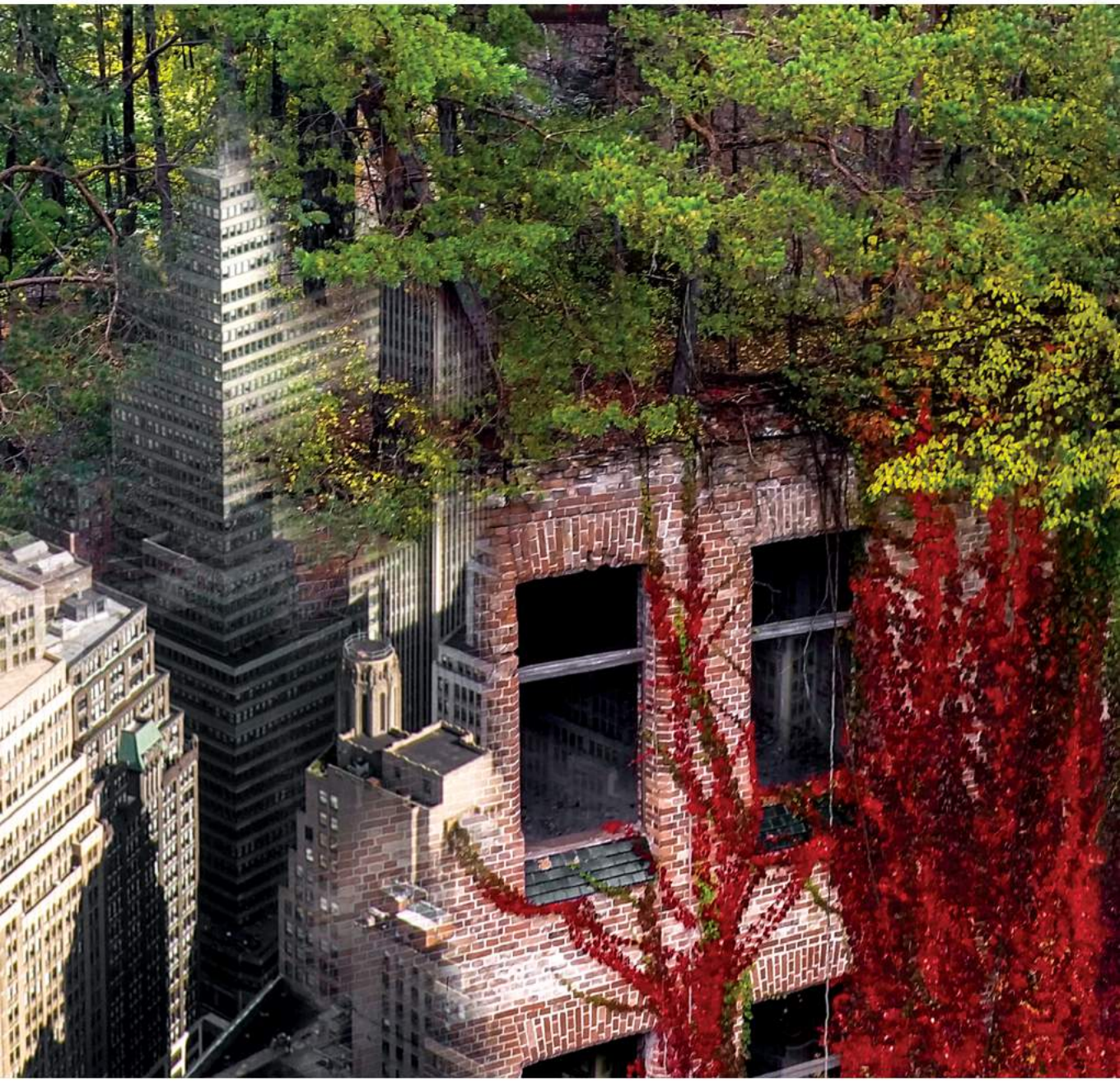
Societas Humboldtiana Polonorum
11th International Congress

Under the Polish - German double patronage
of President Andrzej Duda and Federal President Frank-Walter Steinmeier



SCIENCE IN THE AGE OF GLOBALIZATION

Szczecin 12.09. - 15.09.2019

11th Congress of the Societas Humboldtiana Polonorum

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SCIENCE IN THE AGE OF GLOBALIZATION

Szczecin 12.09. 2019 – 15.09.2019

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- Mr. Olgierd Geblewicz, Marshal of the West Pomerania
- Mr. Piotr Krzystek, President of the City of Szczecin
- Prof. Jacek Wróbel, Rector of the West Pomeranian University of Technology, Szczecin
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In cooperation with

- Alexander von Humboldt Foundation
- German Embassy in Warsaw
- General Consulate of Germany in Gdańsk
- Polish Academy of Sciences
- Foundation for Polish-German Cooperation
- German Academic Exchange Service DAAD
- Association of Polish Electrical Engineers
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Edited by

- Ryszard Pałka

Cover design

- Ewa Łyczywek

Dear Congress Participants

It is my great pleasure to welcome you to the 11th Congress of the Societas Humboldtiana Polonorum "Science in the Age of Globalization" held in Szczecin, Poland.

The goal of the Congress is to initiate and continue the discussion between scientists from different countries about the newest progress in science and its influence and impact on the future of humanity in the age of globalization.

The Congress does not have strictly defined topics, as the term globalization has many meanings. Typically, globalization, as the process of interaction and integration among people worldwide, can be divided into three major areas: economic globalization, cultural globalization, and political globalization. The progress of globalization has been mainly conditioned by the advances in the transportation and communication technologies.

All discoveries and inventions that were made in the 20th century as well as the removal of the cross-border trade barriers have become the major factors in globalization and generated further interdependence of economic and cultural activities around the globe. With the increased global interactions comes the growth of international trade and ideas. Globalization, which was primarily an economic process, could now be associated with many social and cultural aspects. The environmental challenges such as global warming, migration and movement of people, cross-boundary water, air pollution and over-fishing of the oceans are becoming a co-joining problems of the global human village.

Many of the above subjects will be discussed during the Congress. Participants of the Congress are not only Humboldtians, but also other great scholars from around the world who will share their knowledge with all of us and the younger generation researchers who will present their new scientific ideas.

I wish you a successful conference and a pleasant stay in Szczecin.

On behalf of the Organizers,

Ryszard Pałka

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Program of the Congress

Thursday, 12.09.2019, 17:30-22:00, Hotel Radisson, Vivaldi's

17:30-18:00, Congress Opening
Prof. Stanisław Ledakowicz, President of the Societas Humboldtiana Polonorum
Prof. Hans-Christian Pape, President of the Alexander von Humboldt Foundation
Cornelia Pieper, Consul General of Germany in Gdańsk

18:00-19:15, Lectures

1. Manfred Osten, Germany: Importance of Alexander von Humboldt for the scientific community of the 21st century on the occasion of his 250th anniversary
2. Ulrich Teichler, University of Kassel, Germany: The Bologna Process of Two Decades: Actual Changes and Remaining Issues
3. Agnieszka Chacińska, University of Warsaw, Poland: Cellular management of proteins

19:15-19:45, Copernicus II, Concert of Artur Haftman (F. Chopin, F. Schubert)
19:45-22:00, Copernicus II, SHP Dinner Buffet

Friday, 13.09.2019, 9:00-18:00, West Pomeranian University of Technology

9:00-9:20, Welcome
Prof. Ryszard Pałka, West Pomeranian University of Technology, Organizing Committee
Prof. Jacek Przepiórski, Vice-Rector of the West Pomeranian University of Technology
Prof. Jerzy Samochowiec, Vice-Rector of the Pomeranian Medical University in Szczecin
Prof. Edward Włodarczyk, Rector of the University of Szczecin
Piotr Krzystek, President of the City of Szczecin
Gabriele Hermani, Head of the Department of Science and Research, German Embassy in Warsaw: German-Polish scientific relations

9:20-11:30, Invited lectures
Chairpersons: Sławomir Magala and Ryszard Pałka

1. Jerzy Buzek, Member of the European Parliament, Poland: Digital revolution: will engineers rescue Europe?
2. Zbigniew Szawarski, University of Warsaw, Poland: Ethics, science and Spaceship EARTH
3. Florian Steger, Ulm University, Germany: Medical care for forced laborers of Telefunken from Lodz in Ulm (1944-1945): Preliminary results of an ongoing Humboldt project
4. Ole Janssen, Arne Höll, Federal Ministry for Economic Affairs and Energy, Germany: Universal Units: A Short History of Modern Metrology
5. Krzysztof Zanussi, Film director, Poland: Science as an Inspiration in Narrative Art

11:30-12:00, Coffee break

12:00-13:40, Lectures
Chairpersons: Henryk Figiel and Andrzej Sękowski

1. Jan Lubiński, Pomeranian Medical University in Szczecin, Read-Gene SA, Poland: Milestone improvements in prevention and treatment of cancers based on knowledge of patients genetic changes
2. Bartłomiej Głowacki, University of Cambridge, United Kingdom: Symbiosis of hydrogen and superconductivity for the benefit of modern society

