GC content showed a quadratic relationship with genome size, with the decreases in GC content in larger genomes possibly being a consequence of the higher biochemical costs of GC base synthesis. Dramatic decreases in GC content were observed in species with holocentric chromosomes, whereas increased GC content was documented in species able to grow in seasonally cold and/ or dry climates, possibly indicating an advantage of GC-rich DNA during cell freezing and desiccation. We also show that genomic adaptations associated with changing GC content might have played a significant role in the evolution of the Earth's contemporary biota, such as the rise of grass-dominated biomes during the mid-Tertiary. One of the major selective advantages of GC-rich DNA is hypothesized to be facilitating more complex gene regulation.

#### Odůvodnění panelu:

Important study elucidating evolution of the genomic DNA base composition in plants. The authors performed large-scale genomic nucleotide composition survey in monocots. The genomic DNA base composition is significantly associated with genome size and chromosomal structure. The article is published in a top scientific journal.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Functional type 2 photosynthetic reaction centers found in the rare bacterial phylum Gemmatimonadetes

obor: CE

Identifikátor: **RIV/60076658:12310/14:43887164!RIV15-MSM-12310**

Id: 216

Předkladatel výsledku do Pilíře II.:

**IČO: 60076658 Jihočeská univerzita v Českých Budějovicích,  
Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **11 %**

#### **Popis podílu předkladatele:**

11% Michal Koblizek designed the study, conducted part of the measurements and wrote parts of the paper. Hana Medova performed pigment analyses.

#### **Odůvodnění předkladatele:**

Photosynthesis is one of the most fundamental biological processes on Earth. To date, species capable of performing (bacterio) chlorophyll-based phototrophy have been reported in six bacterial phyla. Here we report a phototrophic bacterium belonging to the rare and understudied phylum Gemmatimonadetes. This strain, isolated from a freshwater lake in the Gobi Desert, contains fully functional photosynthetic reaction centers. Its photosynthesis genes appear to originate from an ancient horizontal gene transfer from a purple phototrophic bacterium. Our findings not only demonstrate that Gemmatimonadetes represents a new phototrophic bacterial phylum, but also present, to our knowledge, the first evidence that genes for (bacterio)chlorophyll-based phototrophy can be transferred between distant bacterial phyla

#### **Odůvodnění panelu:**

The authors describe poorly characterized red-pigmented semiaerobic strain of photosynthetic bacteria phylum Gemmatimonadetes found in freshwater lake in Gobi desert. The authors provide evidence that Gemmatimonadetes contain (bacterio)chlorophyll with novel insights into bacterial photosynthesis. The study was published in a highly prestigious journal.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### A retrotransposon-driven Dicer isoform directs endogenous small interfering RNA production in mouse oocytes

obor: EB

Identifikátor: RIV/68378050: /13:00422928!RIV14-GA0-68378050

Id: 217

Předkladatel výsledku do Pilíře II.:

**IČO: 68378050 Ústav molekulární genetiky AV ČR, v. v. i.**

Podíl předkladatele na výsledku: 0 %

#### Popis podílu předkladatele:

The benchwork was completely done in the IMG laboratory; bioinformatic analyses were a collaboration with K. V. (U. of Zagreb) and genetically modified mouse model was produced in collaboration with R.S.

#### Odůvodnění předkladatele:

This work brings together past 14 years of research on RNAi in mammals as it provides a mechanistical explanation for a number of previously unexplained observations and opens new research directions. This work includes the first use of a pair of TAL effector nucleases to cut out a defined genomic sequence. A Cell paper conceived and produced in a Czech lab without western co-authors is extremely rare (there is only one other locally produced Cell paper– from J. Forejt's lab (IMG) published in 1992).

#### Odůvodnění panelu:

The authors investigated iRNA in mouse oocytes and have shown that the Dicer gene encoding ribonuclease is the single factor responsible for control of biogenesis of siRNA and miRNA in the mouse germline. The study provides a mechanistical explanation for a number of previously unexplained observations and opens new research directions.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

**Troy, a tumor necrosis factor receptor family member, interacts with Lgr5 to inhibit Wnt signaling in intestinal stem cells**

**obor: EB**

Identifikátor: **RIV/68378050: /13:00386281!RIV14-GA0-68378050**

Id: 218

Předkladatel výsledku do Pilíře II.:

**IČO: 68378050 Ústav molekulární genetiky AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **0 %**

### **Popis podílu předkladatele:**

The whole study was performed in the Laboratory of Cell and Developmental Biology at IMG, AS CR. Two collaborating laboratories supplied tumor specimens or generated Troy-CreERT2 transgenic mice.

### **Odůvodnění předkladatele:**

The Wnt signaling pathway is required for maintenance of the intestinal epithelia; blocking this pathway reduces the proliferative capacity of intestinal stem cells. However, aberrant Wnt signaling leads to intestinal cancer. We investigated the roles of the Wnt pathway in homeostasis of the intestinal epithelium and during malignant transformation in human cells and mice. We identified Troy as a target of canonical Wnt signaling. Importantly, we showed that Troy represents a novel marker of adult stem cells in the intestine.

### **Odůvodnění panelu:**

The article is excellent functional study which identifies novel negative regulators of Wnt signaling pathway, with potential impact on intestinal cancer treatment. The study is published in a top journal with very good citation record, and is executed by mostly Czech team.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Mutations in ANTXR1 Cause GAPO Syndrome

obor: EB

Identifikátor: **RIV/00216208:11110/13:10192047!RIV14-MZ0-11110**

Id: 219

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, 1. lékařská fakulta**

Podíl předkladatele na výsledku: **72 %**

#### Popis podílu předkladatele:

72% | We performed all genetic and molecular studies except of ANTXR1 Western blot analysis.

#### Odůvodnění předkladatele:

"The genetic cause of GAPO syndrome, a condition characterized by growth retardation, alopecia, pseudoanodontia, and progressive visual impairment, has not previously been identified. We studied four ethnically unrelated affected individuals and identified homozygous nonsense mutations (c.262C>T [p.Arg88\*] and c.505C>T [p.Arg169\*]) or splicing mutations (c.1435-12A>G [p.Gly479Phefs\*119]) in ANTXR1, which encodes anthrax toxin receptor 1. The nonsense mutations predictably trigger nonsense-mediated mRNA decay, resulting in the loss of ANTXR1. The transcript with the splicing mutation theoretically encodes a truncated ANTXR1 containing a neopeptide composed of 118 unique amino acids in its C terminus. GAPO syndrome's major phenotypic features, which include dental abnormalities and the accumulation of extracellular matrix, recapitulate those found in Antxr1-mutant mice and point toward an underlying defect in extracellular-matrix regulation. Thus, we propose that mutations affecting ANTXR1 function are responsible for this disease's characteristic generalized defect in extracellular-matrix homeostasis."

#### Odůvodnění panelu:

The authors investigated genetic causes of GAPO syndrome, consisting of a growth retardation, alopecia, pseudoanodontia, and frequently also of progressive optic atrophy. They propose that mutations affecting ANTXR1 function are responsible for this disease's characteristic generalized defect in extracellular-matrix homeostasis. Excellent article in the field of medical genetics with impact on human health. Study driven by Czech team and published in leading journal.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### MYB transcriptionally regulates the miR-155 host gene in chronic lymphocytic leukemia

obor: EB

Identifikátor: **RIV/00216208:11110/11:10277!RIV12-MSM-11110**

Id: 220

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, 1. lékařská fakulta**

Podíl předkladatele na výsledku: **69 %**

#### Popis podílu předkladatele:

69% |Results of the paper Vargova K et al., 2011 were in the main done at 1st Faculty of Medicine in Prague and General University Hospital in Prague. Namely, design of all experiments provided in the paper, patient sample collection, handling of samples,

#### Odůvodnění předkladatele:

"Chronic lymphocytic leukemia (CLL) represents the most frequent leukemia in Western world. It is very heterogeneous disease, characterized by accumulation of non-functional B cells in peripheral blood, spleen, lymph nodes and bone marrow (Hallek M, 2013). By the most used prognostic markers of CLL belong: ZAP-70, CD38 and mutational status of IgVH (Chiorazzi N, 2012). Nevertheless, measurement of these markers is not sufficient. Therefore, in our work, we focused on searching for proper and reliable molecular prognostic/progression markers of CLL. In the last decade, plenty of research groups aim to understand the role of small non-coding miRNA in the process of leukemogenesis. We found out that increased expression of oncogenic miR-155 in patient samples with CLL is due to direct binding of transcriptional factor MYB (v-myeloblastosis viral oncogene) into its binding site at the miR-155 host gene. The main function of miRNAs lies in negative regulation of target gene expression. In leukemic B cells, the increased expression of miR-155 inhibit the key hematopoietic transcription factor PU.1 production. Described model of increased expression of MYB, miR-155 and decreased expression of PU.1 we described in our unfavorable group of patient samples with CLL. Conclusions: Expression of MYB, miR-155 and PU.1 in CLL differs in their expression in normal healthy controls. There exists clinical importance of overexpression of MYB, miR-155 and down-regulation of PU.1 in CLL. Global gene expression profile of CLL patient samples unrolled deregulation of MYB and miR-155 target genes. In vitro changes at levels of MYB, miR-155 and PU.1 showed on tight relationship between these molecules in CLL. Our results could help in evaluation of CLL patients prognosis, namely by measurement of expression profile MYB, miR-155 and PU.1 in their peripheral blood."

#### Odůvodnění panelu:

This study investigated microRNA miR-155 as a candidate pathogenetic factor in chronic B-lymphocytic leukemia. There is a role of the promoter of the miR-155, which associates with myeloblastosis viral oncogene homolog. The study provides insight into the molecular mechanism contributing to one of the leukemias and has a strong clinical relevance.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Flo11p, drug efflux pumps, and the extracellular matrix cooperate to form biofilm yeast colonies

obor: EE

Identifikátor: RIV/00216208:11310/11:10107096!RIV12-MSM-11310

Id: 221

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **70 %**

#### Popis podílu předkladatele:

70% |Charles University 70%

#### Odůvodnění předkladatele:

"Paper shows that wild strains of *S. cerevisiae* form complex, differentiated colonies that are very similar to biofilms in terms of their organization and protective mechanisms. Analysis of the spatiotemporal development of complex, biofilm colonies formed by *S. cerevisiae* strain isolated from nature was performed using new advanced techniques of confocal microscopy including specific labeling and staining to visualize particular processes within the colony structure. During few days, the yeast form an intricate, three-dimensional structure with an internal cavity and differentiated cells localized in different regions. Some of these cells are functionally specialized to protect the colonies from impact of the environment. Cells in the outer layers produce active multidrug resistance pumps expelling toxic compounds, whereas internal cells produce a selectively-permeable extracellular matrix. While cells in the colony interior continue to divide, surface of colonies is formed by a layer of stationary cells more resistant to environmental stresses. These mechanisms provide population of biofilm colonies multiple protections against the toxic compounds including harmful antifungal agents. Understanding of these mechanisms is crucial for finding of compounds that disrupt the individual processes which would be very important for development of new antifungal strategies in medicine."

#### Odůvodnění panelu:

The study investigated role of drug efflux pumps and extracellular matrix in forming biofilm yeast colonies. The authors describe unique drug extrusion properties first available to all colony cells, later only to the surface area colony cells. Understanding biofilm formation has a major medical and industrial significance.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Mechanistic basis of infertility of mouse intersubspecific hybrids

obor: EB

Identifikátor: RIV/68378050: /13:00397570!RIV14-GA0-68378050

Id: 222

Předkladatel výsledku do Pilíře II.:

**IČO: 27162 Výzkumný ústav veterinárního lékařství, v.v.i.**

Podíl předkladatele na výsledku: **0 %**

#### **Popis podílu předkladatele:**

Authors contributed mainly by one of the crucial approach - life-cell imaging of female germ cells. They also participated on setup of the study and preparation of the manuscript.

#### **Odůvodnění předkladatele:**

The focus of this paper was to elucidate the hybrid sterility, which is one of the mechanisms of postzygotic sterility in mammals. This phenomenon is essential for speciation in mammals. We have used closely related subspecies of mice and studied molecular processes, which might be responsible for sterility of resulting hybrids. Our experiments revealed that early meiotic events and preparation of chromosomes for meiotic divisions are impaired in those animals, in both males and females. This study brought a new piece of information about the origin of species in mammals and therefore it is crucially important for advancing our knowledge in biology as well as for crossbreeding of animals in farm production. The importance of this publication is best documented by part of a message from the editor: "It really is a stellar paper - I was honored to be a part of the process". Also shortly after publication this paper started to be cited with citation reaching 28 until now (published 2013) in excellent journals such as Nature, Genes & Development, PNAS, Annual review of Genetics, Nature Reviews Genetics just to name a few.

#### **Odůvodnění panelu:**

This is investigation on sterility genes in mice. Using the intersubspecific chromosome-substitution strains, the authors demonstrate that the heterospecific pairing of homologous chromosomes is a preexisting condition of asynapsis and may represent a universal mechanism of pachytene arrest in interspecific hybrids. The study provides important new data in the field of population genetics, is published in leading journal by Czech team and has a good citation record.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### The impact of an invasive plant changes over time

obor: EH

Identifikátor: **RIV/00216208:11310/13:10191365!RIV14-MSM-11310**

Id: 223

Předkladatel výsledku do Pilíře II.:

**IČO: 67985939 Botanický ústav AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **95 %**

#### **Popis podílu předkladatele:**

95 %. The research was designed and completed almost entirely at the Institute of Botany. Petr Dostál designed the research and performed all statistical analyses, and wrote the first draft of the manuscript. Petr Dostál and Tereza Klinerová collected data

#### **Odůvodnění předkladatele:**

Previous research showed that invasive plants can reduce native biodiversity locally, but their effects become less obvious at larger spatial scales. Dostál et al. (2013) demonstrated that the time-scale can be important, equally as the spatial resolution, when the impacts of exotic organisms are evaluated. Specifically, the authors studied plant communities invaded by *Heracleum mantegazzianum* (giant hogweed) for different time periods and found native species richness to be most reduced at sites invaded for ~30 years. However, native communities largely recovered at sites invaded for a longer period. A complementary experiment indicated that decreasing invader's performance is most likely due to accumulation of specialist soil pathogens over time. The study is thus remarkable not only for showing time-dependent invader's impact, but also for identifying the underlying mechanism. It is a rare empirical demonstration of stabilizing processes promoting the coexistence of species differing in competitive ability. The study has also possible practical implications for the management of the giant hogweed and other noxious invaders. The results were published in the top-ranked ecological journal and were also highlighted by Faculty of 1000 and by "Science for Environment Policy" of the European Commission. Since last evaluation in 2014 the number of citations has increased significantly.