3. Adam Łukaszewicz, University of Warsaw, Poland: Ambiguity of knowledge and the challenge of humanism
4. Sławomir Magala, Erasmus University, Rotterdam, Holland: The third Enlightenment or Globalizing Meritocracy
5. Krystian Leonard Chrzan, SHP Poland: Prof. Aleksandra Krygier-Stojałowska, the first Polish female scholar of Alexander von Humboldt Foundation

13:40-14:20, Lunch

14:20-16:10, Lectures
Chairpersons: Adam Borkowski and Ewa Stachowska

1. Jan Szopa, University of Wroclaw, Poland: Optimizing flax raw products for tomorrow's uses
2. Halina Podbielska, Wrocław University of Science and Technology, Poland: Globalization as a chance for development of personalized medicine
3. Holger Stark, Heinrich-Heine-Universität Düsseldorf, Germany: Promiscuity in Therapeutic Drugs on Global Market
4. Markus Baltzer, Bayer Poland: Sustainable development on the example of the Bayer approach
5. Rebecca Großmann, AvH-Foundation, Germany: Programmes of the AvH Foundation
6. Matthias Guttke, DAAD Poland: Programmes of the DAAD

16:10-16:25, Coffee break

16:25-18:00, Lectures
Chairpersons: Aleksander Strasburger and Marian Jaskuła

1. Ewa Bartnik, University of Warsaw, Poland: Genome editing − who's next or rather what's next?
2. Gerhard Schembecker, TU Dortmund, Germany: Private Public Partnerships − Enabling Synergies between Academia and Industry
3. Mirosława El Fray, West Pomeranian University of Technology, Poland: Tissue engineered artificial organs: science-fiction or realistic future?
4. Giacomo de Angelis, Institute for Nuclear Physics, Italy: Activities of the Italian Humboldt Association (Exotic nuclei for physics, astrophysics and applications)
5. Marwan S. Mousa, Mu'tah University, Al-Karak, Jordan: Twenty two years (1997 – 2019) of Academic Cooperation, Networking and Partnership in changing communities
6. Tešić Miloš, Martinov Milan, Djatkov Djordje, Babić Mirko, University of Novi Sad, Serbia: Results and Knowledge of Research Activities in International Research Projects in Novi Sad, Serbia and Beneficiary Countries

19:15-20:30, Cruise around the harbor of Szczecin (http://en.statek.info/)
20:30-22:30, Dinner at the harbor restaurant

Saturday, 14.09.2019, 9:00-19:00, West Pomeranian University of Technology

8:45-11:15, Lectures
Chairpersons: Stanisław Ledakowicz and Andrzej Błędzki

1. Szymon Malinowski, University of Warsaw, Poland: Global warming – the perspective of a physicist
2. Michael Stürner, University of Konstanz, Germany: Transfer of Legal Ideas in the Global Arena
3. Jan Sykulski, University of Southampton, United Kingdom: Globalization and Science – the British perspective

4. Jürgen Lieser, Bosch Pharmatec, Germany: Working and living between the cultures. Intercultural experiences between Europe and China
5. Johannes Kluehspies, President of the International Maglev Board, Germany: When fundamental innovation hits an established market: the example of Maglev transport systems
6. Andrzej Ossowski, Pomeranian Medical University in Szczecin, Poland: The secret of the Vampire from Kamień Pomorski

11:15-11:30, Coffee break

11:30-13:30, Session of Young Researchers
Chairpersons: Agnieszka Fogel and Sławomir Steinborn

1. Al-Suod Hossam, Ratiu Ileana-Andreea, Buszewski Bogusław: Optimization Accelerated solvent extraction parameters for sugars and cyclitols
2. Bilińska Lucyna, Gmurek Marta, Ledakowicz Stanisław: Electrocoagulation system for closing textile wastewater loop. From a lab to an industrial scale
3. Michał Bonisławski: Contactless power supply system for rotating telemetry applications
4. Blatkiewicz Michał, Ledakowicz Stanisław :Continuous methods of biosynthesis and purification of fungal laccases
5. Sally F. Desoukey, Shereen E.M. EL-Nahas, Atef Z.Sabh, Z.K. Taha, Hattem M. El-Shabrawi: Antimicrobial effect of Asparagus officinalisL. extract.
6. Abeer.F. Desouky, Hanafy Ahmed A.H, Abdel Salam Redaa, Hartmut Stützel, Moemen Hanafy: Over-expression of a pathogenesis-related protein 10 (PR10a) enhances salt stress tolerance in transgenic faba bean.
7. K.M. Golasiński, E.A. Pieczyska: Polish-Japanese Joint Research on a Multifunctional Titanium Alloy Gum Metal
8. Grochocki Paweł: Hybrid Excited Machine with Magnetic Barriers for Electric Vehicles
9. Jurgielewicz Paweł, Mindur Bartosz, Szypulska Małgorzata, Hottowy Paweł: Scalable real-time DAQ system for neural signal analysis
10. Kaczmarczyk Adriana, Nosek Michał, Miszalski Zbigniew: Cadmium uptake from polluted soil by C_3/CAM intermediate halophyte *Mesembryanthemum crystallinum* L. performing different types of photosynthetic metabolism
11. Kafa' A. Al-Helal: Synthesis and Anti-tumor Activity of 5-(Substituted Piprazinyl) Imidazole Derivatives
12. Kopeć Przemysław: Understanding the mechanisms of cereals response to soil water deficit
13. Kulikova Irina: Multilingualism as a study object
14. Kulikova Natalia: Problem of terminological mistakes in translated scientific texts (on the example of pharmaceutical terminology in the A.C. Celsus' treatise "De Medicina")
15. Tomasz Jacek Lis: Austrian Universalism – the 19th Century Heritage of the Central and Eastern Europe
16. Lytvynenko Anton, Mishura Andrey, Brzózka Agnieszka, Kolotilov Sergey, Sulka Grzegorz: Nanoporous metal foams: "inverted" nanomaterials for catalytic applications
17. Mametov R. Radik, Ratiu Ileana-Andreea, Buszewski Bogusław: Volatile organic compounds associated with colorectal cancer biomarkers
18. Alaa Ibrahim Marzouk, Mohamed Kamal El-Bahr, Ashraf F. El-Baz, Hattem M. El Shabrawi: Effect of Lights Spectrum On Antioxidants Production as A Natural Hepatoprotective Agent from Chicory Cultivars InVitro
19. Babatola Dominic Olawa, Erhabor Sunday Idemudia: Globalization and mental health: Connecting the biopsychosocial conditions of ageing in Europe and Africa
20. Pariiska Olena, Kurys Yaroslav: Oxygen reduction reaction on Co-N-C electrocatalysts based on conjugated polymers and graphene materials

21. Katarzyna Pauter, Małgorzata Szultka-Młyńska, Justyna Walczak, Bogusław Buszewski: Development of HPLC-DAD method for determination and identification of selected antibiotics and their metabolites for biomedical purposes
22. Pidluzhna Anna, Kostruba Andriy, Stakhira Pavlo, Baryshnikov Glib: Quantum dots application in inverted solar cell
23. Paweł Prajzendanc, Piotr Paplicki, Marcin Wardach: Axial Flux Hybrid Excited Electrical Machine – design, simulation and experiment
24. Rodzik Agnieszka, Rogowska Agnieszka, Król Anna, Railean-Plugaru Viorica, Sagandykova Gulyaim, Sprynskyy Myroslav, Pomastowski Paweł, Buszewski Bogusław: Immobilization of silver ions onto casein
25. Estela Rukseniene: Military missions in Lithuania: British and French peace-keeping attempts during Lithuanian- Polish conflict in the 1920's
26. Gulyaim Sagandykova, P. Pomastowski, J. Walczak, M. Szultka-Młynska, B. Buszewski: SARs of selected flavonoids by electrochemical system hyphenated with various ionization methods
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28. Monika Stefaniak: Application of 'click' cycloaddition for synthesis of new macrocyclic systems
29. Marta Śliwa-Cebula, Paweł Kaszycki, Zbigniew Miszalski: Phytoremediation potential of Mesembryanthemum crystallinum L. for removal of heavy metals from industrially degraded soils and contaminated bottom sediments
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31. Nadiia Veselova, Ravlyk Nazar, Volodimir Brzhezitsky, Krystian Leonard Chrzan: The first high voltage laboratories in Ukraine
32. Marcin Wardach: Hybrid excited claw pole machine as a generator to wind turbines
33. Wekesa David, Ndeto Martin :Influence of earth's magnetic field on the conversion efficiency of polycrystalline silicon solar cell
34. Zaverach Ievgeniia :Electrooxidation of methanol on electrodeposited Ni-Cu alloys

13:30-14:10, Lunch

14:10-16:30, Parallel sessions of Humboldtians: humanities
Chair: Jarosław Wenta

1. Erhabor Idemudia, North-West University, South Africa, Jacobs University, Bremen, Germany: Globalization, Migration and the Creation of African refuges in Europe
2. Aleksander Kiklewicz, University of Warmia and Mazury in Olsztyn: Die Gesichter der Globalisierung in den Geisteswissenschaften
3. Ewa Wojno-Owczarska, University of Warsaw: Naomi Klein's Critique of Globalization
4. Davies, Theophilus, Clavell, Department of Geosciences, University of Lagos, Akoka/Yaba, Lagos, Nigeria: Application of professional ethics in geoscience education in Africa
5. Christa Rautenbach, North-West University, Potchefstroom, South Africa: Legal Science in the Age of Globalisation: the Influence of German Precedent on South African Constitutional Court Judges
6. Jiajia YU, KoGuan Law School of Shanghai Jiao Tong University, China: The Protection of Copyright by Criminal Law in the Digital Era – Based on the Observation of Chinese Law
7. Máté Szabó, Eötvös Loránd University, Faculty of Law, Institute of Political Science, Hungary: 1968 in Hungary-half of a century have passed

14:10-16:30, Parallel sessions of Humboldtians: natural sciences

1. Abdelrazek, Fathy M., Cairo University, Egypt: Studies of New Biologically Active Heterocyclic Compounds
2. Yaseen A. Al-Soud, Al al-Bayt University, Al-Mafraq, Jordan: Recent Applications of Triazoles in Medicinal Chemistry
3. Dénes Lóczy, University of Pécs, Hungary: Crop diversification for sustainable farming in Hungary
4. Moemen S Hanafy, Mohamed Matter, Mohsen S. Asker, MR Rady, Mohamed E El Awady, National Research Center Dokki, Cairo, Egypt: Hairy root cultures of *Catharanthus roseus*: a promising approach for the production of antitumor alkaloids
5. K. Snini, H. Rahmouni, F. Ben Jemaa, M. Ellouze, K. Khirouni, Tunisia: Electrical and dielectrical properties of $Pr_{0.67}Ba_{0.22}Sr_{0.11}Mn_{1-x}Fe_xO_3$ ($0 \leq x \leq 0.2$) perovskite

14:10-16:30, Parallel sessions of Humboldtians: technical sciences

1. Mohammed M. Shabat, Department of Physics, Islamic University of Gaza, Gaza Strip, Palestine: Simulation of artificial waveguide structures for solar cell energy
2. Barbara J Gabrys, University of Oxford: Plastic: Fantastic, blessing or curse?
3. Ildiko Tulbure, University "1 December 1918" Alba Iulia, Romania and Clausthal University of Technology, Germany: Innovative Approaches in Technology Assessment in the Globalizing Age
4. Ewa Graczyńska, Opole University of Technology: Globalization of Mathematics and Bureaucracy
5. Igor Shevchenko, Institute of Bioorganic Chemistry and Petrochemistry, Kiev, Ukraine: Influence of Solar Energy on Self-Organization of Water Molecules

16:30-16:45, Coffee break

16:45-18:30, City tour for Guests of the Congress

16:45-19:15, General meeting of the SHP Members

20:30-22:30, Gala dinner, Pomeranian Ducal Castle

Sunday, 15.09.2019, 10:00-14:30, Hotel Radisson, Concerto I

10:00-11:30, Panel discussion "Science in the Age of Globalization"
Chair: Tadeusz Krzemiński

11:30-12:00, Coffee break

12:00-12:30, Congress Summary and Closing

13:30-14:30, Lunch

Invited lectures


Science in the age of globalization
11th Congress of the Societas Humboldtiana Polonorum

Ulrich Teichler

International Centre for Higher Education Research (INCHER-Kassel)
University of Kassel, Germany

The Bologna Process of Two Decades: Actual Changes and Remaining Issues

In the 1990s, efforts began to establish "convergent" structures, i.e. a higher degree of similarity between the structures of higher education systems in Europe, notably through the introduction of a common bachelor-master system of study programmes and degrees. Actually, a bachelor-master structure was implemented almost universally, but substantial differences between the lengths of programmes and the curricular concepts persisted. The official main aim to increase international student mobility through this structural change was realized only to a limited extent, The second – not so much publicly emphasized - major aim to strengthen the role of short study, i.e. to make transition to employment after the completion of a short study programme more attractive, was unevenly achieved across European countries. The Bologna Process was strongly influenced – one might say: overshadowed - by other policy drives in the first two decades of the 21st century: Notably by the increasing attention paid to "ranking" of universities and increasing efforts to concentrate the academic talents in a few "world-class universities" as well as by the debate, whether study programmes should be geared according to the "employability" paradigm.

Altogether, we note completely varied conclusions what changes have been realized as a consequence of Bologna reform policy and what issues persist. Also, views vary as regards the possible rationales of a future European "Bologna" policy.

References

1. Teichler, Ulrich. Hochschulsysteme und quantitativ-strukturelle Hochschulpolitik: Differenzierung, Bologna-Prozess, Exzellenzinitiative und die Folgen. Münster: Waxmann Verlag, 2014.
2. Teichler, Ulrich. Bologna and Student Mobility: A Fuzzy Relationship. Innovation: The European Journal of Social Science Research, 2019 (doi.org/10.1080/13511610.2019.1597685).

Ulrich Teichler has been professor at the International Centre for Higher Education Research, University of Kassel, from 1978 to 2013, and its director for 16 years. Born in 1942, he studied sociology, worked initially at the Max Planck Institute for Educational Research, Berlin, and got his doctoral award (Dr. phil.) in sociology of education. Research focused on higher education and the world of work, international comparison of HE systems, the academic profession, and international mobility and internationalisation of HE. He wrote more than 1,400 publications and made about 1,000 visits to more than 80 countries. He is member of the International Academy of Education (IAE) and the Academia Europaea (AE), and he was the initial chair of the Consortium of Higher Education Researchers (CHER). He was awarded the Comenius Prize of UNESCO and the Dr. h. c. of the University of Turku (Finland).

Agnieszka Chacińska

ReMedy International Unit, Centre of New Technologies, University of Warsaw

Cellular management of proteins

Mitochondrion is a cellular compartment commonly known as “the power plant” of cells. To fulfill its various functions, these organelles need more than one thousand cellular proteins. Yet, the majority of mitochondrial proteins are synthesized outside mitochondria in the cytosol and thus must be transported into mitochondria with the help of other proteins forming import machines. Dysfunctional mitochondrial protein import machines cause mitochondrial malfunctions, but also accumulation of precursor proteins in the cytosol. Cellular consequences of such cellular stress involve the important role of the cytosolic degradation machinery, the proteasome, in precursor protein clearance. The proteasome protects cells from stress caused by mistargeted mitochondrial precursor proteins accumulating in the cytosol and provides a regulatory mechanism for well-balanced transport of mitochondrial proteins. Our studies pinpoint an important crosstalk between the state of mitochondria and regulatory mechanisms responsible for maintaining cellular protein homeostasis.

Both mitochondrial dysfunction and cellular protein homeostasis failure are commonly implicated in many degenerative and age-related diseases in humans. The newly discovered mechanism represents the missing link between the processes underlying degenerative pathologies, and may provide new strategies to maintain cellular survival and to preserve organismal fitness over time.

Agnieszka Chacińska graduated in Biology, University of Warsaw, and in 2000 received a doctoral degree in biochemistry at the Institute of Biochemistry and Biophysics of the Polish Academy of Sciences. From 2001 to 2009 she worked at the University of Freiburg, as a postdoc and head of a research group. Since 2009 she has been based at the International Institute of Molecular and Cell Biology in Warsaw, Poland, where she was the group leader of the Laboratory of Mitochondrial Biogenesis. In 2014 she was awarded the title of full professor by the President of Republic of Poland. In 2017 Agnieszka Chacinska and her group moved to the Centre of New Technologies, University of Warsaw. Prof. Chacinska is the recipient of multiple awards and prestigious grants, including the Welcome Grant of the Foundation for Polish Science. She is a member of EMBO and the Polish Academy of Sciences. Prof. Agnieszka Chacinska is interested in biochemistry of cells and molecular aspects of cell biology. This includes biogenesis, transport and degradation of mitochondrial proteins and their failure resulting in pathologies.

Jerzy Buzek

Digital revolution: will engineers rescue Europe?

In the coming decades, European Union's prosperity and global relevance will first and foremost depend on our ability to create and implement innovations. Revolutionary changes brought by advancing digital technologies have an ever wider impact on all aspects of our daily lives. They open new possibilities, but equally force us to ask most fundamental questions: about the purpose and direction of these changes, about challenges arising from artificial intelligence and robotics, about the relationship between technology, civilization and culture, or about the impact of the changing reality on our values.

When considering strategies for Europe's sustained leadership among the most developed regions and countries in the world, we must seek to found our growth on knowledge and advanced technologies. This itself is a great challenge if we consider that true innovation means solutions that have yet not even been dreamt of. Thus those pursuing technical studies and work must be ready today to create the future that we can hardly imagine. With them rests a unique responsibility: for the prosperity and the global relevance of Europe, and with it Poland as well as all Member States, but equally, or even more so, for technological progress that will not deprive people of their human dignity. The sense of this responsibility certainly motivates Fellows of the Alexander von Humboldt Foundation, and the Congress of Societas Humboldtiana Polonorum offers a good opportunity to look at some of these underlying issues that will come to define the future of our country, the future of Europe, and in short – our own future.

Jerzy Buzek – Member of the European Parliament continuously since 2004. In 2009-2012 he was the President of the European Parliament, being the first and only President of this institution from Central and Eastern Europe.