#### **Odůvodnění panelu:**

This study investigated the impact over time of exotic plant invaders, which pose a serious threat to native communities. The study demonstrates that the initial dominance of an invasive plant species and its negative impact can later be reversed by stabilising processes. This is an influential study from the field of plant ecology published by all Czech team in top journal with very good citation record.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

**Aerobic kinetoplastid flagellate *Phytomonas* does not require heme for viability.**

**obor: EB**

**Identifikátor: RIV/60077344: /12:00375986!RIV13-AV0-60077344**

**Id: 224**

Předkladatel výsledku do Pilíře II.:

**IČO: 60077344 Biologické centrum AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **47,1 %**

### **Popis podílu předkladatele:**

Our lab has first, third (PhD student), fifth and corresponding authorship. By my (Lukeš) estimate, more than 80% of experiments were performed in our lab, while some specialized measurements of heme concentration and the activity of complex II were done

### **Odůvodnění předkladatele:**

We present a discovery that proves that some aerobic organisms can live without heme, as is here the case of the protozoan *Phytomonas*. This is substantial, since so far heme was considered essential for all known forms of life. Moreover, this discovery may contribute to the development of more effective drugs against leishmaniasis, a serious tropical disease that causes the related parasite *Leishmania*, which has striking similarities with *Phytomonas*, when heme pathway is considered.

### **Odůvodnění panelu:**

This important research discovers and investigates that *Phytomonas* flagellates do not require heme for their biological functions. This discovers a unique metabolic adaptation of this cell. The study describes an original phenomenon and was published in a top journal.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Modulation of cell adhesion, proliferation and differentiation on materials designed for body implants

obor: EI

Identifikátor: RIV/67985823: /11:00365232!RIV12-AV0-67985823

Id: 225

Předkladatel výsledku do Pilíře II.:

**IČO: 67985823 Fyziologický ústav AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **0 %**

#### **Popis podílu předkladatele:**

In total, there is five authors of th review, three of them being from the Institute of Physiology. Thus, the Institute of Physiology has a major contribution to the article (at least three fifths). The Authors from the Inst. Physiol. contributed mainly t

#### **Odůvodnění předkladatele:**

The paper sumarizes principles of regulation of the cell adhesion, subsequent cell growth, swith between cell proliferation and differentiation and phenotypic maturation by physical and chemical properties of biomaterials, i.e. artificial materials developped for potential construction of tissue replacements. This knowledge is necessary for advanced approaches to tissue engineering and regenerative medicine. Source: Biotechnology Advances - Impact factor(2014)=9,015.

#### **Odůvodnění panelu:**

This is a review paper on the interaction of cells and tissues with artificial materials. The authors show that nanopatterned surfaces are an effective tool for manipulating the type, number, spacing and distribution of ligands for cell adhesion receptors on the material surface. It is an influential biotechnological article published by Czech team in a leading journal and has an excellent citation record.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Ligand-binding properties of a juvenile hormone receptor, Methoprene-tolerant.

obor: EB

Identifikátor: RIV/60077344: /11:00369355!RIV12-AV0-60077344

Id: 226

Předkladatel výsledku do Pilíře II.:

**IČO: 60077344 Biologické centrum AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **0 %**

#### Popis podílu předkladatele:

The work presented in this article was supervised by Marek Jindra at the Institute of Entomology; Jan Rynes was a graduate student and Keiko Takaki was a postdoctoral fellow in the Jindra laboratory. The French and Australian colleagues were responsible f

#### Odůvodnění předkladatele:

44,4%. This article (now cited 83 times) effectively identifies the long-sought receptor for the insect juvenile hormone. By introducing specific amino acid replacements into the Methoprene-tolerant (Met) protein, the study defines the hormone-binding pocket of Met and establishes the requirement of juvenile hormone binding for the assembly of the receptor complex by the mutually interacting Met and Taiman proteins.

#### Odůvodnění panelu:

This study determined so far obscure receptor for Juvenile Hormone in insects, the Met receptor. Results show that juvenile hormone mediates the signals through direct binding to this intracellular receptor. The article is an excellent experimental study in the field of insect physiology, published in a leading journal with a good citation record.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Carborane-Based Carbonic Anhydrase Inhibitors

obor: EB

Identifikátor: RIV/61388963: /13:00422652!RIV14-AV0-61388963

Id: 227

Předkladatel výsledku do Pilíře II.:

**IČO: 61388963 Ústav organické chemie a biochemie AV ČR, v.v.i.**

Podíl předkladatele na výsledku: 0 %

#### Popis podílu předkladatele:

The project had an equal contribution of three insitutes. The specific contribution of IOCB was design and chemical synthesis of the parental compound and structural determination of protein-inhibitor complexes.

#### Odůvodnění předkladatele:

Human carbonic anhydrases (CAs) are enzymes that play an important role in many physiological processes and thus they are recognized as diagnostic and therapeutic targets. To date, 15 human CA isozymes with different subcellular localization and tissue expression profiles have been identified. About 30 CA inhibitors are used clinically as anti-glaucoma drugs (targeting CAII, CAIV, and CAXII), anti-convulsants (targeting CAII, CAVII, and CAXIV) and anti-obesity agents (targeting CAVA and CAVB). Recently, cancer-associated form CAIX was also validated as targets for inhibitor development. The traditional CA inhibitors contain a sulfonamide or sulfamide moiety that coordinates the zinc cation located in the CA catalytic site. Most of the currently used CA inhibitors lack selectivity and their use causes numerous unwanted side-effects. A current challenge is the design of compounds that can inhibit specific isozymes. We present evidence that carborane-based compounds are promising lead structures for development of inhibitors of CA isozymes. Our experiments demonstrated that various types of hydrophobic, space-filling carborane clusters can be accommodated in the CA active site and that substitution with an appropriately attached sulfamide group and other substituents leads to compounds with high selectivity toward the cancer-specific CAIX isozyme over the widespread CAII isozyme. Crystal structures provided information that can be applied to the structure-based design of specific inhibitors.

#### Odůvodnění panelu:

This research is focused on carbonic anhydrase inhibitors, which have significant use as anti-glaucoma drugs, anti-seizure medication and anti-obesity agents. The authors show that carborane-based compounds are promising lead structures for the development of inhibitors of CA isozymes. New type of carbonic anhydrase inhibitors is discovered and molecular mechanism of action described.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Omsk haemorrhagic fever.

obor: EB

Identifikátor: RIV/60077344: /10:00352320!RIV11-AV0-60077344

Id: 228

Předkladatel výsledku do Pilíře II.:

**IČO: 60077344 Biologické centrum AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **40 %**

#### **Popis podílu předkladatele:**

Contribution of DR as the first author was the major one and consisted in creation of general idea and study design, search and analysis of relevant data, evaluation of the data, concept building, manuscript writing and coordination of co-authors collabor

#### **Odůvodnění předkladatele:**

To present previously unknown or inaccessible data and data released in Russian-language journals only, we published the study on Omsk hemorrhagic fever – acute viral tick-transmitted disease with fatality rate to up to 3%, in one of the most prestigious scientific journals, summarizing historical findings, it characteristic epidemiological, clinical and biological features. The article currently represents the most accessed source of information about the disease.

#### **Odůvodnění panelu:**

Interesting and potentially significant epidemiological overview about Omsk haemorrhagic fever, an important and dangerous tick-borne infection in Russia, with a number of new and previously unpublished experimental data, driven by Czech scientist who is the first author on article published in a leading medical journal.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Stretching the Rules: Monocentric Chromosomes with Multiple Centromere Domains

obor: EB

Identifikátor: **RIV/60077344: /12:00377728!RIV15-AV0-60077344**

Id: 229

Předkladatel výsledku do Pilíře II.:

**IČO: 60077344 Biologické centrum AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **87,5 %**

#### Popis podílu předkladatele:

All experiments with the exception of electron microscopy were carried out in the Laboratory of Molecular Cytogenetics (LAMC, Biology Centre CAS, České Budějovice, Czech Republic). Electron microscopy was done by Dr. Schroeder-Reiter and Dr. Wanner (Ultra

#### Odůvodnění předkladatele:

During cell division, DNA packed in chromosomes must be perfectly distributed between daughter cells. Centromeres play a crucial role in this process. Current centromere biology maintains that stable chromosomes can be either monocentric, with one functional domain located at a single position, or polycentric, with multiple domains located along the entire chromosome. In the pea (*Pisum sativum* L.), we found a novel type of centromere organization, consisting of remarkably extended primary constrictions containing multiple functional centromere domains composed of 13 distinct families of repetitive DNA. Discovery of this centromere organization, which we designated as “meta-polycentric”, demonstrate that the organization and DNA sequence composition of functional centromere domains can be far more complex than previously thought, do not require single repetitive elements, and do not require single centromere domains in order to segregate properly. Establishing the pea as a new model organism for centromere investigation will contribute to a better understanding of centromere chromatin organization and dynamics during the cell cycle as well as the still elusive role of repetitive DNA in centromere evolution, determination and function.

#### Odůvodnění panelu:

The authors studied pea centromeres and show found that pea chromosomes are different, exhibiting very large single centromeres containing multiple functional domains, thus representing a novel intermediate type of centromere. The organization and DNA composition of functional centromere domains can be far more complex than previously thought. Published in a high-quality journal, with good citation record.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Ecological impacts of invasive alien plants: a meta-analysis of their effects on species, communities and ecosystems

obor: EH

Identifikátor: RIV/67985939: /11:00365131!RIV12-AV0-67985939

Id: 230

Předkladatel výsledku do Pilíře II.:

**IČO: 67985939 Botanický ústav AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **40 %**

#### **Popis podílu předkladatele:**

40 %. The role of the authors from Institute of Botany was instrumental in conceiving the idea, as indicated by four of them being involved and by the prestigious last position of P. Pyšek. The paper was based on the database of impacts of invasive plant

#### **Odůvodnění předkladatele:**

A global meta-analysis of impacts of invasive plants on resident species, communities and ecosystems revealed that the magnitude and direction of the impact varied both within and between different types of impact. Abundance and diversity of the resident species decreased in invaded sites, whereas primary production and several ecosystem processes were enhanced. Important signal is the fact that by the time changes in nutrient cycling are detected, major impacts on plant species and communities are likely to have already occurred. The paper attracted enormous attention from the research community, gaining 408 citations on WoS Core Collection within 4.5 years since publication, and has the status of a 'Highly Cited Paper'.

#### **Odůvodnění panelu:**

A global meta-analysis of impacts of invasive plants on resident species, communities and ecosystems revealed that the magnitude and direction of the impact varied both within and between different types of impact. Very highly cited review (over 400 citations since 2011) published in a prestigious journal in the field ecology. Important contribution of authors from the nominating institution.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Gain-of-function mutations of PPM1D/Wip1 impair the p53-dependent G1 checkpoint

obor: EB

Identifikátor: RIV/68378050: /13:00423172!RIV14-GA0-68378050

Id: 231

Předkladatel výsledku do Pilíře II.:

**IČO: 68378050 Ústav molekulární genetiky AV ČR, v. v. i.**

Podíl předkladatele na výsledku: 0 %

#### Popis podílu předkladatele:

Major part of this project was performed in the Laboratory of Cancer Cell Biology at IMG including identification and functional characterization of PPM1D mutations in cancer cell lines. Libor Macurek designed all experiments, coordinated collaboration be

#### Odůvodnění předkladatele:

Here we have identified novel mutations in exon 6 of the PPM1D gene that result in production of an enzymatically active C-terminally truncated Wip1 phosphatase. Truncation of Wip1 increases its protein stability and impairs the ability of cells to activate the tumor-suppressor protein p53. This results in suppressed ability to activate the G1 checkpoint and allows replication in the presence of damaged DNA. We have found these truncating mutations in the PPM1D gene in selected cancer cell lines and in a subset of breast cancer patients. Truncating mutations in PPM1D represent a newly identified genetic defect predisposing the mutation carriers to cancer development. Future studies are needed to explore the intriguing possibility that truncated Wip1 might be a suitable target for personalized cancer therapy.

#### Odůvodnění panelu:

The authors investigate effects gain of function mutations on p53-dependent G1-phase checkpoint in cell tumor lines. The authors propose that the high expression level of truncated Wip1 impairs the p53-dependent genome surveillance system in mutation carriers, making their genomic DNA hypersensitive to various genotoxic insults. This is an excellent functional study on the mechanisms of DNA repair published in leading journal with major contribution of the Czech team.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Discovery of a Chlorophyll Binding Protein Complex Involved in the Early Steps of Photosystem II Assembly in Synechocystis

obor: EE

Identifikátor: **RIV/60076658:12310/14:43887093!RIV15-MSM-12310**

Id: 232

Předkladatel výsledku do Pilíře II.:

**IČO: 60076658 Jihočeská univerzita v Českých Budějovicích,  
Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **43 %**

#### **Popis podílu předkladatele:**

43% We performed vast majority of molecular-biological, biochemical and physiological work and experiments, our colleagues in London constructed a plasmid used for ycf39 deletions and participated in writing.

#### **Odůvodnění předkladatele:**

A novel cyanobacterial chlorophyll-binding complex is described in the article. This complex is important for photoprotection of the newly formed Photosystem II and for chlorophyll binding to newly synthesized protein chains. A similar complex most probably exists in plants and is likely essential. Plant cell is a prestigious journal (IF 9.3) in the area of research.

#### **Odůvodnění panelu:**

The authors focused on studying of oxygen-evolving photosystem II complex, an essential part of photosynthetic activity in plants, algae and cyanobacteria. They provide evidence that a certain pigment protein is vital for chlorophyll delivery during the early stages of the photosystem II complex. This is an excellent paper in one of the best journal of the discipline, led by Czech authors.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Dysfunction of Chromatin Assembly Factor 1 Induces Shortening of Telomeres and Loss of 45S rDNA in *Arabidopsis thaliana*

obor: EB

Identifikátor: **RIV/00216224:14310/10:00045818!RIV11-MSM-14310**

Id: 233

Předkladatel výsledku do Pilíře II.:

**IČO: 216224 Masarykova univerzita, Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **83 %**

#### Popis podílu předkladatele:

83%The result has been accomplished by the staff members of Masaryk University, as a part of PhD thesis of Dr. Iva Mozgova, within the research project/Research Plan of MEYS headed by prof. Jiří Fajkus, supervisor of I. Mozgova's PhD. thesis.

#### Odůvodnění předkladatele:

The paper was published in Plant Cell, the major journal in the field of Plant sciences (IF 9,3, 4th in total ranking, the 1st when not counting the review journals occupying the first three positions). The work was cited in major journals in the field and invited for international conference presentations. The paper thus describes discovery of the novel type of genome instability in higher eukaryotes, which is induced by dysfunction of the epigenetic process of chromatin assembly. This result was important in several ways: i) it inspired related studies in other laboratories ii) it led to further investigation of the phenomenon, namely its mechanism and a possible reversibility iii) mutant plant lines from late generations bearing only active rDNA genes were generated which made it possible to study epigenetic regulation of rDNA genes. The result initiated several international collaborations with top laboratories in the field, such as Prof. Craig S. Pikaard, USA, Charles White, France, Julio Saez Vasquez, France, and Lars Hennig, Sweden. Some of these already resulted in further papers (Pontvianne et al., Genes & Dev. 2013, Muchova et al., The Plant Journal, submitted). Besides citations in major journals in the field (Plant Cell, Genes & Dev., Plant J., Plant Physiol., Curr. Op. Plant Biol.), the work (presented as the opening lecture) was highlighted in the meeting summary from Eur. Plant Chromatin Workshop (published in Epigenetics).

#### Odůvodnění panelu:

The authors studied in Arabidopsis, dysfunction of chromatin assembly factor, which is a histone chaperone depositing histones H3/H4. They show that mutations in two genes FAS1 and FAS2 (encoding 2 out of 3 subunits of the factor) progressively reduce telomeric DNA repeats. The publication describes a unique epigenetic/genetic phenomenon.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Cytokine expression and signaling in drug-induced cellular senescence

obor: EB

Identifikátor: RIV/68378050: /10:00333900!RIV10-MSM-68378050

Id: 234

Předkladatel výsledku do Pilíře II.:

**IČO: 68378050 Ústav molekulární genetiky AV ČR, v. v. i.**

Podíl předkladatele na výsledku: 0 %

#### Popis podílu předkladatele:

The whole study was performed in the Laboratory of Genome Integrity at IMG, AS CR.

#### Odůvodnění předkladatele:

In this study we show for the first time that drug-induced DNA damage response is activating complex network comprising of more than two dozens of various cytokine species. These cytokines produced both in normal and tumor senescent cells activate corresponding signaling pathways (JAK/STAT) and gene expression in autocrine and paracrine way and they can modulate tissue microenvironment. In general, our findings contribute to understanding several patho/physiological processes including wound healing, inflammation and tumor immunosurveillance.

#### Odůvodnění panelu:

The authors investigated inducers of cellular senescence in several human cell lines. These genotoxic compounds upregulated JAK/STAT pathway as well as the pro-inflammatory cytokines, which contributed by paracrine/autocrine effects to senescence. The study is a molecular analysis of mechanisms of important phenomenon executed by Czech team and published in a leading journal. The article has a good citation record.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Interallelic and intergenic incompatibilities of the Prdm9 (Hst1) gene in mouse hybrid sterility

obor: EB

Identifikátor: RIV/68378050: /12:00382929!RIV15-AV0-68378050

Id: 235

Předkladatel výsledku do Pilíře II.:

**IČO: 68378050 Ústav molekulární genetiky AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **0 %**

#### Popis podílu předkladatele:

The study was performed in the Laboratory of Mouse Molecular Genetics at IMG, AS CR. JC Schimenti (Cornell University, NY), Y Matsui (Tohoku University, Sendai), F. Baudat and B de Massy (CNRS Montpellier) provided mutants of Prdm9 gene. Experiments with

#### Odůvodnění předkladatele:

To characterize the incompatibilities underlying hybrid sterility, we phenotyped reproductive and meiotic markers in males with altered copy numbers of Prdm9. A partial rescue of fertility was observed upon removal of the B6 allele of Prdm9 from the azoospermic hybrids, whereas removing one of the two Prdm9 copies in PWD or B6 background had no effect on male reproduction. Additions and subtractions of Prdm9 copies, as well as allelic replacements, improved meiotic progression and fecundity.

#### Odůvodnění panelu:

The study investigated disturbed gametogenesis in the progeny of two fertile parental forms called hybrid sterility (using PWD male and C57BL/6J female mice) investigating the genes involved in this phenomenon using additions and subtraction of gene copies. It seems that the semisterility of (PWD6WSB)F1 males involves Prdm9 gene, which likely is an important regulator of mouse hybrid fertility. An excellent paper in a very good journal with significant contribution of the Czech team. Impact on the field is high.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Vinylsulfonamide and Acrylamide Modification of DNA for Cross-linking with Proteins

obor: EB

Identifikátor: RIV/61388963: /13:00398521!RIV14-AV0-61388963

Id: 236

Předkladatel výsledku do Pilíře II.:

**IČO: 61388963 Ústav organické chemie a biochemie AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **50 %**

#### Popis podílu předkladatele:

Dominant role of IOCB (1st and \* author from IOCB). M. Hocek conceived the idea and supervised the research. All chemistry and most biochemistry was done by J. Dadova. BFU contributed by expression of p53 and mutants and some biophysical studies.

#### Odůvodnění předkladatele:

Novel nucleoside triphosphates modified by Michael acceptors were prepared and their polymerase incorporations to DNA was developed. The resulting reactive DNA probes specifically react with cysteine or cysteine-containing peptides or proteins to form covalent cross-link. The proof-of-principle has been showed on covalent cross-linking of DNA probe with transcription factor p53. The specific reactivity of such DNA probes has promising potential in construction of irreversible inhibitors of DNA-binding proteins and for pull-down analysis and selection of unknown proteins binding to certain DNA sequences.

#### Odůvodnění panelu:

The authors present the synthesis of oligonucleotides and DNA bearing reactive acrylamide or vinylsulfonamide groups and their covalent cross-linking reactions with cysteine-containing peptides and DNA binding domain of protein p53. The vinylsulfonamide-modified dNVSTPs are proposed as suitable building blocks for the construction of oligonucleotides or DNA probes for cross-linking to DNA-binding proteins or for the synthesis of irreversible inhibitors of DNA-modifying enzymes. An excellent paper published in very good journal by completely Czech team. Visible impact on the field.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Horizontal Gene Transfer from Diverse Bacteria to an Insect Genome Enables a Tripartite Nested Mealybug Symbiosis.

obor: EB

Identifikátor: RIV/60077344: /13:00396410!RIV14-AV0-60077344

Id: 237

Předkladatel výsledku do Pilíře II.:

**IČO: 60077344 Biologické centrum AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **7,1 %**

#### **Popis podílu předkladatele:**

FH performed all the genomic, transcriptomic and phylogenetic analyses and wrote the paper together with JM. Other authors participated in provision in preparation of mealybug samples, smaller-scale experiments and manuscript revisions. FH started to work

#### **Odůvodnění předkladatele:**

Genome and transcriptome sequencing revealed 22 expressed horizontally transferred genes from multiple diverse bacteria to the mealybug genome. They likely complement genes missing from the mealybug bacterium-within-bacterium symbiotic system, but none of them was acquired from the current symbionts, but rather from insect reproductive manipulators frequently infecting insect oocytes. The results indicate an unprecedented path to genetic and metabolic mosaicism in multicellular eukaryotes.

#### **Odůvodnění panelu:**

The study investigates the smallest reported bacterial genome in bacteria and its symbiont. Excellent paper published in a high ranking journal. The Czech author led the international team.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Fungal community on decomposing leaf litter undergoes rapid successional changes

obor: EE

Identifikátor: RIV/61388971: /13:00423947!RIV14-MSM-61388971

Id: 238

Předkladatel výsledku do Pilíře II.:

**IČO: 61388971 Mikrobiologický ústav AV ČR, v.v.i.**

Podíl předkladatele na výsledku: **100 %**

#### Popis podílu předkladatele:

100 % The experimental work was done in the Institute of Microbiology ASCR.

#### Odůvodnění předkladatele:

Fungi are considered the primary decomposers of dead plant biomass in terrestrial ecosystems. However, current knowledge regarding the successive changes in fungal communities during litter decomposition is limited. Here we explored the development of the fungal community over 24 months of litter decomposition in a temperate forest with dominant *Quercus petraea* using 454-pyrosequencing of the fungal internal transcribed spacer (ITS) region and cellobiohydrolase I (cbhI) genes, which encode exocellulases, to specifically address cellulose decomposers. To quantify the involvement of phyllosphere fungi in litter decomposition, the fungal communities in live leaves and leaves immediately before abscission were also analysed. The results showed rapid succession of fungi with dramatic changes in the composition of the fungal community.

#### Odůvodnění panelu:

Using genetic analysis, the authors explored the development of the fungal community over 24 months of litter decomposition in a temperate forest with dominant *Quercus petraea*. The study demonstrates that the composition of the fungal community quickly changes with changing litter quality. An extensive and influential ecological study by Czech team consisting of only two authors. Excellent citation record.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Fail-safe mechanism of GCN4 translational control-uORF2 promotes reinitiation by analogous mechanism to uORF1 and thus secures its key role in GCN4 expression

obor: EE

Identifikátor: RIV/61388971: /14:00433445!RIV15-AV0-61388971

Id: 239

Předkladatel výsledku do Pilíře II.:

**IČO: 61388971 Mikrobiologický ústav AV ČR, v.v.i.**

Podíl předkladatele na výsledku: **100 %**

#### Popis podílu předkladatele:

100 % Both idea originated from our Institute as well as all experimental work has been done in the Institute of Microbiology ASCR.

#### Odůvodnění předkladatele:

One of the extensively studied mechanisms of genespecific translational regulation is reinitiation. It takes place on messenger RNAs (mRNAs) where main ORF is preceded by upstream ORF (uORF). Even though uORFs generally down-regulate main ORF expression, specific uORFs exist that allow high level of downstream ORF expression. The key is their ability to retain 40S subunits on mRNA upon termination of their translation to resume scanning for the next AUG. Here, we took advantage of the exemplary model system of reinitiation, the mRNA of yeast transcriptional activator GCN4 containing four short uORFs, and show that contrary to previous reports, not only the first but the first two of its uORFs allow efficient reinitiation. Strikingly, we demonstrate that they utilize a similar molecular mechanism relying on several cis-acting 5' reinitiation-promoting elements, one of which they share, and the interaction with the  $\alpha$ /TIF32 subunit of translation initiation factor eIF3. Since a similar mechanism operates also on YAP1 uORF, our findings strongly suggest that basic principles of reinitiation are conserved. Furthermore, presence of two consecutive reinitiation-permissive uORFs followed by two reinitiation-non-permissive uORFs suggests that tightness of GCN4 translational control is ensured by a fail-safe mechanism that effectively prevents or triggers GCN4 expression under nutrient replete or deplete conditions, respectively.

#### Odůvodnění panelu:

The study investigated gene-specific translational regulation of reinitiation in yeast. The authors show that the underlying reinitiation mechanism in yeasts is highly conserved securing fail-safe regulation of gene expression under various conditions of nutrition. Well-executed study about mechanisms of translation regulation published by Czech scientists in a very good journal.

**PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A**  
**X chromosome control of meiotic chromosome synapsis in mouse inter-subspecific hybrids**

**obor: EB**

**Identifikátor: RIV/68378050: /14:00424947!RIV14-GA0-68378050**

**Id: 240**

**Předkladatel výsledku do Pilíře II.:**

**IČO: 68378050 Ústav molekulární genetiky AV ČR, v. v. i.**

**Podíl předkladatele na výsledku: 0 %**

**Popis podílu předkladatele:**

The study was performed in the Laboratory of Mouse Molecular Genetics at IMG, AS CR. I Mistrík and I. Marticová (Palacký University Olomouc) provided access and expertise to their super-resolution microscope

**Odůvodnění předkladatele:**

Infertility of hybrids between closely related species is important for maintaining genome integrity during evolution, but its molecular mechanism is largely unknown. Here it is shown that hybrid sterility is a consequence of a failure of mutual recognition of chromosomes originating from different subspecies. One of the two major hybrid sterility genes, which control synapsis of meiotic chromosomes and male sterility has been localized to a 4.7Mb interval on the Chromosome X.

**Odůvodnění panelu:**

The authors analyzed hybrid sterility in male *Mus musculus*. They propose a new working hypothesis about male sterility of mouse inter-subspecific F1 hybrids as a consequence of meiotic chromosome asynapsis. Very good paper in good journal.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Socioeconomic legacy yields an invasion debt

obor: EH

Identifikátor: RIV/67985939: /11:00365089!RIV12-AV0-67985939

Id: 241

Předkladatel výsledku do Pilíře II.:

**IČO: 67985939 Botanický ústav AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **30 %**

#### **Popis podílu předkladatele:**

30 %. The role of the authors from Institute of Botany was instrumental in conceiving the idea, as indicated by the prestigious last position of P. Pyšek. Furthermore, the paper was based on the DAISIE database, in the building of which the researchers fr

#### **Odůvodnění předkladatele:**

In this paper we introduce the concept of the “invasion debt” based on the idea of a delay between first introduction of a species in a new territory and its establishment and spread, and provide an explicit test of this phenomenon. Current alien species richness is better explained by socio-economic data from 1900 than from 2000, suggesting strong historical legacy for species groups analysed. Invasions triggered by current economic behavior will thus take decades to become fully realized. The paper received 119 citations on Web of Science Core Collection and reached the status of a ‘Highly Cited Paper’ there.

#### **Odůvodnění panelu:**

The authors investigate alien invading species in 28 European countries. They found that the species invasion is rather related to human economic activity of early 20th century despite the invasion occurring in late 20th century, while current activity will affect invasions probably several decades in future. Highly cited PNAS paper with an author from a Czech institution on the prestigious last position.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### A proposed unified framework for biological invasions

obor: EF

Identifikátor: **RIV/00216208:11310/11:10107767!RIV12-MSM-11310**

Id: 242

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **20 %**

#### **Popis podílu předkladatele:**

20% |Charles University 20%

#### **Odůvodnění předkladatele:**

"A mature understanding of the field of biological invasions has been hampered because invasion biologists concerned with different taxa and different environments have largely adopted different model frameworks for the invasion process, resulting in a confusing range of concepts, terms and definitions. We proposed a unified framework for biological invasions that reconciles and integrates the key features of the most commonly used invasion frameworks into a single conceptual model that can be applied to all human-mediated invasions. The unified framework combines previous stage-based and barrier models, and has been published in one of the most influential journals in the field of ecology and evolutionary biology. Over three years since publication, the paper has accumulated over 260 citations in Web of Science, and almost 400 on Google Scholar, and is becoming a standard in the classification of species invasion status. Czech co-authors based at both Charles University in Prague and Institute of Botany ASCR, particularly prof. Petr Pyšek, had a very important role in the idea formation and as well as in the writing of the paper."