In the current 9th term of the EP, he is a member of the Committee on Industry, Research and Energy (ITRE), which he headed for the entire 8th term, and he is a member of the Security and Defense Subcommittee (SEDE). At the EP, he was the author of many important reports, including amendments to the gas directive, regulation on the security of gas supply or the 7th Framework Program for Research and Innovation. In 2016, the "Euractiv" portal placed him in the "EurActory40" ranking among the three most influential people in the European energy policy. "Member of the European Parliament of the Year" 2006 and 2013, according to the Brussels "The Parliament Magazine". The winner of the "Rzeczpospolita" daily rankings for the best Polish MEP in 2008 and 2018.In the years 1997-2001, Jerzy Buzek was the Prime Minister of the Polish Government, who introduced the reforms of administration, education, health and retirement, and began negotiations regarding Poland's membership in the European Union. He is the Knight of the Order of the White Eagle.

Zbigniew Szawarski

Ethics, science and the spaceship "Earth"

The role of science and ethics in the era of globalization is perfectly illustrated by four classic metaphors: (1) Earth as a spaceship, (2) Earth as a lifeboat, (3) Earth as a common pasture (commons) and Earth as a kind of super-organism (Gaia hypothesis). These metaphors (1-3) are a perfect introduction to the discussion on the state of the world and the future of our species. It is obvious that the world is changing. We do not know, however, whether it is being changed for the better or for the worse, though the latter appears to more likely at the moment. The answer to this question requires a thorough analysis of all relevant consequences of human existence and activity on our planet. The author discusses, in turn, the issue of moral evaluation of the consequences of the unprecedented development of science and technology, the causes and moral implications of ecological disaster, population crisis and the role of politics, in which technologies of survival are usually more important than ethics of survival. If we effectively want to avoid existential risk, we have to answer the following question honestly: *what sort of world should we leave to posterity*?

Zbigniew Szawarski – philosopher, with particular interests in moral philosophy, ethics in science, philosophy of medicine and bioethics. Retired professor of philosophy at Warsaw University, where he graduated in 1963. Awarded British Council Fellowship for postgraduate students (Oxford, 1975-1976). From 1988 to 1990 he was Chair of Philosophy of Medicine and Medical Ethics at the Medical University of Warsaw. From 1990 to 2000 he was a lecturer at the Centre for Philosophy and Health Care at the University Wales Swansea. Former President of the European Society for Philosophy of Medicine and Health Care.

And from 2010 – till 2019 Chair of the Committee of Bioethics at the Polish Academy of Sciences. Member of Permanent Working Group Science and Ethics ALLEA (All European Academies) till 2019. His publications include books and articles on ethics, bioethics, and philosophy. He edited (with Don Evans), *Solidarity, Justice and Health Care Priorities*, Linköping 1993. His last book – *Wisdom and the Art of Healing* (2005 – in Polish) is a collection of essays on moral issues in medical practice.

Florian Steger

Ulm University, Institute of the History, Philosophy and Ethics of Medicine

Medical care for forced laborers of Telefunken from Lodz in Ulm (1944-1945): Preliminary results of an ongoing Humboldt project

In years 1944–1945, more than 1400 workers, most of them girls, from Łódź (Poland) were displaced to Ulm and forced to work for military manufacturer Telefunken. During their stay, they were mistreated and had to endure severe living conditions. The devastating workload, limitation of living space, hunger and poor hygiene led to outbreak of several diseases and to overwhelming health problems. They were affected by epidemic typhus, tuberculosis or scabies. They received rudimentary medical care; however, the extent and provision of it remains undisclosed. Up to now, no systematic scientific research concentrated on this topic, especially from the perspective of the affected individuals. The goal of this project is historical reappraisal of the experiences of the forced laborers from Łódź coerced to work in Ulm, with particular attention paid to the medical care that they received.

Full Professor and Director of the Institute of the History, Philosophy and Ethics of Medicine at Ulm University, Before in the same function at the Institute for History and Ethics of Medicine at the Martin-Luther-University Halle-Wittenberg. Chairman of the Research Ethics Committee at Ulm University. In 2014, Leibniz-Professor at the University of Leipzig. 2009–2014, member of the Junge Akademie at the Berlin-Brandenburg Academy of Science and the German Academy of Naturalists Leopoldina. 2008, habilitation at the Medical Department of the University Erlangen-Nuremberg. 2003, Bavarian Habilitation Grant of the Bavarian Ministry for Science. 2002, PhD at the Ruhr-University Bochum. Studies of medicine, classical philology and history at the University of Würzburg and at the Ludwig-Maximilians-University München. Scholarship holder and now liaison professor of the German National Academic Foundation. 2018 Medal "Universitatis Lodziensis Amico" by the Łódź University (Poland) and Honorary Professor at Semmelweis University, Budapest (Hungary). 2019 Professor at I.M. Sechenov First Moscow State Medical University (Russia). 2019 Member of Saxon Academy of Sciences and Humanities. 2019: Alexander von Humboldt Polish Honorary Research Scholarship (Foundation for Polish Science).

Main Research Fields: problems of injustice in a politicized medicine, current ethical questions in medicine, ancient medicine and its reception, medicine and arts.

Ole Janssen, Arne Höll

Federal Ministry for Economic Affairs and Energy

Universal Units: A Short History of Modern Metrology

Metrology has been an important matter for mankind from its very beginning. It has been driven by economic advance and has developed by the state of scientific knowledge of the time. Today measurements even at high precision can be compared worldwide. This is a result of modern international metrology that started on 20 May 1875, when representatives from 17 nations signed the Meter Convention.

This contribution looks into major historical developments of metrology. The interdependency of metrology as an element of the quality infrastructure with innovation and industrial progress as well as economic growth is discussed. The global effort is presented that has led to the recent redefinitions of the International System of Units and that became effective on 20 May 2019. An outlook is given to the challenges that metrology is facing today.

Dr. Ole Johann Janssen is the Deputy Director General for Innovation and Technology Policy at the Federal Ministry for Economic Affairs and Energy of Germany. As Deputy Director General “Innovation and Technology Policy”, Mr. Janssen oversees the following units: General issues of national and international innovation and technology policy; Accreditation and conformity assessment; Supervision of the Federal Institute for Material Research and Testing (BAM) and the German National Metrology Institute (PTB); Central Innovation Programme for SME; Industrial research for companies and innovation guidance for SME. Previously, he served at the Ministry for Economic Affairs, Labor and Transport of Lower Saxony and as Director at the State Chancellery of Lower Saxony. He graduated in economics at Hannover University. He had been an Academic assistant at the chair for economics at Greifswald University and holds a PhD in economics.

Dr. Arne Höll is Head of Division for accreditation and conformity assessment, metrology, supervision of BAM and PTB at the Federal Ministry for Economic Affairs and Energy of Germany (BMWi). Among others, Mr. Höll is in charge for the supervision of the German National Metrology Institute (PTB), the Federal Agency for material research and testing (BAM) as well as for the „German National Accreditation Body (DAkkS)“. Previously, he worked in the area of energy research at the BMWi, where he was responsible for the general outline of energy research of the Helmholtz Association (HGF) as well as for European and international aspects in this area. Dr. Höll holds a PhD in physics from the University of Rostock. He worked as a postdoc at the Argonne National Laboratory in the USA and in Rostock, before joining BMWi in 2007.

Krzysztof Zanussi

Film director, Poland

Science as an Inspiration in Narrative Art

Krzysztof Zanussi is a film director, producer and scriptwriter. Director of many award-winning, internationally acclaimed films (awarded in Cannes, Venice, Locarno, Moscow, Chicago, Montreal, Berlin, Tokio): *The Structure of Crystal* (1968), *Illumination* (1973), *Camouflage* (1976), *Constant Factor* (1980), *The Year of Quiet Sun* (1984), *Wherever You Are If You Are* (1988), *In Full Gallop* (1996), *Persona Non Grata* (2004), *Revisited* (2009), *Foreign Body* (2014). Krzysztof Zanussi is also a theatre director staging productions all around the world. He has authored several books. Has honorary doctorate of many renowned universities and gives lectures all around the world.
President of Tor Film Production, producer of the films by Krzysztof Kieślowski, Agnieszka Holland and many others. Professor at Silesian University in Katowice (Poland).

Lubiński Jan

Pomeranian Medical University in Szczecin
Read-Gene SA

Milestone improvements in prevention and treatment of cancers based on knowledge of patients genetic changes

Abstract

Special emphasis will be devoted to:

1) Platins in the treatment of BRCA1-dependent breast cancers;
2) SELINA - clinical trial on lowering the risk of malignancies by optimizing selenium levels in females from families with hereditary breast cancer;
3) Arsenic as prognostic and risk factor of cancers.

Ad 1)

Aim. To evaluate in a contemporary cohort the impacts of chemotherapy and oophorectomy on survival for breast cancer patients with a BRCA1 mutation.

Method. We reviewed the pathology reports and medical records of 372 women with breast cancer and a BRCA1 mutation, diagnosed from 2005 to 2017, between the ages of 25 and 65 and followed them for death from all causes and death from breast cancer. Death was ascertained through the Poland vital statistics registry. We performed survival analysis to evaluate the impacts of chemotherapy (including neoadjuvant cisplatinum) and of oophorectomy on survival.

Results. After a mean follow-up of 5.6 years (median 5.2), 66 of the 372 women died; 56 of the deaths were from breast cancer and 6 were from ovarian cancer. 127 women received neoadjuvant cisplatinum and 245 women received other chemotherapies. Cisplatinum (versus all other therapies) was associated with a hazard ratio of 0.42 (95%CI 0.20-0.87) on breast cancer-specific survival. The 10-year actuarial all-cause survival for women who had both cisplatinum and an oophorectomy was 94.4%. The 10-year all-cause survival for women who had neither cisplatinum nor an oophorectomy was 65.4% ($p < 0.01$).