#### **Odůvodnění panelu:**

Highly significant paper providing a framework for studying biological invasions. A collaborative international effort with significant Czech contribution. Timely topic. The paper represents an important publication that has attracted enormous attention from the research community, gaining more than 260 citations.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Graphene substrates promote adherence of human osteoblasts and mesenchymal stromal cells

obor: EI

Identifikátor: **RIV/00216208:11110/10:6941!RIV11-MSM-11110**

Id: 243

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, 1. lékařská fakulta**

Podíl předkladatele na výsledku: **60 %**

#### Popis podílu předkladatele:

60% |The group of First Faculty of Medicine, Charles University (IFM) had the privilege to be a partner of the group of J. Heyrovsky Institute of Physical Chemistry (JHIPC), which learned at MIT, U.S.A the procedure of preparing large-area graphene on non

#### Odůvodnění předkladatele:

"This paper is the first in the field of graphene science describing the novel 2D material graphene (Nobel Price for graphene was awarded in the same year 2010 as this paper was published) as a possible substrate for cell cultivation. In our work graphene of large area was synthesized, transferred to non-toxic substrate and characterized by Raman spectroscopy showing its purity and homogeneity. This newly developed surface was used for cultivation of human osteoblastic cell line as well as for human mesenchymal stem cells and their adhesion and proliferation was found superior to the underneath silicon substrate. Thus it was proposed that graphene can be used as a suitable material for bio-applications. This study has been well cited in the field of graphene application with citations above 120 after 5 years of its publication and it is still very often downloaded as it could be seen by ResearchGate. The citation of this paper has been found in all the reviews in high-impact journals. Thus it was a breakthrough paper showing the possible bio-application of graphene. Since that time many papers on related topics have been appearing."

#### Odůvodnění panelu:

This study evaluated biocompatibility of a single graphene layer with human osteoblasts and mesenchymal stromal cells in comparison with the SiO<sub>2</sub> film. An interesting study of possible future biological and medical applications of graphene. Well cited.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Controls on pathogen species richness in plants' introduced and native ranges: roles of residence time, range size and host traits

obor: EH

Identifikátor: **RIV/00216208:11310/10:10081123!RIV11-MSM-11310**

Id: 244

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **30 %**

#### Popis podílu předkladatele:

30% |Charles University 30%

#### Odůvodnění předkladatele:

"One ecological process that is assumed to play important role in biological invasions is the effect of pathogens on introduced species; surprisingly, almost no empirical data exist on how fast new pathogens are being accumulated in the new range following introduction of the host plant, and which factors affect the richness of pathogen species on host plants in both the native and introduced range. In this paper, we contributed to closing this gap by analyzing fungal and viral pathogen species richness on 124 plant species in both their native European range and introduced North American range. Hosts introduced 400 years ago supported six times more pathogens than those introduced 40 years ago. In hosts' native range, pathogen richness was greater on hosts occurring in more habitat types, with a history of agricultural use, and adapted to greater resource supplies. In hosts' introduced range, pathogen richness was correlated with host geographic range size, agricultural use, and time since introduction, but not any measured biological traits. Introduced species have accumulated pathogens at rates that are slow relative to most ecological processes, and contingent on geographic and historic circumstance. The Czech authors, based at both the Charles University in Prague and the Institute of Botany, Czech Academy of Sciences, contributed substantially to the study design, were heavily involved in statistical analyses and paper writing, and provided data on plants. Their key role is reflected by the senior-author position for Petr Pyšek. The paper gained 41 WoS citations (50 at Google Scholar) since its publication."

#### Odůvodnění panelu:

This study analyzed fungal and viral pathogens of plants. The results indicate that introduced plants accumulate pathogens at extremely slow pace. Publication in one of the best journal, with Czech scientists playing a major role in the study.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Evidence for the prepattern/cooption model of vertebrate jaw evolution

obor: EG

Identifikátor: **RIV/00216208:11310/10:10082363!RIV11-GA0-11310**

Id: 245

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **33 %**

#### Popis podílu předkladatele:

33% |Charles University 33%

#### Odůvodnění předkladatele:

"This paper presents a new scenario that brings molecular insights into mechanisms of vertebrate jaw evolution. The evolution of jaws was undoubtedly a key event in the history of vertebrate life that allowed us to become active predators. To understand the developmental bases of this major evolutionary transition we analysed and compared molecular patterning programs in pharyngeal area of jaw-less fish lamprey and jawed (gnathostome) vertebrates. In the jaw-less lamprey, we identified sophisticated gnathostome-type pharyngeal patterning, but missing molecular regulators of the proper jaw-joint formation. We conclude that the key event in vertebrate jaw evolution was appearance of the jaw-joint and further identifies what was instrumental for its evolution: incorporation of the jaw-joint regulators (cooption of Bapx/Gdf5 genes) into already pre-existing patterning pharyngeal program drove the appearance of the jaw-joint by altering the identity of the intermediate first-arch chondrocytes. This paper addresses a central question in vertebrate evolution and details the most comprehensive and mechanistic developmental-genetic model for vertebrate jaw evolution to date."

#### Odůvodnění panelu:

This research evaluates phylogenesis of jaws. The authors tested hypothesis that the jaw evolution was driven by sophisticated dorso-ventral esophageal evolution. This development was driven by the Dlx, Msx, and Hand genes. Excellent and influential study in the field of mammalian molecular evolution, published in leading journal with Czech first author.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### The Planar Cell Polarity Pathway Drives Pathogenesis of Chronic Lymphocytic Leukemia by the Regulation of B-Lymphocyte Migration

obor: ED

Identifikátor: **RIV/00216224:14310/13:00065763!RIV14-MZ0-14310**

Id: 246

Předkladatel výsledku do Pilíře II.:

**IČO: 216224 Masarykova univerzita, Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **100 %**

#### Popis podílu předkladatele:

100%Know how fully with the Masaryk University scientists.

#### Odůvodnění předkladatele:

The work opened new direction in the studies focused on chronic lymphocytic leukemia (CLL). Multiple follow-up studies in the respected journals and industrial application towards novel treatment of CLL. The planar cell polarity (PCP) pathway is a conserved pathway that regulates cell migration and polarity in various contexts. Here we show that key PCP pathway components such as Vangl2, Celsr1, Prickle1, FZD3, FZD7, Dvl2, Dvl3, and casein kinase 1 (CK1)-epsilon are upregulated in B lymphocytes of patients with chronic lymphocytic leukemia (CLL). Elevated levels of PCP proteins accumulate in advanced stages of the disease. Here, we show that PCP pathway is required for the migration and transendothelial invasion of CLL cells and that patients with high expression of PCP genes, FZD3, FZD7, and PRICKLE1, have a less favorable clinical prognosis. Our findings establish that the PCP pathway acts as an important regulator of CLL cell migration and invasion. PCP proteins represent an important class of molecules regulating pathogenic interaction of CLL cells with their microenvironment.

#### Odůvodnění panelu:

The authors investigate planar cell polarity pathway (a conserved pathway that regulates cell migration and polarity) components in patients with chronic lymphocytic leukemia. Wnt/Planar cell polarity pathway acts as an important regulator of CLL cell migration and invasion. The study provides mechanistic explanation for a phenomenon of medical impact.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

**Air2p is critical for the assembly and RNA-binding of the TRAMP complex and the KOW domain of Mtr4p is crucial for exosome activation**

**obor: EB**

**Identifikátor: RIV/00216224:14740/12:00057391!RIV13-GA0-14740**

Id: 247

Předkladatel výsledku do Pilíře II.:

**IČO: 216224 Masarykova univerzita, Středoevropský technologický institut**

Podíl předkladatele na výsledku: **100 %**

### **Popis podílu předkladatele:**

100%The whole work was fully accomplished at CEITEC Masaryk University.

### **Odůvodnění předkladatele:**

In 2012, the groups of Dr. Vanacova and Dr. Stefl published key findings, that revealed detailed mechanisms how eukaryotic cells destroy aberrant RNAs, that would be otherwise detrimental for the cell. The data were published in Nucleic Acids Research Journal, and the paper was selected as featured article of the issue. The work uncovered how the major nuclear RNA surveillance factor TRAMP4 binds RNAs, and how it subsequently activates the degradation machinery. Moreover, they revealed, how the TRAMP4 assembles into a stable surveillance complex, and which protein subunits are key for RNA recognition and which for interaction with other components of the RNA quality control pathway.

### **Odůvodnění panelu:**

In this study, the authors investigated a polyadenylation complex essential for nuclear RNA surveillance in the yeast. They identified several key features of this complex. The publication reports a key finding that revealed detailed mechanisms how eukaryotic cells destroy aberrant RNAs, that would be otherwise detrimental for the cell.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Four opportunities for studies of ecological succession

obor: EH

Identifikátor: **RIV/60076658:12310/11:43881336!RIV12-MSM-12310**

Id: 248

Předkladatel výsledku do Pilíře II.:

**IČO: 60076658 Jihočeská univerzita v Českých Budějovicích,  
Přírodovědecká fakulta**

Podíl předkladatele na výsledku: **33 %**

#### **Popis podílu předkladatele:**

33% K. Prach wrote the first draft, both authors participated on the final version. The overall contribution of KP was cca 60 %.

#### **Odůvodnění předkladatele:**

"Publication in the ecological journal with the highest impact factor. Succession is a critical, integrative concept that is central to ecology. It was suggested that succession is particularly suitable to address concerns about biodiversity loss, climate change, invasive species, and ecological restoration. The paper has already attracted cca 60 citations."

#### **Odůvodnění panelu:**

The authors review aspects of ecological succession, the sequential replacement of species after ecological disturbance. Succession remains a key concept in ecology and is critical for understanding of current environmental challenges. This is a highly cited paper in a prestigious journal, led by a Czech researcher.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Structure of the immature retroviral capsid at 8 angstrom resolution by cryo-electron microscopy

obor: EE

Identifikátor: **RIV/60461373:22330/12:43894097!RIV13-GA0-22330**

Id: 249

Předkladatel výsledku do Pilíře II.:

**IČO: 60461373 Vysoká škola chemicko-technologická v Praze, Fakulta potravinářské a biochemické technologie**

Podíl předkladatele na výsledku: **33 %**

#### **Popis podílu předkladatele:**

(33,3%) This work resulted from long-term collaboration between UCT Prague and EMBL Heidelberg. Authors from UCT Prague contributed as follows. Pavel Ulbrich, Michaela Rumlova and Tomas Ruml co-designed the whole research plan and experiments. The most im

#### **Odůvodnění předkladatele:**

We consider this paper excellent not only because it was published in very prestigious scientific journal - Nature, but especially because it solves detailed 3D-structure of retrovirus immature particle at 8 Å resolution by cryo-electron microscopy and tomography (solved in collaboration with colleagues in EMBL, Heidelberg). The electron-microscopic image thus outlines the organization of protein components of the particle. This allowed precise fitting of individual subunits of virus structural polypeptide into the virus particle electron density map. By comparison with crystallographic data published for mature virus core we explained the transition of immature retrovirus into the mature and fully infectious virus. Due to high structural similarity shared among retroviral structural proteins, it provides the opportunity to generalize some of these data also to HIV. This knowledge helps to rationally design inhibitors of HIV assembly.

#### **Odůvodnění panelu:**

The authors generate a high-resolution three-dimensional reconstruction of the tubes of Mason-Pfizer monkey virus by using real-space helical reconstruction using cryo-electron microscopy. Highly cited paper published in Nature. Significant contribution of scientists from the nominating institution.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Paratrypanosoma Is a Novel Early-Branching Trypanosomatid.

obor: EB

Identifikátor: RIV/60077344: /13:00396796!RIV14-AV0-60077344

Id: 250

Předkladatel výsledku do Pilíře II.:

IČO: 60077344 Biologické centrum AV ČR, v. v. i.

Podíl předkladatele na výsledku: 31,3 %

#### Popis podílu předkladatele:

A collaborative effort with two labs in Moscow, Charles University lab of P. Volf and the Archibald lab at Dalhousie University, Halifax. The Lukeš lab has first three shared authors (TS is a PhD student) and the corresponding author and we implemented an

#### Odůvodnění předkladatele:

We have discovered a new trypanosomatid, Paratrypanosoma confusum, that constitutes a distinct branch between free-living and obligatory parasitic clades. Individual protein phylogenies plus analyses of concatenated alignments show that P. confusum represents a missing link between ancestral free-living bodonids and derived parasitic trypanosomatids. Further analysis of the P. confusum genome should provide insight into the emergence of parasitism in medically important trypanosomatids.

#### Odůvodnění panelu:

This study investigated a novel insect trypanosomatid (single cell eukaryot, many of which are parasitic in both animals and humans) in the gut of a mosquito. The finding of the most deeply diverging branch in a dipteran host suggests that association of trypanosomatids with this insect order may be an ancestral state, with its spread to other insects, plants and vertebrates occurring secondarily. An important research field with clear medical implications.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Ms1, a novel sRNA interacting with the RNA polymerase core in mycobacteria

obor: EE

Identifikátor: RIV/61388971: /14:00439950!RIV15-AV0-61388971

Id: 251

Předkladatel výsledku do Pilíře II.:

**IČO: 61388971 Mikrobiologický ústav AV ČR, v.v.i.**

Podíl předkladatele na výsledku: **100 %**

#### Popis podílu předkladatele:

100 % All experiments have been performed in the Institute of Microbiology ASCR without any cooperation.

#### Odůvodnění předkladatele:

Small RNAs (sRNAs) are molecules essential for a number of regulatory processes in the bacterial cell. Here we characterize Ms1, a sRNA that is highly expressed in *Mycobacterium smegmatis* during stationary phase of growth. By glycerol gradient ultracentrifugation, RNA binding assay, and RNA co-immunoprecipitation, we show that Ms1 interacts with the RNA polymerase (RNAP) core that is free of the primary sigma factor (sigma(A)) or any other sigma factor. This contrasts with the situation in most other species where it is 6S RNA that interacts with RNAP and this interaction requires the presence of sigma(A). The difference in the interaction of the two types of sRNAs (Ms1 or 6S RNA) with RNAP possibly reflects the difference in the composition of the transcriptional machinery between mycobacteria and other species. Unlike *Escherichia coli*, stationary phase *M. smegmatis* cells contain relatively few RNAP molecules in complex with sigma(A). Thus, Ms1 represents a novel type of small RNAs interacting with RNAP.

#### Odůvodnění panelu:

The authors investigate small RNAs in bacterial cells. Here they describe a novel type of small RNA (Ms1), which is interacting with RNA polymerase. This is an extensive study performed by Czech authors and published in a highly respected journal.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

**Common and distinct roles of juvenile hormone signaling genes in metamorphosis of holometabolous and hemimetabolous insects.**

**obor: EB**

**Identifikátor: RIV/60077344: /11:00369386!RIV12-AV0-60077344**

**Id: 252**

Předkladatel výsledku do Pilíře II.:

**IČO: 60077344 Biologické centrum AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **66,7 %**

### **Popis podílu předkladatele:**

This study was supervised and written by Marek Jindra at the Institute of Entomology. Experiments were performed by two graduate students of the Jindra laboratory, Barbora Konopova and Vlastimil Smykal.

### **Odůvodnění předkladatele:**

This article (now cited 56 times) identifies the juvenile hormone (JH) receptor Met and its immediate target gene Kr-h1 as the evolutionarily conserved core of the JH signalling pathway that controls metamorphosis in all winged insects. It presents the first evidence that the advanced complete metamorphosis (holometaboly, as in beetles or butterflies) and the primitive hemimetaboly (as in true bugs or cockroaches) rely on the same molecular mechanism.

### **Odůvodnění panelu:**

A novel insight into the biology of the Juvenile Hormone, the key hormone for larva metamorphosis in insects. A perfect example of a significant well-cited paper on a non-laboratory animal model.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### The differential interaction of snRNPs with pre-mRNA reveals splicing kinetics in living cells

obor: EB

Identifikátor: RIV/68378050: /10:00351126!RIV11-GA0-68378050

Id: 253

Předkladatel výsledku do Pilíře II.:

**IČO: 68378050 Ústav molekulární genetiky AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **0 %**

#### Popis podílu předkladatele:

Our team was the main driving force of the project. M. Huranova and D. Stanek planned and performed most of the experiments and I. Ivani analyzed FRAP data. I. Poser, Y. Bordy, Y. Shav-Tal and KM. Neugebauer provided cell lines for FRAP and fluorescence co

#### Odůvodnění předkladatele:

The spliceosome formation has been mostly studied in vitro. Here we applied fluorescence correlation spectroscopy and FRAP to monitor dynamic interaction of splicing factors with pre-mRNA to get inside into spliceosome assembly in living cells. We showed that splicing factors differ in their interaction time with pre-mRNA, which supported a step-wise assembly model of the spliceosome. In addition, we provided one of the first estimates of human pre-mRNA splicing rates in vivo.

#### Odůvodnění panelu:

The authors used fluorescence correlation spectroscopy and FRAP to investigate the dynamic properties of several macromolecular complexes, including splicing factors and RNA polymerases. Their analysis of snRNP dynamics in the cell nucleus reveals that small nuclear RNP particles roam throughout the cell nucleus and continuously scan their environment via numerous transient interactions. The study is executed by Czech team, published in a leading journal and has a good citation record.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### The Arabidopsis Exocyst Complex Is Involved in Cytokinesis and Cell Plate Maturation

obor: EB

Identifikátor: RIV/61389030: /10:00351017!RIV11-MSM-61389030

Id: 254

Předkladatel výsledku do Pilíře II.:

**IČO: 61389030 Ústav experimentální botaniky AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **70 %**

#### Popis podílu předkladatele:

This work lead by the corresponding author V. Žárský was largely done at the Inst. of Exp. Botany ASCR. The corresponding author is also employee of the Faculty of Science, Charles university and he worked partly on the data analysis and writing also ther

#### Odůvodnění předkladatele:

Regulation of the spatial and temporal progress of the plant cell division is distinctly more important for the whole organism morphogenesis as compared with animals. The reason is an immobility of plant cells; their cell wall is deposited de novo exactly during the cell division. In this report we prove that exocyst complex, mediating targeting of secretory membrane vesicles and which we characterized in plants, plays a central role in the process of cell division organization. For this aim we used interdisciplinary combination of methods – we used T-DNA Arabidopsis insertional mutants to proof genetically functions we observed on the cellular level, we used microscopy techniques including confocal and electron ultrastructural microscopy and also biochemical approaches combined with proteomic analyses of proteins immunoprecipitated along with the tagged exocyst subunits. Maximal activity of the exocyst complex is necessary for the very initiation of cell division process by mediation of primordial fusion of cell plate initial cloud of vesicles. Cell plate then centrifugally expands to the maternal cell wall. In the moments of insertion and fusion of the cell plate with the maternal cell wall and final cell wall maturation we established a second peak of the exocyst activity. This work opened a new perspective on the molecular mechanisms during the cell division and cytokinesis in plants and inspired therefore new experimental work – including newly established international collaboration aiming to move on with the analysis of cell division in plants.

#### Odůvodnění panelu:

The authors investigate EXO84 subunit of the Arabidopsis exocyst complex. Their data suggest that EXO84b and the exocyst participate in cytokinesis in Arabidopsis. The work represents a molecular dissection of the exocyst complex, which plays a role in the secretory pathway employing secretory vesicles derived from the Golgi complex. The study has general cell-biology relevance

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Mutation of Nogo-B Receptor, a Subunit of cis-Prenyltransferase, Causes a Congenital Disorder of Glycosylation

obor: EB

Identifikátor: RIV/00064165: /14:10283195!RIV15-MZ0-00064165

Id: 255

Předkladatel výsledku do Pilíře II.:

**IČO: 64165 Všeobecná fakultní nemocnice v Praze, Všeobecná fakultní nemocnice v Praze**

Podíl předkladatele na výsledku: **28 %**

#### Popis podílu předkladatele:

28% | We performed all human subjects related studies.

#### Odůvodnění předkladatele:

"Dolichol is an obligate carrier of glycans for N-linked protein glycosylation, O-mannosylation, and GPI anchor biosynthesis. cis-prenyltransferase (cis-PTase) is the first enzyme committed to the synthesis of dolichol. However, the proteins responsible for mammalian cis-PTase activity have not been delineated. Here we show that Nogo-B receptor (NgBR) is a subunit required for dolichol synthesis in yeast, mice, and man. Moreover, we describe a family with a congenital disorder of glycosylation caused by a loss of function mutation in the conserved C terminus of NgBR-R290H and show that fibroblasts isolated from patients exhibit reduced dolichol profiles and enhanced accumulation of free cholesterol identically to fibroblasts from mice lacking NgBR. Mutation of NgBR-R290H in man and orthologs in yeast proves the importance of this evolutionarily conserved residue for mammalian cis-PTase activity and function. Thus, these data provide a genetic basis for the essential role of NgBR in dolichol synthesis and protein glycosylation."

#### Odůvodnění panelu:

The authors focus on investigation of NoGo-B receptor in yeast, mice and men. Data provide a genetic basis for the essential and evolutionally conserved role of NoGo-B receptor in dolichol synthesis and protein glycosylation. This is an important work at the field of metabolic disorders, published in a leading journal by an interational team dominated by Czech scientits.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Mutation of Nogo-B Receptor, a Subunit of cis-Prenyltransferase, Causes a Congenital Disorder of Glycosylation

obor: EB

Identifikátor: **RIV/00216208:11110/14:10283195!RIV15-MSM-11110**

Id: 0

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, 1. lékařská fakulta**

Podíl předkladatele na výsledku: **50 %**

#### Popis podílu předkladatele:

50% | We performed all human subjects related studies.

#### Odůvodnění předkladatele:

"Dolichol is an obligate carrier of glycans for N-linked protein glycosylation, O-mannosylation, and GPI anchor biosynthesis. cis-prenyltransferase (cis-PTase) is the first enzyme committed to the synthesis of dolichol. However, the proteins responsible for mammalian cis-PTase activity have not been delineated. Here we show that Nogo-B receptor (NgBR) is a subunit required for dolichol synthesis in yeast, mice, and man. Moreover, we describe a family with a congenital disorder of glycosylation caused by a loss of function mutation in the conserved C terminus of NgBR-R290H and show that fibroblasts isolated from patients exhibit reduced dolichol profiles and enhanced accumulation of free cholesterol identically to fibroblasts from mice lacking NgBR. Mutation of NgBR-R290H in man and orthologs in yeast proves the importance of this evolutionarily conserved residue for mammalian cis-PTase activity and function. Thus, these data provide a genetic basis for the essential role of NgBR in dolichol synthesis and protein glycosylation."

#### Odůvodnění panelu:

The authors focus on investigation of NoGo-B receptor in yeast, mice and men. Data provide a genetic basis for the essential and evolutionally conserved role of NoGo-B receptor in dolichol synthesis and protein glycosylation. This is an important work at the field of metabolic disorders, published in a leading journal by an interational team dominated by Czech scientits.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### When the forest dies: the response of forest soil fungi to a bark beetle-induced tree dieback

obor: EE

Identifikátor: RIV/61388971: /14:00440622!RIV15-AV0-61388971

Id: 256

Předkladatel výsledku do Pilíře II.:

**IČO: 61388971 Mikrobiologický ústav AV ČR, v.v.i.**

Podíl předkladatele na výsledku: **95 %**

#### **Popis podílu předkladatele:**

95 % The work on the project has been mostly carried out in the Institute of Microbiology ASCR with only a little contribution of other partners (help with managing of field experiments). Methodology used in the experiments was developed in our Institute.

#### **Odůvodnění předkladatele:**

Forest ecosystems form large biomes and significantly decrease the negative effects of global climate change due to the ability to accumulate atmospheric carbon. This ability can be impaired by ecosystem disturbances such as insect invasions whose frequency increases.

#### **Odůvodnění panelu:**

The authors examined the structural and functional response of the litter and soil microbial community in a Picea abies forest to tree dieback following an invasion of the bark beetle Ips typographus, with a specific focus on the fungal community, in coniferous forests. The study demonstrates that an insect-induced disturbance of the forest ecosystem that rapidly and profoundly changed the vegetation cover and activity was also associated with profound changes in microbial community structure and activity, especially of soil fungi. This is an interesting study with potential broad impact, published by Czech team in a very good journal at the field. Good citation record so far.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Lipolytic effects of B-Type natriuretic peptide(1-32) in adipose tissue of heart failure patients compared with healthy controls

obor: FA

Identifikátor: RIV/00023001: /11:00002471!RIV12-MZ0-00023001

Id: 257

Předkladatel výsledku do Pilíře II.:

**IČO: 23001** Institut klinické a experimentální medicíny

Podíl předkladatele na výsledku: **100 %**

#### Popis podílu předkladatele:

All authors besides dr. Wendellova were employees of IKEM (including first author). Study was conducted in IKEM.

#### Odůvodnění předkladatele:

Enhanced adipose tissue lipolysis can contribute to myocardial lipid overload, insulin resistance, and cachexia in advanced HF. Natriuretic peptides were recently recognized to stimulate lipolysis in healthy subjects. The goal of the study was to examine the role of B-type natriuretic peptide (BNP) in lipolysis regulation in heart failure (HF) patients. We compared nondiabetic HF patients and healthy subjects of similar age, sex, and body composition who underwent a microdialysis study of subcutaneous abdominal adipose tissue. Four microdialysis probes were simultaneously perfused with 0.1  $\mu$ M BNP(1-32), 10  $\mu$ M BNP(1-32), 10  $\mu$ M norepinephrine (NE) or Ringer's solution. Outgoing dialysate glycerol concentration (DGC) was measured as an index of lipolysis. We found that spontaneous lipolysis was higher in HF patients compared with control subjects. Response to NE was similar in HF patients and control subjects. BNP(1-32) 10  $\mu$ M markedly increased lipolysis in both HF patients and control subjects (DGC increase of  $2.8 \pm 0.5$ -fold vs.  $3.2 \pm 0.3$ -fold), whereas the response to 0.1  $\mu$ M BNP(1-32) was more pronounced in HF patients ( $p = 0.02$ ). In HF patients, spontaneous lipolysis positively correlated with insulin resistance and the response to BNP(1-32) negatively correlated with adiposity. In summary, we found that BNP(1-32) exerts strong lipolytic effects in humans. Despite marked elevation of plasma immunoreactive BNP, the responsiveness of adipose tissue to BNP(1-32) is not attenuated in HF, possibly reflecting a deficiency of endogenous bioactive BNP. Lipolytic effects of BNP can contribute to excessive fatty acid mobilization in advanced HF. This study was the first ever that directly examined lipolytic effects of natriuretic peptides in HF patients in vivo. The study was awarded The Parmley Price (runner up) by the editor of JACC for the best paper of the year from a young researcher and his mentor.

#### Odůvodnění panelu:

v předcházejícím hodnocení hodnoceno jako „A“

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Brain structural signature of familial predisposition for bipolar disorder: replicable evidence for involvement of the right inferior frontal gyrus

obor: FL

Identifikátor: RIV/00023752: /13:43914189!RIV14-MSM-00023752

Id: 258

Předkladatel výsledku do Pilíře II.:

**IČO: 23752 Národní ústav duševního zdraví**

Podíl předkladatele na výsledku: **46 %**

#### Popis podílu předkladatele:

This was a result of an international collaboration between Prague, Czech Republic and Halifax, Canada. Dr. Hajek designed the study, collected the data, performed the analyses and wrote the paper. 72 participants for this study were recruited in Prague,

#### Odůvodnění předkladatele:

HÁJEK, T., CULLIS, J., NOVÁK, T., KOPEČEK, M., BLAGDON, R., PROPPER, L., STOPKOVÁ, P., DUFFY, A., HÖSCHL, C., UHER, R., PAUS, T., YOUNG, L.T., ALDA, M. Brain structural signature of familial predisposition for bipolar disorder: replicable evidence for involvement of the right inferior frontal gyrus. *Biological Psychiatry*. 2013, 73(2), 144-152. ISSN 0006-3223. DOI: 10.1016/j.biopsych.2012.06.015. IF 9,472 Actual IF of *Biological Psychiatry* 10,255 This was the very first replication design neuroimaging study in psychiatry. We found an enlarged right inferior frontal gyrus (rIFG) in relatives of bipolar probands, regardless of whether they were themselves affected or unaffected with mood disorders. The larger rIFG volume was replicated in both the unaffected as well as affected offspring of bipolar parents from a parallel arm of the study performed in Prague, Czech Republic. Thus, this change may represent a neuroanatomical signature of familial predisposition for bipolar disorders and could aid in early identification of subjects at risk for BD even before any behavioral manifestations develop. Since then several other studies have replicated our findings. The study also illustrated how brain structural changes in BD may result from a dynamic interplay between illness burden and compensatory processes, which may be enhanced by pharmacological treatment. The paper was selected for the cover page of the January 15 issue of the *Biological Psychiatry*, one of the leading journals in the field. The study was identified by Psychology Progress team as: "being of special interest to the progress in the Psychology field" and was featured at Psychology Progress website, which is viewed about 40,000 times each month. The same paper was featured in the *Psychiatric News*, *Medical Tribune* and *Journal Watch*. It ranked among the most read papers on MDLinx Psychiatry. It has reached 28 citations in 2 years, thus several times exceeding the average number of citations for papers in this top psychiatric journal. This was a result of an international collaboration between Prague, Czech Republic and Halifax, Canada. Dr. Hajek designed the study, collected the data, performed the analyses and wrote the paper. 72 participants for this study were recruited in Prague, the rest in Halifax.