Conclusions. Cisplatinum and oophorectomy are effective therapies for women with breast cancer and a BRCA1 mutation.

Ad 2)

Aim. Prospective observational studies showed that blood selenium (Se) levels associated with significantly lower risk of cancers can be identified in Polish females from families with hereditary breast cancers (HBC). For BRCA1 mutation carriers it is: 70-89 µg/l at age <50 years (OR~12) and 95-120 µg/l at age ≥50 years (OR~4). For females without detected BRCA1 mutation but from families with pedigree/clinical features of HBC it is 98-108 µg/l (OR~5).

The main goal of SELINA is validation of hypothesis that optimization of Se level by supplementation or diet changes can decrease the risk of malignancies in groups described above.

Method. 7000 females (including 1200 BRCA1 carriers) from families with HBC and deficiency or excess of Se will be recruited and randomly qualified to one of the following arms: “placebo”, prospective observational, supplement (Sodium Selenite) or diet modification. Blood Se level will be systematically measured using ICP-MS and appropriately optimized. Follow-up will take 5 years.

Results. At present we are performing recruitment. It is planned to close it at the end of 2019.

Conclusion. SELINA is the first clinical trial aimed to decrease the risk of cancers by active control of blood selenium levels. All interested scientists/institutions are welcome for collaboration. Project - INNOMED/I/16NCBR/2014 - sponsored by National Center of Research and Development and Read-Gene SA.

Ad 3)

Background. Inherited mutations of high risk can explain only a few percent of cases of breast carcinoma. Environmental factors like exposure on metals may play role in such cases. Arsenic (As) is known as a potent carcinogen. Knowledge of chronic low level exposure is limited to a few studies.

Aim. Authors aim was to determine if blood arsenic level may reflect cancer risk among women in Poland.

Method. Cohort of 1702 healthy women, aged 40 and above was set. Only women without BRCA1 mutations were enrolled. Blood arsenic level was determined by inductively coupled plasma mass spectrometry. Statistical analysis was performed using Cox regression model for equal quartiles of arsenic levels.

Results. Over an average of 4.5 years (range 0.7 to 7.3) of follow-up and 7.731 person-years, there were 110 incident cases of cancer diagnosed in the cohort. Annual breast cancer incidence rate is was 4.9 times greater than the expected risk based on Polish statistics. Women in the highest quartile of arsenic had a highly significant 12-fold increased risk of developing breast cancer compared to women in the lowest quartile (HR = 12.72; 95%CI 3.89-41.57). Cumulative incidence was 0.7% for quartile 1, 3.8% for quartile 2, 4.2% for quartile 3 and 9.5% for quartile 4. Results were similar in the analysis including all incident cancers (HR quartile 4 vs. quartile 1 = 13.14; 95%CI 4.72-36.51).

Conclusions. Unexpectedly, the blood arsenic level may be particularly strong marker of low/high cancer risk in women.

Reference: Blood arsenic levels and the risk of familial breast cancer in Poland, Int J Cancer. 2019 Jul 26.

Jan Lubiński, MD, PhD, International Hereditary Cancer Center of Pomeranian Medical University, Szczecin, Poland. The most important divisions of this center: a) network of cancer genetic outpatient clinics covering almost entire country and b) cancer bio-bank with biological samples and clinical data from 200,000 cancer cases and appropriate controls including registries of thousands of mutation carriers such as registry of 7,000 BRCA1 carriers. J. Lubiński is an author of ~700 papers on clinical and molecular genetics of cancers (Hirsch-index: 76, No. of citations: 27303), author and coordinator of a few EU projects, editor of a journal published under UICC auspices “Hereditary Cancer in Clinical Practice”.

Bartlomiej Glowacki[1,2,3]

(1) Department of Materials Science and Metallurgy, University of Cambridge, Cambridge CB3 0FS, UK
(2) Institute of Power Engineering, 02-981 Warsaw, Poland
(3) Epoch Wires Ltd. Cambridge CB22 6SA, UK

Symbiosis of hydrogen and superconductivity for the benefit of modern society

The World is encountering a continuous depletion of fossil fuel resources and an acceleration of climate change, widely believed to be caused by the emission of greenhouse gases. Energy demand is also expected to increase by 56 % between 2010 and 2040, increasing by a factor of 5 by 2100 due to human population growth and accelerated global industrialisation. Considering the projected increased energy demand in transportation and electrical supply, there will be an increased pressure on energy generation, storage and use and changes will have to be made. The energy supply is currently in transition partly due to the need for a lower carbon future. Due to the expected increase in the penetration of intermittent renewable energy to the electrical grid in the future, there is a need for reliable energy storage systems. The research and development of these systems focuses on reducing the effects of the world's emerging energy problems. The integration of energy storage systems, including hydrogen, with renewable energy, such as wind, would allow otherwise wasted energy to be stored. Capital costs of storage systems are a barrier to their widespread installation. However, with energy management, profits can be enhanced by supplying stored energy at times when demand and prices are high. Developments in the hydrogen economy in conjunction with superconductor technologies will almost certainly induce changes in the natural gas industry and vice versa.

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3. B. A. Glowacki, *Advances in Development of Powder-in-Tube Nb_3Sn, Bi-Based, and MgB_2 Superconducting Conductors* Acta Physica Polonica A, **135** (1) 7-13 (2019).

Prof. Glowacki's academic and strategic leadership in energy technology, he is a member of the World Energy Council, and the European Energy Research Alliance representative responsible for the basic science programme policy, which seeks to combine the potential of European research institutions. He has co-organised thematic international conferences and workshops, principally on

applied superconductivity and hydrogen-cryomagnetic technologies. Prof. Glowacki's research field is the physics, chemistry and technology of metal, oxide, carbon and electro-ceramic thin composite superconducting films and nanostructures for energy applications. He is leading a network of international partners, the Transnational Energy Materials Printing Research Initiative, http://www.tempri.eu. Recent and current work is principally on superconductors for, wind generators, fault current limiters and transmission cables. His research on carbon use reduction and new advanced carbon technologies is focused on direct carbon solid oxide fuel cells, microwave plasma processing of CH4 and CO2, as well as second generation vanadium redox flow batteries. He has led national and international projects researching
superconducting generators, cables, fault current limiters, MRI and NMR applications, fusion, liquid hydrogen, photocatalysts, fuel cells and electrolysers for energy applications. The global shortage of helium revealed by his collaborative modelling with Culham1 and Linde/BOC has driven a transition to alternative coolants. This, in combination with his fuel cell research, has led him in recent years to broaden his research programme from technical issues to contextual issues relating to technology policy. Part of that journey involves hydrogen technologies, for which he has secured funding under EPSRC SUPERGEN-14. He was developing a highlyspecialised liquid hydrogen laboratory, which will enable interdisciplinary research on hydrogen decentralisedeconomy solutions for hospitals and transport, combining generation, liquefaction, storage and use of hydrogen. His research programmes on superconductivity, fuel cells, inkjet printing and hydrogen form a strong and farreaching portfolio united by the goal of securing materials science solutions to growing global sustainability and energy challenges. He has a deep interest in synergy between superconductivity and hydrogen technologies
including liquefaction and cryosorption for use in new patented designed superconducting electric machines ranging from wind turbine generators to electric motors for aviation. Prof. Glowacki's recent initiative and strong involvement with fully superconducting electric motors cooled by Liquid hydrogen and powered by gas hydrogen prove his visionary academic and strategic leadership in energy technology and is recognised internationally. He has supervised 20 PhD students. He is cofounder shareholder and director of two UK companies: Metalysis Ltd., and EpochWires Ltd. Recently he is conducting study of integrated energy and hydrogen-cryomagnetic technology development - modelling pathways towards modern decentralised energy systems using System Dynamics.
Prof. Glowacki has published 9 book chapters and 19 patents, and authored or co-authored more than 360 research publications, (https://ascg.msm.cam.ac.uk/publications) receiving more than 3000 citations and an h-index of 27. He delivered numerous invited, keynote and plenary lectures during international meetings. He served on five international research and research policy panels.

Sławomir Magala

Rotterdam School of Management Erasmus University Rotterdam (em.)
Faculty of Management, Warsaw University (visiting)

The Third Enlightenment or Globalizing Meritocracy

Mankind is a slow learner. Ancient Greeks and modern Leonardo failed to progress from mechanical toys to the industrial revolution. Kant, Hegel and Voltaire failed to progress from "raison au cheval" to historical synthesis of the Jesuits and the Bolsheviks. They left the Enlightenment to us, proud owners of the world wide web and speed dating robots, of the European Union and crowdsourcing bitcoin entrepreneurs.

The core problem of contemporary knowledge intensive societies is the explosive growth of unknown unknowns, which accompanies systematic enlargement of the cloud of knowledge. Balancing acts become difficult to perform. Universities and hospitals slowly evolve from elitist centers of emergency services for the sick and the ignorant to the proactive role of health consultants and knowledge facilitators. Is the long march from a dictatorship of science and the divine rights of experts to the democracy of knowledge and the third Enlightenment a brilliant success or a dismal failure?