#### Odůvodnění panelu:

v předcházejícím hodnocení hodnoceno jako „A“

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Spatial navigation impairment is proportional to right hippocampal volume

obor: FH

Identifikátor: RIV/67985823: /12:00390000!RIV13-AV0-67985823

Id: 259

Předkladatel výsledku do Pilíře II.:

**IČO: 67985823 Fyziologický ústav AV ČR, v. v. i.**

Podíl předkladatele na výsledku: 0 %

#### Popis podílu předkladatele:

The research report was written by a team of authors from 2nd Faculty of Medicine UK and from Institute of Physiology ASCR. The spatial navigation task was originally designed in the Institute of Physiology by Jan Bureš and in this paper both authors from

#### Odůvodnění předkladatele:

The study was first to document a significant relationship between the volume of hippocampal cortex and allocentric spatial navigation impairment in Alzheimer's disease patients and even in mild cognitive impairment patients. The patients with lower right hippocampal volume reached lower scores in allocentric navigation, when required to find a hidden goal on the arena floor by only two landmarks on the walls, both in real space and on a computer monitor. The mild cognitive impairment is a stage in the development of Alzheimer's disease with previously documented hippocampal deficits and spatial navigation impairments. Our results support further the view that spatial navigation impairment can serve as a biomarker of Alzheimer's disease development. Source: Proceedings of the National Academy of Sciences of the United States of America - Impact factor(2014)=9,674.

#### Odůvodnění panelu:

v předcházejícím hodnocení hodnoceno jako „A“

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Spatial navigation impairment is proportional to right hippocampal volume

obor: FH

Identifikátor: RIV/00159816: /12:#0000958!RIV13-MSM-00159816

Id: 260

Předkladatel výsledku do Pilíře II.:

**IČO: 159816 Fakultní nemocnice u sv. Anny v Brně**

Podíl předkladatele na výsledku: **37 %**

#### Popis podílu předkladatele:

This manuscript has been authored by 9 authors altogether where 7 authors have been affiliated to ICRC-FNUSA. The first, the last (senior) and the corresponding author have been FNUSA-ICRC employees at the time of its publication. The FNUSA-ICRC employee

#### Odůvodnění předkladatele:

PNAS is a high tier multidisciplinary, not only medical, scientific journal. In practice, PNAS publishes the top 10 per cent of scientific studies world-wide not limited to narrow spectrum of specific disciplines (i.e. Blood or Leukemia journal publish solely studies related to blood or blood cell malignancies). This means studies published in PNAS contribute to a general knowledge in a modern science. In the study, we suggested that the right hippocampal volume affects the ability to navigate in space. We studied the relationship between hippocampal atrophy and spatial orientation failure in cognitively impaired elderly compared to their cognitively healthy peers. Result of study help to clarify brain organization and relationship between hippocampal structure and its function, and moreover, reasons and quality of cognitive impairment during the course of Alzheimer's disease (AD). Until now, it has not been demonstrated that the relationship hippocampus and spatial orientation is so important, especially not in elderly people with mild cognitive impairment, which may precede the development of AD. Our findings may help to diagnose individuals at risk of AD early on. Spatial navigation has been conducted in a unique method which is parallel to Morris Water Maze for rodents and is called the human analogue of Morris Water Maze developed in Prague. It has two settings: 2D computer and real-space. The test has been designed to separately evaluate allocentric spatial navigation that is hippocampus dependent and egocentric that is parietal cortex dependent. Therefore, we believe we are able to evaluate two types of navigational behavior that is linked to two brain regions where AD strikes typically. The translational aspect of the method and our study result might be beneficial in clinical trials or designing improved trials testing drugs targeted on AD-related pathology. Improvements in spatial orientation might be considered as primary outcome and hippocampal atrophy measurements as surrogate marker of outcome.

#### Odůvodnění panelu:

v předcházejícím hodnocení hodnoceno jako „A“

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Spatial navigation impairment is proportional to right hippocampal volume

obor: FH

Identifikátor: **RIV/00064203: /12:8061!RIV13-MZ0-00064203**

Id: 261

Předkladatel výsledku do Pilíře II.:

**IČO: 64203 Fakultní nemocnice v Motole, Fakultní nemocnice v Motole**

Podíl předkladatele na výsledku: **20 %**

#### **Popis podílu předkladatele:**

20% |First, senior and corresponding author from Motol University Hospital

#### **Odůvodnění předkladatele:**

"Multidisciplinary journal, unique methodology, first study to demonstrate relationship between hippocampal atrophy and spatial navigation impairment in the real space in elderly. F"

#### **Odůvodnění panelu:**

v předcházejícím hodnocení hodnoceno jako „A“

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

**Dynamics of T-cell infiltration during the course of ovarian cancer: The gradual shift from a Th17 effector cell response to a predominant infiltration by regulatory T-cells**

**obor: FD**

**Identifikátor: RIV/00216208:11130/13:10193840!RIV14-MZ0-11130**

**Id: 262**

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, 2. lékařská fakulta**

Podíl předkladatele na výsledku: **60 %**

### **Popis podílu předkladatele:**

60% | 60% share reflects correctly the engagement of our team.

### **Odůvodnění předkladatele:**

"The work initiated in the Department of Immunology investigated a role of dendritic cells in tumors, particularly prostate and ovarian carcinoma. Longtime and complex investigation of dendritic cells resulted in a development of dendritic cells based vaccine against cancer. Based on these discoveries a vaccine for preclinical and later for clinical testing was developed and further manufactured by a biotechnological company. The project and clinical trials are still ongoing, its original foundation was in brief published here: FOCUS on FOCIS: combined chemo-immunotherapy for the treatment of hormone-refractory metastatic prostate cancer. Clin Immunol. 2009 Apr;131(1):1-10."

### **Odůvodnění panelu:**

v předcházejícím hodnocení hodnoceno jako „A“

**PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A**  
**A Controlled Trial of Revascularization in Acute Stroke**

**obor: FH**

**Identifikátor: RIV/61989592:15110/13:33145181!RIV14-MZ0-15110**

**Id: 263**

**Předkladatel výsledku do Pilíře II.:**

**IČO: 61989592 Univerzita Palackého v Olomouci, Lékařská fakulta**

**Podíl předkladatele na výsledku: 45 %**

**Popis podílu předkladatele:**

45% contribution from Faculty of Medicine and Dentistry, Palacký University, Olomouc.

**Odůvodnění předkladatele:**

0

**Odůvodnění panelu:**

v předcházejícím hodnocení hodnoceno jako „A“

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### A Controlled Trial of Revascularization in Acute Stroke

obor: FP

Identifikátor: **RIV/00216208:11150/13:10139867!RIV14-MSM-11150**

Id: 264

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Lékařská fakulta v Hradci Králové**

Podíl předkladatele na výsledku: **5 %**

#### **Popis podílu předkladatele:**

5% |For patients who underwent cerebral angioplasty with stent placement, the efficacy of recanalization was evaluated at the end of the procedure by using dedicated criteria. Two experienced, independent, blinded radiologists evaluated all findings before

#### **Odůvodnění předkladatele:**

"On the basis of results of this controlled trial, intraarterial revascularization with use of stents is an effective and safe therapeutic method for patients with acute ischemic stroke. with 92.6% recanalization rate, it had a favourable clinical outcome for 43.5% with intravenous thrombolysis failure and for 45.2% with contraindication to intravenous thrombolysis, with a 4% risk of symptomatic intracerebral bleeding. Local revascularization with stents is superior to no further therapy."

#### **Odůvodnění panelu:**

v předcházejícím hodnocení hodnoceno jako „A“

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

**Primary angioplasty in acute myocardial infarction with right bundle branch block: should new onset right bundle branch block be added to future guidelines as an indication for reperfusion therapy?**

**obor: FA**

**Identifikátor: RIV/00216224:14110/12:00059081!RIV13-MSM-14110**

**Id: 265**

Předkladatel výsledku do Pilíře II.:

**IČO: 216224 Masarykova univerzita, Lékařská fakulta**

Podíl předkladatele na výsledku: **7 %**

### **Popis podílu předkladatele:**

7%The study that has been strongly contributed by the researchers from MU.

### **Odůvodnění předkladatele:**

This is unique retrospective study that aims at evaluation of to what extent right bundle branch block may be an indication for reperfusion therapy. This is clinically highly important study that has been strongly contributed by the researchers from MU. This study analysed patients with AMI presenting with RBBB [with or without left anterior hemiblock (LAH) or left posterior hemiblock (LPH)] and compared them with those presenting with LBBB or with other electrocardiographic (ECG) patterns. The aim was to describe angiographic patterns and primary angioplasty use in AMI patients with RBBB.

### **Odůvodnění panelu:**

v předcházejícím hodnocení hodnoceno jako „A“

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

**Primary angioplasty in acute myocardial infarction with right bundle branch block: should new onset right bundle branch block be added to future guidelines as an indication for reperfusion therapy?**

**obor: FA**

**Identifikátor: RIV/00669806: /12:10108062!RIV13-MZ0-00669806**

**Id: 266**

Předkladatel výsledku do Pilíře II.:

**IČO: 669806 Fakultní nemocnice Plzeň, Fakultní nemocnice Plzeň**

Podíl předkladatele na výsledku: **5 %**

### **Popis podílu předkladatele:**

5% [The submitter (from the University Hospital in Pilsen) has contributed 40% to the presented publication.

### **Odůvodnění předkladatele:**

"The publication deals with current issues of acute myocardial infarction treatment in the frame of a large Czech multicentric trial. Achieved results will improve the quality of treatment and above all will reduce the ratio of complications. The methodology has been successfully implemented in the clinical routine."

### **Odůvodnění panelu:**

v předcházejícím hodnocení hodnoceno jako „A“

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

**Primary angioplasty in acute myocardial infarction with right bundle branch block: should new onset right bundle branch block be added to future guidelines as an indication for reperfusion therapy?**

**obor: FA**

**Identifikátor: RIV/00064165: /12:11629!RIV13-MZ0-00064165**

**Id: 267**

Předkladatel výsledku do Pilíře II.:

**IČO: 64165 Všeobecná fakultní nemocnice v Praze, Všeobecná fakultní nemocnice v Praze**

Podíl předkladatele na výsledku: **10 %**

### **Popis podílu předkladatele:**

10% |General University Hospital in Prague - 10 %

### **Odůvodnění předkladatele:**

"This multicenter study aimed at high risk acute coronary syndrome subpopulation. The 2nd Department of Internal Medicine, Cardiovascular Medicine, General University Hospital in Prague and 1st Medical School, Charles University in Prague (VFN), a co-investigator center, is a high-volume PCI center and actively participated on patients screening, enrollment and follow-up. The main role of VFN was to retrieve an appropriate data based on the study protocol, to evaluate and to include into a database. Co-investigators from VFN also actively participated on manuscript preparation and critically revised the draft of the manuscript. Despite that, the main intellectual property of the study results belong to the main investigator, the Cardiocenter of the Third Medical Faculty of Charles University."

### **Odůvodnění panelu:**

v předcházejícím hodnocení hodnoceno jako „A“

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Core/Shell Nanofibers with Embedded Liposomes as a Drug Delivery System

obor: FP

Identifikátor: RIV/68378041: /12:00377767!RIV13-AV0-68378041

Id: 268

Předkladatel výsledku do Pilíře II.:

**IČO: 68378041 Ústav experimentální medicíny AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **38 %**

#### Popis podílu předkladatele:

From the Institute of Experimental Medicine Academy of Sciences of the Czech Republic Dr. Andrea Míčková, Dr. Matej Buzgo, Dr. Michala Rampichová, Dr. Eva Filová, and Prof. Evžen Amler participated in the present study, contributing a share of 38,30%

#### Odůvodnění předkladatele:

The broader application of liposomes in regenerative medicine is hampered by their short half-life and inefficient retention at the site of application. These disadvantages could be significantly reduced by their combination with nanofibers. We produced 2 different nanofiber-liposome systems in the present study, that is, liposomes blended within nanofibers and core/shell nanofibers with embedded liposomes. Herein, we demonstrate that blend electrospinning does not conserve intact liposomes. In contrast, coaxial electrospinning enables the incorporation of liposomes into nanofibers. We report polyvinyl alcohol-core/poly-ε-caprolactone-shell nanofibers with embedded liposomes and show that they preserve the enzymatic activity of encapsulated horseradish peroxidase. The potential of this system was also demonstrated by the enhancement of mesenchymal stem cell proliferation. In conclusion, intact liposomes incorporated into nanofibers by coaxial electrospinning are very promising as a drug delivery system.

#### Odůvodnění panelu:

v předcházejícím hodnocení hodnoceno jako „A“

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Core/shell nanofibers with embedded liposomes as a drug delivery systém

obor: FP

Identifikátor: RIV/68407700:21460/12:00202548!RIV13-MZ0-21460

Id: 0

Předkladatel výsledku do Pilíře II.:

**IČO: 68407700 České vysoké učení technické v Praze, Fakulta biomedicínského inženýrství**

Podíl předkladatele na výsledku: **10 %**

#### Popis podílu předkladatele:

10% - Rating A in H14  
<http://www.isvav.cz/h14/resultDetail.do?rowId=RIV%2F68407700%3A21460%2F12%3A00202548!RIV13-MZ0-21460> - The 10% for the CTU is confirmed by the corresponding author. Calculation is based on the number of co-authors and their affili

#### Odůvodnění předkladatele:

The broader application of liposomes in regenerative medicine is hampered by their short half-life and inefficient retention at the site of application. These disadvantages could be significantly reduced by their combination with nanofibers. We produced 2 different nanofiber-liposome systems in the present study, that is, liposomes blended within nanofibers and core/shell nanofibers with embedded liposomes. Herein, we demonstrate that blend electrospinning does not conserve intact liposomes. In contrast, coaxial electrospinning enables the incorporation of liposomes into nanofibers. We report polyvinyl alcohol-core/poly-?-caprolactone-shell nanofibers with embedded liposomes and show that they preserve the enzymatic activity of encapsulated horseradish peroxidase. The potential of this system was also demonstrated by the enhancement of mesenchymal stem cell proliferation. In conclusion, intact liposomes incorporated into nanofibers by coaxial electrospinning are very promising as a drug delivery system.

#### Odůvodnění panelu:

v předcházejícím hodnocení hodnoceno jako „A“

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

**CD2-positive B-cell precursor acute lymphoblastic leukemia with an early switch to the monocytic lineage**

**obor: FP**

**Identifikátor: RIV/00216208:11130/14:10287124!RIV15-MZ0-11130**

**Id: 269**

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, 2. lékařská fakulta**

Podíl předkladatele na výsledku: **90 %**

### **Popis podílu předkladatele:**

90% |Authorship share for 2LF: 90% as the key role in the story was played by our faculty members; the first, senior and corresponding authors all come from our staff.

### **Odůvodnění předkladatele:**

"Paediatric haematology-focused research group has discovered and described entirely new subgroup of childhood acute leukaemia and published their findings in one of two most prestigious journals in field. All experiments, including the animal modelling of the disease, were performed by our faculty staff."

### **Odůvodnění panelu:**

Autoři z instituce předkladatele mají dominantní podíl na publikaci, včetně hlavního autorství. Jde o kvalitní původní práci, o čemž svědčí zařazení časopisu v horním decilu oboru dle IF

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Aggressive acute myeloid leukemia in PU.1/p53 double-mutant mice

obor: FD

Identifikátor: **RIV/00216208:11110/14:10196519!RIV15-MSM-11110**

Id: 270

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, 1. lékařská fakulta**

Podíl předkladatele na výsledku: **98 %**

#### Popis podílu předkladatele:

98% |This research project was done in the Stopka laboratory by the first author Petra Bašová and her colleagues in years 2010-2013. The lab utilized Mouse Facility and also expertise in Flow cytometry and Gene expression. The laboratory team used previous

#### Odůvodnění předkladatele:

"In this study we developed murine model of aggressive acute myeloid leukemia (AML) by crossing a known AML model with downregulation of myeloid transcription factor PU.1 with another transcription factor deletion model containing inactivation of tumor suppressor gene p53. Using this double mutant model we identified a hierarchical order of oncogenic transcription factor Myb that activates another oncogene microRNA miR-155, a known posttranscriptional suppressor of PU.1. This oncogenic pathway, according to our data, is involved also in human AML aggressiveness by contributing to the downregulation of PU.1 in a subset of human AML, especially in aggressive cases characterized by p53 inactivation. In summary, we herein established a mouse model to study the role and impact of p53 loss in AML pathogenesis. We identified a candidate mechanism that is responsible for PU.1 downregulation in murine AML and showed its possible involvement in the pathogenesis and aggressiveness of human AML."

#### Odůvodnění panelu:

Autoři z instituce předkladatele jsou hlavním i korespondenčním autorem. Dominantní podíl těchto autorů na práci. IF časopisu je nad horním decilem oboru.

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### DNA Damage Response and Inflammatory Signaling Limit the MLL-ENL-Induced Leukemogenesis In Vivo

obor: FD

Identifikátor: RIV/61989592:15110/12:33139786!RIV13-MSM-15110

Id: 271

Předkladatel výsledku do Pilíře II.:

**IČO: 61989592 Univerzita Palackého v Olomouci, Lékařská fakulta**

Podíl předkladatele na výsledku: **63 %**

#### Popis podílu předkladatele:

63% contribution from Faculty of Medicine and Dentistry, Palacký University, Olomouc.

#### Odůvodnění předkladatele:

Acute myeloid leukemias (AML), like other cancers, are thought to arise through a multistep process of accumulation of several mutations and/or epigenetic changes. However, although the concept of additional (preceding or subsequent) genetic and/or epigenetic events, that might be necessary for the development of the full AML phenotype caused by a transforming “leukemogenic” oncogene is well accepted (MLL-ENL being a good example), the nature of intrinsic and extrinsic mechanisms that govern the leukemogenic process is not well understood. This study provides novel mechanistic insights into fundamental biology of multistep tumorigenesis, and reports on development and analysis of a new animal model that faithfully mimics human leukemogenesis. Using this mouse model with long latency of mixed-lineage leukemia (MLL) development, we identified DNA damage response as a critical mechanism rate-limiting for malignant transformation by the MLL-ENL oncogene, synergizing with inflammatory factors in checkpoint signaling and senescence, thereby counteracting leukemogenesis. This was the first in vivo model of DNA damage response and inflammatory barriers co-operating in their natural settings, with implications for understanding cancer stem cell evolution and multistep tumorigenesis. This study offers a major conceptual advance in better understanding the stepwise process of AML development in vivo, with a particular focus on the molecular basis and functional impact of the interplay between the cell-intrinsic and tissue environment-dependent fail-safe mechanisms that jointly serve as a barrier that either delays (resulting in a long latency of MLL) or prevents progression to full malignancy. This article was published in a leading journal for cancer research – Cancer Cell, supporting the novelty of this contribution to the field of the molecular pathogenesis of hematological malignancies. Scientometric evaluation: IF (2012): 24.755, journal ranking: 4. in categories “Cell biology” and “Oncology”. Times cited: 18; high visibility journals citing this work: Molecular Cell; Leukemia, Blood, etc.

#### Odůvodnění panelu:

Autoři z instituce předkladatele mají dominantní podíl na publikaci, včetně hlavního autorství. Jde o kvalitní původní práci, o čemž svědčí zařazení časopisu v horním decilu oboru dle IF

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

**Genetic variation in TNFA predicts protection from severe bacterial infections in patients with end-stage liver disease awaiting liver transplantation.**

**obor: FE**

**Identifikátor: RIV/00023001: /14:00058866!RIV15-MZ0-00023001**

**Id: 272**

**Předkladatel výsledku do Pilíře II.:**

**IČO: 23001 Institut klinické a experimentální medicíny**

**Podíl předkladatele na výsledku: 75 %**

### **Popis podílu předkladatele:**

MUDr. Sperl from IKEM designed the study and, together with prof. Jirsa, elaborated the detailed study protocol. MUDr. Sperl also selected patients for the pilot study. Their clinical and laboratory data were then collected (contributed by all authors from

### **Odůvodnění předkladatele:**

Severe bacterial infections represent the leading cause of death in patients with end-stage liver disease waitlisted for orthotopic liver transplantation. Susceptibility to infections in these patients is influenced by genetic factors. In our study we sought to determine the contribution of selected genetic variants involved in inflammatory signalling downstream of the Toll-like receptor 4. Our findings indicate potential clinical utility of TNFA rs361525 genotyping in assessment of individual risk of severe bacterial infection in patients awaiting liver transplantation.

### **Odůvodnění panelu:**

Autoři z předkládající instituce jsou hlavním i korespondenčním autorem. Dominantní podíl těchto autorů na práci. Jde o kvalitní původní práci, o čemž svědčí zařazení časopisu v horním decilu oboru dle IF

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Functional inactivation of the rat hippocampus disrupts avoidance of a moving object

obor: FH

Identifikátor: RIV/67985823: /11:00364564!RIV12-AV0-67985823

Id: 273

Předkladatel výsledku do Pilíře II.:

**IČO: 67985823 Fyziologický ústav AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **0 %**

#### Popis podílu předkladatele:

This work originated on the basis of ideas of MUDr. Jan Bures, DSc. founder of the Laboratory of Neurophysiology of Memory, Institute of Physiology Academy of Sciences of the Czech Republic. The study was completely done at the Institute and additional a

#### Odůvodnění předkladatele:

The work shows that avoidance of a visible moving object (a small robot) relies on the hippocampus, an archicortical brain area considered to be crucial for memory and spatial navigation. Navigation with respect to a stable robot did not require hippocampus. Study was done in an original Enemy avoidance task developed in the laboratory and hippocampus was functionally inactivated by stereotaxic injection of tetrodotoxin. The study represents crucial finding significantly extending the "Cognitive map Theory" of the hippocampus function, which predicted that navigation with respect to visible goal did not require the hippocampus, but did not account for moving goals. The study was published in a high-IF journal (PNAS). The paper in a high-impact renowned journal represents a significant piece of evidence in behavioral neurophysiology. The results of the paper can be interpreted as a significant extension of the Cognitive Map Theory, proposed by John O'Keefe and Lynn Nadel in 1978 in a book entitled Hippocampus as a Cognitive Map. The paper has steadily rising number of citations, which suggest that it is becoming to be accepted by neuroscientific community. For the aforementioned reasons, we propose to include this paper for Evaluation in 2015. Source: Proceedings of the National Academy of Sciences of the United States of America - Impact factor(2014)=9,674.

#### Odůvodnění panelu:

Autoři z předkládající instituce jsou hlavním i korespondenčním autorem. Dominantní podíl těchto autorů na práci. IF časopisu je nad horním decilem oboru

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Intensive Chemotherapy for Childhood Acute Lymphoblastic Leukemia: Results of the Randomized Intercontinental Trial ALL IC-BFM 2002

**obor: FD**

Identifikátor: **RIV/00216208:11130/14:10292788!RIV15-MSM-11130**

Id: 274

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, 2. lékařská fakulta**

Podíl předkladatele na výsledku: **60 %**

#### **Popis podílu předkladatele:**

60% | 60% authorship share (three faculty members and the position of the first and corresponding authors) does not correctly reflect the importance of this study for the Czech paediatric haematology and entire medicine.

#### **Odůvodnění předkladatele:**

"Prof. Starý has led an international academic clinical trial focusing on the front-line treatment of paediatric acute lymphoblastic leukaemia. It unified the treatment in 15 countries on three continents and for all the countries involved it was the most successful treatment trial in their entire history. More than 5,000 children were enrolled in the protocol. The results of this study were published in the most prestigious journal in the field of oncology clinical trials - the Journal of Clinical Oncology - and the importance of the paper was underlined by an editorial devoted to this article. It is the first clinical trial of such size and importance led by the Czech researcher and published in this journal."

#### **Odůvodnění panelu:**

Původní práce českých a zahraničních autorů v prestižním časopise, Q1 ve WOS, výborný citační ohlas. Autor z navrhující instituce je prvním a korespondujícím autorem

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Intensive Chemotherapy for Childhood Acute Lymphoblastic Leukemia: Results of the Randomized Intercontinental Trial ALL IC-BFM 2002

**obor: FD**

Identifikátor: **RIV/00064203: /14:10292788!RIV15-MZ0-00064203**

Id: 275

Předkladatel výsledku do Pilíře II.:

**IČO: 64203 Fakultní nemocnice v Motole, Fakultní nemocnice v Motole**

Podíl předkladatele na výsledku: **30 %**

#### **Popis podílu předkladatele:**

30% |Randomized international trial. First and corresponding author is staff member of the University Hospital Motol. Supported by the project for conceptual development of research organisation Motol University Hospital 00064203.

#### **Odůvodnění předkladatele:**

"More than 5000 children with leukemia from 15 countries at 3 continents were enrolled into the study. Principal Investigator from Motol Hospital. The results of the study acknowledged at the Editorial written by the world leading expert in the field."

#### **Odůvodnění panelu:**

Původní práce českých a zahraničních autorů v prestižním časopise, Q1 ve WOS, výborný citační ohlas. Autor z navrhující instituce je prvním a korespondujícím autorem

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Long-term survival after alcohol septal ablation for hypertrophic obstructive cardiomyopathy: a comparison with general population

obor: FA

Identifikátor: **RIV/00216208:11130/14:10292962!RIV15-MSM-11130**

Id: 276

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, 2. lékařská fakulta**

Podíl předkladatele na výsledku: **75 %**

#### **Popis podílu předkladatele:**

75% |Authorship share for 2LF: 75% both formally and truly reflects the engagement of our faculty staff (including the positions of the first, senior and corresponding authors).

#### **Odůvodnění předkladatele:**

"This an example of the original research in the very competitive field of cardiology performed by the team almost exclusively coming from our faculty staff. Team led by Prof. Veselka demonstrates permanent, high-quality research and publishing activity over the years."

#### **Odůvodnění panelu:**

Vynikající původní práce, autor z předkládající instituce je prvním i korespondenčním autorem. IF časopisu je druhý nejvyšší v oboru

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Long-term survival after alcohol septal ablation for hypertrophic obstructive cardiomyopathy: a comparison with general population

**obor: FA**

Identifikátor: **RIV/00064203: /14:10292962!RIV15-MZ0-00064203**

Id: 277

Předkladatel výsledku do Pilíře II.:

**IČO: 64203 Fakultní nemocnice v Motole, Fakultní nemocnice v Motole**

Podíl předkladatele na výsledku: **38 %**

#### **Popis podílu předkladatele:**

38% |Corresponding author is staff member of the University Hospital Motol. Supported by the project for conceptual development of research organisation Motol University Hospital 00064203.

#### **Odůvodnění předkladatele:**

"These long-term results of a double-center registry demonstrated efficacy and safety of alcohol septal ablation for hypertrophic obstructive cardiomyopathy. Scientific priority of this study was based on comparison of treated group and sex- and age-matched general population. The results showed that combination of ASA and ICD implantation can lead to survival of HOCM pts. comparable with the general population. These results will affect the future guidelines for this disease."

#### **Odůvodnění panelu:**

Vynikající původní práce, autor z předkládající instituce je prvním i korespondenčním autorem. IF časopisu je druhý nejvyšší v oboru

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

**MicroRNA-650 expression is influenced by immunoglobulin gene rearrangement and affects the biology of chronic lymphocytic leukemia**

**obor: FD**

Identifikátor: **RIV/65269705: /12:#0001317!RIV12-MZ0-65269705**

Id: 278

Předkladatel výsledku do Pilíře II.:

**IČO: 65269705 Fakultní nemocnice Brno**

Podíl předkladatele na výsledku: **35,3 %**

**Popis podílu předkladatele:**

0,353

### **Odůvodnění předkladatele:**

MicroRNAs (miRNAs) play a key role in chronic lymphocytic leukemia as well as in normal B cells. Notably, miRNA gene encoding miR-650 and its homologs overlap with several variable (V) subgenes coding for lambda immunoglobulin (IgL $\lambda$ ). Recent studies describe the role of miR-650 in solid tumors, but its role in chronic lymphocytic leukemia (CLL) has not yet been studied. Our experiments demonstrate that miR-650 expression is regulated by coupled expression with its host gene for IgL $\lambda$ . This coupling provides a unique yet unobserved mechanism for microRNA gene regulation. We determine that higher expression of miR-650 is associated with a favorable CLL prognosis and influences the proliferation capacity of B cells. We also establish that in B cells, miR-650 targets proteins important in cell proliferation and survival: cyclin dependent kinase 1 (CDK1), inhibitor of growth 4 (ING4), and early B-cell factor 3 (EBF3). This study underscores the importance of miR-650 in CLL biology and normal B-cell physiology and was published in the most prestigious hematological journal Blood (IF=10).

### **Odůvodnění panelu:**

Autoři z předkládající instituce mají dominantní podíl na publikaci, včetně hlavního autorství. Časopis patří dle IF k druhému nejvýznamnějšímu časopisu oboru

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Long-Term Outcomes of Pre-emptive Valganciclovir Compared with Valacyclovir Prophylaxis for Prevention of Cytomegalovirus in Renal Transplantation

obor: FE

Identifikátor: **RIV/00216208:11140/12:10123753!RIV13-MSM-11140**

Id: 279

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, Lékařská fakulta v Plzni**

Podíl předkladatele na výsledku: **71 %**

#### Popis podílu předkladatele:

71% [The study was supported by Research Project No. MSM0021620819 and by the project CZ.1.05/2.1.00/03.0076 from European Regional Development Fund. The Faculty of Medicine in Pilsen, Charles University in Prague, is a holder of both projects.