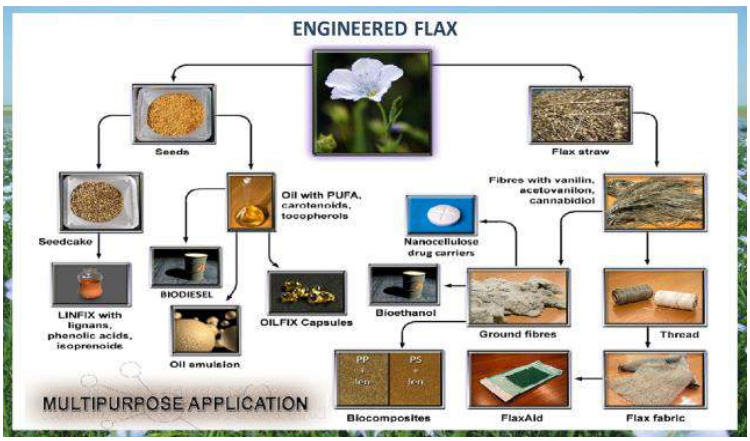
Slawomir Jan Magala taught cross-cultural management at the Rotterdam School of Management, Erasmus University Rotterdam, The Netherlands (1985-2015), He wrote "Class Struggle in Classless Poland"(South End Press, 1982, under the penname of Stanislaw Starski), "The Polish Student Theatre as an Element of Counterculture" (MAW Publishers, 1988, in Polish), "Cross Cultural Management" (Routledge, 2005), "The Management of Meaning in Organizations"(Emerald, 2009. Blogs online: www.magala.nl. Since 2004 the editor-in-chief of Journal of Organizational Change Management. Married to Joanna Ramlau, son Jacek and daughter Magdalena. Described as a generalist with a cause.

Jan Szopa

Linum Foundation, Wroclaw, Poland

Optimizing flax raw products for tomorrow's uses

Flax is a dual-purpose plant providing the fiber and oil. The principal use of fiber was for textiles manufacturing and oil for paints and varnishes. However, in the last decades devaluation of flax fiber in the world has been observed due to hardships associated with flax cultivation and processing, some disadvantages of flax fiber (poor elasticity, unpredictable quality) properties together with the appearance of cotton and synthetic fibers on the market. Recently, due to research findings the flax raw material appears to provide a variety of industrial and health benefits. For example manipulation of flavonoid genes expression significantly increases antioxidant potential and thus oil stability against oxidation and fatty acids composition. Squalene accumulation (potent anticancer agent) was increased by silencing carotene synthesis. Unique flax fiber was obtained, by co- synthesis of polyhydroxybutyrate (PHB) with cellulose during fiber development. PHB fiber embedded in polypropylene and polystyrene can be used for the production of biodegradable packaging, while embedded in polylactide can serve as a scaffold for tissue engineering and has proven useful as a biodegradable implant. The unique application of flax product has been shown in chronic wound healing. Pre-clinical study revealed healing improvement of chronic ulcers upon treatment with wound dressing (Flax-Aid) based on new fibers strengthened by supplementation with activators derived from refined seed extract. Although the routine use of linen dressing is strongly limited in Poland and Europe according to the GMO principles, the results clearly show the real possibility of integrating numerous compounds from various raw flax products to improve wound healing. It also provides motivation to search for a method that is to improve the quality of plant products and is not subject to GMO regulation. In recent years, we have started using the OLIGOs method (plant treated with a short oligonucleotide) to meet this expectation, and the initial result is quite optimistic but efficient optimization will take a long time. The following image summarizes the multi-faceted use of raw materials from modified flax plants.



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Szopa-Skorkowski Jan, professor., biochemist/biotechnologist, MSc (1969), PhD (1972), DSc (1977), full Professor (1987). Head of Genetic Biochemistry Department at Wroclaw University in the past, currently running a team of plant engineering at Wroclaw University of Environmental and Life Sciences. Awarded twice by Polish Biochemistry Society (1971, 1973), Polish Academy of Sciences (1991) and Polish Prime Minister (2009). Fellow of Humboldt Foundation (1978-1980, 1982-1983), Max-Planck Gesellschaft (1994-2004) and French Government (2001, 2002). Co-founder & Editor of Cellular and Molecular Biology Letters and member of Editorial Board of Plant Physiology & Biochemistry. Recently he started to run the *Linum* Foundation (www.leczenielnem.pl), a non-profit organization promoting flax products for human health protection. Nowadays the Foundation offers several kinds of products available by Internet. Research interest: valorization of plant products; plant engineering; plant metabolism; natural compounds. Author and co-author of over 150 original publications.

Halina Podbielska

Department of Biomedical Engineering, Wrocław University of Science and Technology

Globalization as a chance for development of personalized medicine

Evidence based Predictive, Preventive & Personalised Medicine (PPPM) is a new approach in medical health care system directed to the patients real needs. It requires a strong integration of science and healthcare practice to identify the right patient treating with the right medication and the right dose at the right time after right diagnosis. To reach such ideal status in the health's care system, international integration and collaboration between innovative medical fields, technology and basic sciences, is necessary. In this case, globalization should be regarded in terms of Strength and Opportunity rather than Weakness and Threat. In Europe these activities are leaded by EPMA Association (www.epmanet.eu).

Prof. Dr. Eng. MD Halina Podbielska graduated from the Faculty of Fundamental Problems of Technology of Wroclaw University of Technology (WrUT) and from the Faculty of Medicine of Wrocław Medical University. She is the head of the Biomedical Engineering Department. Her professional experiences include biomedical engineering with emphasis on medical application of optics, biomaterials and physical and personalized medicine. She was visiting scientist in several scientific institutions worldwide: as an A. v. Humboldt fellow at the University of Frankfurt/Main (1984-85), University of Muenster (1985-86), and at the Weizmann Institute of Science, Israel (1989-1990). In years 2002-2005 she was a visiting professor at the Institute of Optics of Technical University in Berlin. She was also visiting scientist at the Charite Medizin University of Berlin (2005) working at the Medical Laser Technology Center LMTB, Germany.

She is a member of the Scientific Council of Institute of Biomedical Engineering and Biocybernetics of Polish Academy of Science (PAS) in Warsaw and a member of The Committee on Medical Physics, Radiobiology and Diagnostic Imaging of the PAS and a member of The Committee on Biomedical Engineering of PAS. She a member of the Academic Advisory Board and Representative of Biomedical Engineering of EPMA (European Association for Predictive, Preventive and Personalized Medicine and board member of EPMA Journal.

Holger Stark

Heinrich Heine University Düsseldorf, Germany

Promiscuity in Therapeutic Drugs on Global Market

The search and development of new therapeutic drugs is a long lasting, high risk and very expensive process. Numerous ways have been approached to optimize this process. One technique is to re-use already marketed drugs with a new therapeutic indication.[1] This drug repurposing has already successfully been applied to indication with the similar mechanism of action or with the re-orientation on the previously unwanted side-effect profile. The re-use of old drugs also known as repositioning still needs the proof of concept in clinical trials, but accelerates the development line to a high extend. Sometimes the clinical indication already shifts in the premarket clinical trials as in the case of Sildenafil (Viagra®) which was initially tested as anti-hypertonic drug and then changed to erectile dysfunction. The effectiveness on several targets simultaneously can also be used for a multitargeting purpose,[2] where the combined pharmacological profile of one biologically active compound on several targets, e.g. enzymes, receptors, additively or synergistically supports the treatment of diseases with complex etiology, which is especially true in numerous central diseases.[3]

Conclusion

The possibility of repurposing ´old´ drugs for new therapeutic indications offers a more rapid way for novel drug approval. The strategic combination of addressing different targets simultaneously in one compound gives a new approach in complex neuronal diseases, which is more promising the better the understanding of the cause of disease.

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Prof. Dr. Dr. h.c. Holger Stark studied pharmacy and finished his PhD in Medicinal Chemistry at the Free University of Berlin, Germany. He focused on neurotransmitter research with emphasis on histamine as well as dopamine receptor subtypes and expanded this on lipid signaling. In 2000 he became full professor at the Goethe University in Frankfurt, Germany and went in 2013 to the Heinrich Heine University in Düsseldorf, Germany where he has his actual position. He founded start-up companies on cancer therapeutics (Warburg Glycomed, PSites Pharma) and has received several prices for his successful research as well as for teaching. He is co-inventor of pitolisant (Wakix®), the first histamine H3 receptor antagonist with market approval on narcolepsy, an orphan disease, and has prepared some back-up clinical candidates on different leads for various targets. 2016 he received an honor PhD from University of Nis, Serbia. Since 2004 Holger Stark is Editor-in-Chief of the *Archiv der Pharmazie – Chemistry in Life Sciences*, one of the oldest journals on Medicinal Chemistry.

Ewa Bartnik

Institute of Genetics and Biotechnology, Faculty of Biology, University of Warsaw

Human Genome Editing – who's next or what's next

Modified humans were described by Aldous Huxley in Brave New World, but this was not something many people thought about as it just was not possible. Now not only is it possible to modify human DNA, but it has been done. Two girls were born in China in 2018, and in Russia currently one scientist is planning to enable deaf parents to have deaf children. Many international institutions are currently considering how to prevent rogue scientists from performing these types of experiments. This is difficult, because regulations are never the same all over the world, and the problem with rogue scientists is that they can always or almost always find a place where there are no pertinent laws.