#### Odůvodnění předkladatele:

"Cytomegalovirus (CMV) infection is a key infectious complication in kidney transplant recipients. The role of CMV is not limited to acute symptoms of CMV disease but, includes indirect effects which negatively influence graft outcome in the long-term. The presented randomized study provides a long-term comparison of 2 major approaches used for CMV prevention. Patients were randomly allocated to pre-emptive valganciclovir therapy for significant CMV viremia or 3-month high-dose valacyclovir prophylaxis. The primary outcome was moderate-to-severe interstitial fibrosis and tubular atrophy assessed by protocol biopsy at 3 years. The incidence of moderate-to-severe interstitial fibrosis and tubular atrophy was 38% in prophylaxis and 19% in pre-emptive therapy (p=0.222). Significantly higher intrarenal mRNA expression of genes involved in fibrogenesis was observed with prophylaxis. CMV disease rates were comparable in both groups; however, graft survival within 4 years was improved with pre-emptive therapy (92% vs. 74%; HR 0.25; 95% CI 0.06-0.96; p=0.044) due to inferior outcomes in patients with late-onset cytomegalovirus viremia. The major contribution of the study, which was the reason for publication in J Am Soc Nephrol (No 1 ranked journal in nephrology+urology), was a first time prove that pre-emptive therapy may result in better graft survival over universal prophylaxis. Such a finding was supported by less histological damage in late graft biopsies and poor outcomes in patients suffered from late-onset CMV viremia associated with universal prophylaxis. The importance of the data was highlighted later-on by the invitation of principal study investigator to CMV consensus meeting of The Transplantation Society which resulted in new CMV management guidelines (Transplantation 2013, 96:333-360). The Guidelines included the study results and changed the previous recommendation favoring prophylaxis over pre-emptive approach."

#### Odůvodnění panelu:

Autoři z předkládající instituce mají dominantní podíl na publikaci, včetně hlavního autorství. Časopis patří dle IF k třetímu nejvýznamnějšímu časopisu oboru

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

**Eating two larger meals a day (breakfast and lunch) is more effective than six smaller meals in a reduced-energy regimen for patients with type 2 diabetes: a randomised crossover study**

**obor: FB**

Identifikátor: **RIV/00023001: /14:00059039!RIV15-MZ0-00023001**

Id: 280

Předkladatel výsledku do Pilíře II.:

**IČO: 23001 Institut klinické a experimentální medicíny**

Podíl předkladatele na výsledku: **83 %**

### **Popis podílu předkladatele:**

All authors who participated in designed study and its implementation were from the workplace of IKEM. Only the statistical evaluation was carried out in the collaboration with the Institute of Endocrinology and mathematical modelling of insulin secretion

### **Odůvodnění předkladatele:**

These are the priority results which completely alter the perspective on reduction diet in patients of type 2 diabetes. It is commonly recommended to divide the total energy intake (hypocaloric diet) into several small meals a day, usually 5-6 portions. Our results suggest the improved effect of reducing in the number of portions into two meals per day. The results have already been reflected in the recommendations of the Czech Diabetes Society and are the topic of discussion at international forums.

### **Odůvodnění panelu:**

Autoři z instituce předkladatele jsou hlavním i korespondenčním autorem. Dominantní podíl těchto autorů na práci. IF časopisu je nad horním decilem oboru

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

**Mutant p53 accumulation in human breast cancer is not an intrinsic property nor dependent on structural or functional disruption but is regulated by exogenous stress and receptor status**

**obor: FD**

**Identifikátor: RIV/00209805: /14:#0000515!RIV15-MZ0-00209805**

**Id: 281**

**Předkladatel výsledku do Pilíře II.:**

**IČO: 209805 Masarykův onkologický ústav**

**Podíl předkladatele na výsledku: 80 %**

### **Popis podílu předkladatele:**

The contribution of researchers at MOU: This work followed on previous research on p53 stability in human cancers that had been initiated and performed by researchers at MOU (e.g. Nenutil R, et al., J Pathol 2005; 207:251-9; Muller P, et al., Oncogene 200

### **Odůvodnění předkladatele:**

The p53 protein is mutated in about 50% of human cancers and missense TP53 mutations cause p53 protein accumulation. At MOU, we have been investigating the mechanisms through which mutant p53 is stabilized. As part of that work, we had shown that mutant p53 stabilization occurs to different levels in different tumors and that the specific mutation-type can influence its stability. Because mutant p53 has oncogenic functions, the level of stabilization should influence patient outcomes. In addition, understanding the mechanisms responsible for stabilization may allow new therapeutic approaches to inhibit stabilization. At MOU, these hypotheses were tested using a large panel of cell lines with different types of p53 mutation. We showed that cell lines, like primary cancers, show different levels of mutant p53 stabilization. These models then allowed us to demonstrate that a range of factors that normally stabilize p53 also stabilize the mutant protein. In collaborative work, we used a cohort of breast cancer patients from Dundee that had previously been sequenced for p53 mutations. We characterized the p53 stabilization patterns of these tumors at MOU. We showed that the type of p53 mutation influences p53 activity, indicating that p53 mutation can be used for individualized prognosis. We also found that the amount of p53 stabilization is inversely proportional to the level of MDM2 (that degrades wild-type p53) in ER+ breast cancers, but not ER- tumors. These data demonstrate for the first time that individual p53 mutations have different effects, that the degree of stabilization is important for biological activity, and that interfering with p53 stabilization through MDM2 may have therapeutic benefit. The data also indicate that common genotoxic therapies will have an unexpected and unwanted side-effect of increasing the oncogenic effects of mutant p53 in the subset of patients with low-level stabilization.

### **Odůvodnění panelu:**

Autoři z předkládající instituce mají dominantní podíl na publikaci, včetně hlavního autorství. IF časopisu je nad horním decilem oboru

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Availability of energetic substrates and exercise performance in heart failure with or without diabetes

obor: FA

Identifikátor: RIV/00023001: /12:00056120!RIV13-MZ0-00023001

Id: 282

Předkladatel výsledku do Pilíře II.:

**IČO: 23001** Institut klinické a experimentální medicíny

Podíl předkladatele na výsledku: **80 %**

#### Popis podílu předkladatele:

Study was fully conducted in IKEM, only minority of biochemical tests were performed in collaborating extramural labs. All authors besides dr. B. Bendova and dr. P. Jarolim were employees of IKEM.

#### Odůvodnění předkladatele:

The goal of the study was to examine the importance of metabolic substrate levels at rest and during exercise on exercise performance and outcome in diabetic or non-diabetic heart failure (HF) patients or controls. 25 healthy controls matched 97 patients with stable advanced HF were prospectively enrolled and subjects underwent maximal bicycle spiroergometry with blood sampling to measure metabolites and neurohormones before and immediately after the exercise. HFDM+ patients had increased free fatty acids, glucose, and  $\beta$ -hydroxybutyrate compared with controls. HFDM+ patients had higher baseline copeptin but otherwise showed similar neurohumoral activation and exercise response to HFDM- patients. Peak oxygen consumption ( $VO_2$ ) was unrelated to post-exercise free fatty acids, glucose, lactate, or glycerol, but strongly correlated with post-exercise pyruvate (in all:  $r = 0.62$ ,  $P < 0.001$ ). During the next  $17 \pm 10$  months, 36% of HF patients experienced an adverse event. From metabolic factors, only post-exercise glucose [hazard ratio (HR) 1.28,  $P = 0.04$ ] and the presence of DM were predictive of the outcome. With the exception of pyruvate, acute changes of metabolic substrates are not related to cardiac performance in HF, regardless of diabetic status. Our study indicated that inhibition of body fat depletion, attenuation of stress-related hyperglycaemia, or increasing dynamics of plasma pyruvate may represent therapeutic targets in advanced HF.

#### Odůvodnění panelu:

Autoři z instituce předkladatele mají dominantní podíl na publikaci, včetně hlavního autorství. Jde o kvalitní původní práci, o čemž svědčí zařazení časopisu v horním decilu oboru dle IF

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

**Synergistic induction of lipid catabolism and anti-inflammatory lipids in white fat of dietary obese mice in response to calorie restriction and n-3 fatty acids**

**obor: FB**

Identifikátor: **RIV/67985823: /11:00364489!RIV12-AV0-67985823**

Id: 283

Předkladatel výsledku do Pilíře II.:

**IČO: 67985823 Fyziologický ústav AV ČR, v. v. i.**

Podíl předkladatele na výsledku: **88 %**

### **Popis podílu předkladatele:**

The first as well as the corresponding (the last) authors are from the Institute of Physiology, as well as majority of all the co-authors (88%), reflecting the fact that major part of the results was generated at the home institution, except for the anal

### **Odůvodnění předkladatele:**

The effects of combination treatment using omega-3 long-chain polyunsaturated fatty acids (omega-3 PUFA) and mild calorie restriction were characterized in mice fed high-fat diet. The combined treatment prevented weight gain and insulin resistance, despite the fact that omega-3 PUFA or calorie restriction alone cannot fully counteract induction of obesity. Combination treatment significantly reduced whole-body inflammation, which is connected to obesity. The crucial consequences of the combination treatment were represented by metabolic changes in adipose tissue and production of anti-inflammatory lipid mediators. The results are important for development of novel strategies in prevention and treatment of obesity and diabetes, eventually also of other disorders related to chronic inflammation such as some neurodegenerative and gastrointestinal diseases. Listed among the most significant papers of the Academy in 2011. Awarded by the Institute of Physiology as one of its best publications in 2011. One of the publications which triggered the 2013 Award by the Minister of Education, Youth and Sports to Jan Kopecky for the studies of the effects of omega-3 fatty acids. This article is re-submitted for evaluation reflecting its increasing impact, as reflected by the number of citations each year. Source: Diabetologia - Impact factor(2014)=6,671.

### **Odůvodnění panelu:**

Autoři z předkládající instituce mají dominantní podíl na publikaci, včetně hlavního a korespondenčního autorství. IF časopisu je nad horním decilem oboru

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Identification of novel sequence variations in microRNAs in chronic lymphocytic leukemia

obor: FD

Identifikátor: **RIV/00216224:14740/14:00078304!RIV15-MZ0-14740**

Id: 284

Předkladatel výsledku do Pilíře II.:

**IČO: 216224 Masarykova univerzita, Středoevropský technologický institut**

Podíl předkladatele na výsledku: **100 %**

#### **Popis podílu předkladatele:**

100%This study has been completely designed and coordinated by the author residing at MU.

#### **Odůvodnění předkladatele:**

This study is the most extensive sequencing of human miRNAs ever to describe their variations with putative role in the pathogenesis of chronic lymphocytic leukemia (CLL, n>200). It identified six novel miR-sequence variations, including a mutation in miR-16 that affects its expression and the levels of its target BCL2. This has important implications for the mechanisms of CLL pathogenesis. Not only the idea but also majority of the work originates at MU.

#### **Odůvodnění panelu:**

Časopis je těsně pod horním decilem oboru dle IF. Studie je však výhradním dílem autorů předkládající instituce

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

**Adipose tissue secretion and expression of adipocyte-produced and stromavascular fraction-produced adipokines vary during multiple phases of weight-reducing dietary intervention in obese women**

**obor: FB**

**Identifikátor: RIV/00216208:11120/12:43903599!RIV13-MZ0-11120**

Id: 285

Předkladatel výsledku do Pilíře II.:

**IČO: 216208 Univerzita Karlova v Praze, 3. lékařská fakulta**

Podíl předkladatele na výsledku: **90 %**

### **Popis podílu předkladatele:**

90% [The work is the original project of the Department of Sports Medicine, Third Faculty of Medicine. The coordination of the study, experimental part and publication of the results were realized by personnel of the Third Faculty of Medicine, contributio

### **Odůvodnění předkladatele:**

"The work was linked to the previous studies of our group demonstrating a distinct behaviour of cellular components, namely adipocytes and macrophages, in adipose tissue of obese individuals during calorie restriction that induced improvement of insulin resistance. Attention was paid to secretory products of the two populations: adipokines and cytokines. It was shown that the pattern of the diet-induced response was different in adipocytes vs. cytokines. Thus, the study revealed the distinct regulation of secretory products of adipocytes and macrophages in adipose tissue during calorie restriction and suggests a different role of the two populations in the regulation of systemic insulin resistance in humans. Times cited WOS (February 15, 2016): 8"

### **Odůvodnění panelu:**

Autoři z instituce předkladatele mají dominantní podíl na publikaci, včetně hlavního autorství. Jde o kvalitní původní práci, o čemž svědčí zařazení časopisu do horním decilu oboru dle IF

## PLNÝ NÁZEV VYBRANÉHO PŘÍSPĚVKU TŘÍDY A

### Intermittent hemodialysis is superior to continuous veno-venous hemodialysis/hemodiafiltration to eliminate methanol and formate during treatment for methanol poisoning

obor: FE

Identifikátor: RIV/00064165: /14:10282875!RIV15-MZ0-00064165

Id: 286

Předkladatel výsledku do Pilíře II.:

**IČO: 64165 Všeobecná fakultní nemocnice v Praze, Všeobecná fakultní nemocnice v Praze**

Podíl předkladatele na výsledku: **20 %**

#### Popis podílu předkladatele:

20% |Department of Occupational Medicine, Toxicological Information Center: general conception and study design, study hypothesis and methodology, preparation and distribution of the study protocol, coordination and management of the multi-center blood se

#### Odůvodnění předkladatele:

"Mass or cluster methanol poisonings represent a challenge for health systems throughout the world, with mortality exceeding 40% and high prevalence of visual and cerebral damage in survivors. During 2000-2012, more than 50 mass poisoning outbreaks with about 5000 poisoned subjects and 2000 fatalities had occurred worldwide. Rapid elimination of methanol and its metabolite formate is crucial for recovery. Despite an established role of hemodialysis, lack of consensus exists regarding the modality of choice. Priority: The study was the first to prove the superiority of intermittent hemodialysis (IHD) over continuous modalities (CVVHD/HDF) in terms of the rate of elimination of both methanol and formate, the latter being especially important in the late-presenting patients. By kinetics data, we proved short 2-hour sessions of IHD are insufficient to eliminate formate and provided recommendations on a minimum duration and optimal technical parameters of dialysis sessions. Scientific benefit: The results were used by International Working Group "Extracorporeal Treatments in Poisoning (EXTRIP)" in Recommendations for the role of extracorporeal treatments in the management of acute methanol poisoning, where IHD was recommended as a modality of choice (Roberts et al., 2015)1. Economic benefit: The median cost of hospital treatment of one poisoned patient is 2,422 (IQR 1,364-4,748) euros. In our study, application of IHD led to 2.2-time more rapid elimination of methanol and formate. The intensive care unit length of stay and the treatment costs depend on the duration and cost of extracorporeal treatment. Social benefit: optimization of extracorporeal treatment may have both direct (by rapid elimination of causative agent) and indirect (by decreasing the time/dose of systemic anticoagulation during dialysis) effect on the prevalence and severity of health sequelae (brain hemorrhages, basal ganglia necrosis, optic nerve/retinal nerve fibers damage) in survivors."

#### Odůvodnění panelu:

Autor z předkládající instituce je prvním i korespondenčním autorem. IF časopisu je druhý nejvyšší v oboru