Ewa Bartnik
Professor of Genetics at the University of Warsaw. Current research interests: role of mitochondria in human diseases and aging; previous DNA methylation, regulation of gene expression in mitochondria, mitochondrial DNA mutations in cancer. She coordinated the program of reforming the science curriculum in Polish schools in 2008 and is active in popularizing science.
Member of the Bioethics Committee of the Presidium of the Polish Academy of Sciences since 2015.
Member of the UNESCO International Bioethics Committee 2010-2017.
Member of the PISA Science Expert Group 2006-2009.
Member of the WHO Expert Advisory Committee on Human Genome Editing.

Mirosława El Fray

West Pomeranian University of Technology, Szczecin, Division of Functional Materials and Biomaterials, Faculty of Chemical Technology and Engineering, Szczecin, Poland

Tissue engineered artificial organs: science-fiction or realistic future?

Abstract: *Tissue engineering is one of the most promising interdisciplinary field combining materials science and regenerative medicine in order to construct tissues, and ultimately, functional organs. Application of newest developments in using new polymers as functional scaffolds for cell proliferation and adsorption of key provisional matrix proteins, fibrinogen and fibronectin are discussed in context of cardiac tissue engineering.*

Introduction

Cardiovascular diseases (CVD) are the main source of morbidity and mortality worldwide. According to the World Health Organization (WHO) 17.5 mln people die each year from CVDs, at estimated 31% of all deaths worldwide[1]. It is worth noting that 80% of all CVD deaths are due to heart attacks and strokes. Ultimately, heart transplantation is often the only option, but is very limited by few donors, possible organ rejection, lifelong immunosuppression, and very high costs. Novel polymeric materials and surgery options could reduce incidence of heart failure, reducing the need for transplants in the coming years and thus reducing the total cost of transplants. Therefore, tissue engineering is dynamically developing field that constantly offers new possibilities in combinations of scaffolds (mainly polymeric, degrading with time) and cells (including stem cells) to produce functional tissues or even organs.

Electrospinning is one of the most effective ways to produce scaffolds mimicking the native cardiac extracellular matrix (ECM). However, to obtain a good cell infiltration for the final application and to better mimic not only the fibrillar structure, but also the spatial characteristics of the ECM (3D instead of planar), an elastic fiber morphology with high degree of looping and tortuosity (curly), able to coordinate with the stretching and contraction movements of heart tissue are needed. In order to address this problem, we applied the wet-electrospinning, a modification of the traditional electrospinning to prepare such 3D scaffolds.

Materials and Methods

Porous, spring-like fibers spatially organized in a 3D architectures were fabricated by the use of elastomeric copolymer poy(butylene succinate-dilinoleic succinate) (PBS-DLS) for the wet-electrospinning technique applying a non-solvent bath collector[2]. PBS:DLS with 70:30 wt% ratio of hard to soft segments, was prepared *via* melt transesterification and polycondensation two step-process[3]. The obtained material was processed into scaffolds in a vertical electrospinning set-up connected to a grounded collector, a stainless steel coagulation bath for the fabrication of 3D spongiform scaffolds. The fiber formation in both systems (conventional and wet electrospinning) has been optimized. Cell adhesion (L929 fibroblasts, and C2C12 myoblasts) and adsorption of key provisional matrix proteins, fibrinogen and fibronectin, has been studied[4].

Results and discussion

Wet electrospinning was successfully used to produce scaffolds from the synthesized materials using a non-solvent coagulation bath in the electrospinning process. Highly porous, spring-like fibers, spatially organized in a 3D structure have been obtained. Electrospun PBS-DLS materials are cytocompatible, based upon lack of cytotoxicity in extract and direct contact

tests, as well as observed adhesion and growth of cells. Importantly, newly developed polymeric materials demonstrated robust adsorption of both crucial provisional matrix proteins.

Conclusion

Heart tissue engineering is a promising approach in delivering not only functional tissues, but ultimately, it has great potential for future development of functional artificial organs. New materials developed in our laboratory showed marked increase in cell proliferation and robust proteins adsorption thus confirming the suitability of these 3D materials as scaffolds for soft tissue engineering.

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Miroslawa El Fray is full professor at the West Pomeranian University of Technology, Szczecin. She is director of the Polymer Institute and head of the Division of Functional Materials and Biomaterials, and director of the Nanotechnology Centre for Education and Research. She was a post-doc at the Technical University Hamburg-Harburg and at the University Bayreuth, Germany and she received the Royal Society fellowship at the Imperial College London, UK. She completed 12 projects financed for national and international research funding bodies (NCN, NCBiR, 7FP) and a number of projects in cooperation with DePuy Johnson & Johnson (UK), Uniqema/Croda, Philips (Netherlands), Honda Europe (Germany). She holds 9 patents, including 2 granted by USPTO. She co-authored over 120 publications in indexed journals. She is also a CEO of a spin-off company PolTiss sp z o.o. commercializing new injectable photocurable polymers for innovative hernia treatment. Her scientific background spans polymer synthesis and characterization, biodegradation, and modification towards specific biomedical applications.

Szymon Malinowski

University of Warsaw, Faculty of Physics

Global warming: physicist's perspective

The work of Joseph Fourier from the early 19th century laid the foundations for a modern understanding of the functioning of the climate system. It was he who discovered the importance of the energy balance of the planet and the mechanisms of heat transport. Later works on radiation transfer, fluid mechanics, knowledge of nuclear physics and quantum mechanics allowed to explain the most important cause-and-effect relationships in the climate system, forcings and couplings. This brought not only an understanding of how the climate worked in the past, but also explained that today's global warming is a phenomenon unprecedented in the geological history of the planet and that its primary cause is the anthropogenic emission of greenhouse gases into the atmosphere from fossil-fuel burning. Known cause-and-effect relationships allowed to formulate predictions. The continuation and even more acceleration of emissions of these gases will change the climate at a rate much faster than the possible adaptation of existing ecosystems and our global civilization. The consequences of this discovery are still not accepted in a wide public space.

Conclusion

Although global warming can easily be explained by using fundamental and simple physical dependencies, in social perception it is mysterious and often questionable phenomenon. This lack of understanding results in slowing down application of appropriate measures which could remedy or reduce the imminent climate catastrophe. This is a huge failure in the social communication of science.

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Szymon Malinowski: Director of the Institute of Geophysics, Faculty of Physics, University of Warsaw, head of the Committee of Geophysics, Polish Academy of Sciences. Atmospheric scientist, cloud physicist, specialist in atmospheric turbulence. PhD in 1988 at the Institute of Geophysics, Polish Academy of Sciences, Post-Doc at the Universite du Quebec a Montreal, since 2002 professor at the University of Warsaw. Visiting scientist in many institutions, including National Center for Atmospheric Research, Boulder, USA and Johannes Gutenberg-Universität Mainz, Germany. Participant to international atmospheric research campaigns including DYCOMS II, POST, ACORES. Popularizes science about climate, clouds, atmosphere: co-founder and editor of https://naukaoklimacie.pl/.

Michael Stürner

University of Konstanz, Germany; Higher Regional Court, Karlsruhe, Germany

Transfer of Legal Ideas in the Global Arena

The adoption of foreign ideas and concepts is probably as old as mankind. Nowadays, with the help of modern technologies, the dissemination of innovation goes even faster as mass communication can spread the word within seconds in all parts of the globe. Legal concepts and ideas have been travelling just like other innovations. The notion of legal families (Rechtskreise) that we still cherish today mainly roots in the degree of acceptance of Roman law in the respective legal order. When looking at the reasons for the transfer of legal ideas and concepts, it is mainly in the aftermath of changes in the political system that the need for new legal rules arises. However, a political change is not the only possible reason for the transfer of legal ideas and concepts. Simple economic reasons sometimes force a state to modernise its legal system. Quite often states choose to transfer foreign legal ideas and concepts rather than create their own approach.

For many years now, these legal transplants, as they are commonly called, have been the object of legal and socio-legal research. The radical position of some scholars who submitted that it is impossible to transfer legal concepts has remained solitary. Today, new forms of migration of legal concepts can be identified. Unlike before, the transfer of legal ideas happens in a more eclectic way, as role models such as the comprehensive civil codes seem to lose attraction because of their age. One could speak of a synthetic transfer of ideas, when a legal system imports concepts and norms from various sources. Moreover, modern types of export of legal norms can be witnessed. While such a transfer of norms and concepts was a typical feature of colonial times, nowadays more subtle forms evolve. One is jurisdictional hegemony by way of long arms jurisdiction; another consists in private export by global law firms or by semi-private institutions such as professional associations or foundations set up by the industry.

Michael Stürner (Dr. iur, Munich; M.Juris, Oxford) is Professor of Civil Law, Private International Law and Comparative Law at the University of Konstanz, Germany, since 2012. He also serves as a judge at the Higher Regional Court (Oberlandesgericht) in Karlsruhe, Germany. As of 1 October 2019 he will be the Vice-Rector for Teaching and Curricular Affairs of the University of Konstanz. Previously he has held a chair of Civil Law, Private International Law and Comparative Law at Europa-Universität Viadrina Frankfurt (Oder), Germany (2009 to 2012). He has been appointed as a member of the Council of the International Association of Procedural Law (IAPL) and as a Fellow of the European Law Institute.

He has been a Visiting Fellow at the University of Florence, Italy, as a scholar of the Alexander von Humboldt-Foundation (2006/07), a Visiting Scholar at the University of California at Berkeley, Boalt Hall School of Law (2013), and a Resident Fellow at the Institute for Advanced Study Konstanz (2016/17). His main research interests lie in the fields of cross-border dispute resolution, comparative law, conflict of laws, and European private law.

Jan Sykulski

Electronics and Computer Science, University of Southampton, Southampton, United Kingdom

Globalization and Science – the British perspective

Globalization in science has a long history and tradition; perhaps nowhere as strong as in the United Kingdom. The days of the British Empire may be long gone, but its political, legal, linguistic and cultural legacy is widespread and still very much visible and recognizable. In early 20th century the British Empire held sway over 412 million people, 23% of the world population at the time, and covered 24% of the Earth's total land area. The educational systems and organization of science in former dominions, colonies and protectorates were broadly speaking cloned from the existing structures from England. Even today, many countries around the world follow the system originally developed in the United Kingdom. At the same time the British universities have established their very strong position worldwide and students from many remote countries are attracted to do their degrees in the UK, but even more to continue with higher degrees and engage in research. It is therefore not surprising that the effects of globalization were felt in the British university sector long before they appeared in other countries.

The talk will first focus on explaining why the British experience – even within the context of Brexit – may still be valuable and relevant to other European countries. The very high proportion of overseas students, PhD students and post-doctoral researchers at most British universities provides a natural ground for multi-disciplinary, multi-cultural and ultimately global character of scientific research. The presentation will provide some interesting factual information as well as draw on personal experiences.

Jan K. Sykulski is Emeritus Professor at the University of Southampton, U.K. His research covers computational electromagnetics, applications of high temperature superconductivity, simulation of coupled field systems and design optimisation of electromechanical devices. He has published over 420 scientific papers and has contributed to four books. He is General Secretary of International Compumag Society, Editor-in-chief of SMT (IET), Editor-in-chief of COMPEL (Emerald), Editor of IEEE Transactions on Magnetics and member of Steering Committees of several international conferences. Professor Sykulski is Fellow of the IEEE, IET, IoP, and BCS and doctor honoris causa of the University d'Artois (France).

Jürgen Lieser

Pharmatec GmbH Dresden (Germany), Bosch Packaging Company

Working and living between the cultures. Intercultural experiences between Europe and China

For international successful companies like Bosch it is essential that managers are aware, respect and deal adequate with intercultural differences. Intercultural differences do not only occur obviously e.g. between Germany and China but also unexpected between e.g. Germany and Sweden. How to deal with this in science, business and private life will be shown in this presentation. Also an overview of the R&D structure in the different countries will be given.

Finding the right compromise in leadership between “being authentic” and “adapt” is the key to success to drive business successfully in the different countries. Considering the supposed cultural strength and weaknesses and combining them in a good matter is a key driver for success.

Dr.-Ing. Jürgen Lieser studied Mechanical Engineering at the University of Kassel, Germany. His PhD Thesis was „Implementation of a quality management system for the recycling of technical thermoplastics“ at the Institut für Werkstofftechnik, Universtität Kassel. After starting at Robert Bosch in 2000 he worked in different Bosch divisions (Diesel Systems, Bosch Rexroth, Packaging Technology) in different functions (Quality Management, Production, Plant Management) and countries (Germany, China and Sweden). Currently he is Technical Vice President at Bosch Pharmatec responsible for Development, Project Management, Production and service. Bosch Pharmatec is producing equipment for the pharmaceutical industry. Customers are located worldwide.

Johannes Kluehspies

The International Maglev Board

When fundamental innovation hits an established market: the example of Maglev transport systems

Throughout history, events have often converged to create entirely new paradigms. Some of those paradigm shifts were entirely predictable; others came as a total surprise. Maglev is one of those 'disruptive' technologies that have the power to dramatically alter and improve the way we live and travel.

Magnetic levitation transport, or maglev, is still a modern form of transportation that suspends, guides and propels vehicles via electromagnetic force. This High-Tech method can be significantly faster than wheeled mass transit systems, potentially reaching velocities comparable to turboprop and jet aircraft (550 to 700 km/h) in regular service.

Maglev systems represent a revolutionary transport innovation. The idea of considering Maglev systems challenges established ways of thinking on how to deal with an increasing transport demand. Today, the railway industry seems focused on traditional business models that profit from friction, wear and tear of established conventional transport systems. Maglev systems have begun to put these traditional business concepts into question. Maglev is a fundamentally different concept of transport – which might explain the reluctance, even ignorance, which Maglev systems continue to face.

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Johannes Kluehspies is the President of the International Maglev Board (e.V.). He holds a Master's Degree in Urban and Transport Geography from Technical University of Munich, a doctor's degree in Transport Geography from University of Bochum, and a post-doctorate degree (Dr. habilitatus) from the University of Leipzig, Germany. As a DAAD scholarship holder, he conducted research in Japan, China and Russia. In 2018 he was awarded a doctor honoris causa by the Emperor Alexander I. St. Petersburg State Transport University, Russian Federation. He lectures as a full professor at the Deggendorf Institute of Technology and the University of Leipzig.

Humboldtians lectures


Science in the age of globalization
11th Congress of the Societas Humboldtiana Polonorum

Adam Łukaszewicz

University of Warsaw

Ambiguity of knowledge and the challenge of humanism

In his *Apology* Socrates said: "The human wisdom is worth little or nothing". However, we believe in some positive value of wisdom, which is not only the product of research in natural or technical sciences, but also in the humanities.

Humanism is a combination of knowledge and of classical culture understood in the Ciceronian sense of *philosophia - cultura animi*. In any kind of scholarly activity truth is and should be the supreme value.

The scholars in the humanities have a duty of discovering relevant information coming from the past. We study the past for the future. We must profoundly engage into the salutary analysis of human nature, of the genesis of mankind and of reasons of crises and conflicts to help find the way out.

Adam Łukaszewicz was born and educated in Warsaw as archaeologist, papyrologist and historian of antiquity. As a young post-doctoral researcher working at the University of Warsaw he spent a time in Marburg in Germany as Alexander-von-Humboldt fellow. His further scholarly development was largely influenced by his studies and research at the University of Leuven (Belgium). Since 1995 *professor extraordinarius* in Warsaw, was in 2004 awarded the title of full professor by the President of the Republic of Poland and since 2005 is *professor ordinarius* at the University of Warsaw in the Institute of Archaeology, Department of Papyrology.

He was deputy-Dean of the Historical Faculty. As a head of a Polish archaeological expedition in Egypt he carried out research in Upper Egypt and as a specialist in epigraphy he currently works in the archaeological mission of the University of Warsaw in Alexandria. He also carries out a papyrological research project in Georgia.

A. Łukaszewicz is deputy-Chairman of the Committee for the Study of Ancient Culture, Polish Academy of Sciences, member of the Institute for Advanced Study in Princeton, N.J., former Chairman of the Polish Philological Society in Warsaw, member of the Polish PEN-Club etc.

He works in the field of archaeology, ancient history and textual criticism in a wide historical context. He published a number of books including *Les édifices publics dans les villes de l'Égypte romaine* (1986, 2nd edition 2018), *Kleopatra* (2005), *Egipt Greków i Rzymian* (2006), *Inter Orientem et Septentrionem* (2009), *Polish Archaeological Activities in Egypt* (2013), other books and over 200 minor studies in several languages.

Krystian Leonard Chrzan[1], Stefan Stojałowski[2]

Societas Humboldtiana Polonorum (1)
West Pomeranian University of Technology Szczecin (2)

Prof. Aleksandra Krygier-Stojałowska, the first Polish female scholar of Alexander von Humboldt Foundation

Abstract: *Prof. Alexandra Krygier-Stojałowska got the Humboldt Foundation scholarship at Goethe University n Frankfurt in 1959 as the first Polish scientist after the WW II. She "opened the door" for over* ***1500*** *Polish scientists which followed her till today. She was the founder (1952) and the head of the Department of Cell Pathology (1983 – 1996), and had many significant positions at the Pomeranian Academy of Medicine and in scientific societies.*



Aleksandra Krygier-Stojałowska was born on October, 3 1923 in a village Ryczywół, Oborniki Wielkopolskie county. Her father Jan Krygier and mother Weronika Krygier *de domo* Kosmowska had a large farm. Aleksandra finished third class at Przemysław II Gymnasium and Lyceum in Rogoźno in 1939. After the World War II she graduated the Przemysław II Lyceum and begun to study at the Medical Faculty of Poznań University in 1946. However, she moved to Szczecin in 1951 to Pomeranian Academy of Medicine (PAM) where she graduated next year later and joined the team of Prof. Kazimierz Stojałowski at the Department of Pathalogical Anatomy of PAM. She initiated her research in the field of histopathology and got the degree of PhD for the thesis "Nucleic acids in some tumors of the peripheral nervous system". She has built a cytophotometer of own construction at that time which was used for many years in her laboratory. For the thesis "Cytochemical and cytophotometric investigations of fibroblast in cell culture" she got the degree DSc in 1962. The scientific title Associate Professor and title of Full Professor she received in 1972 and 1989, respectively. She was retired in 1994 but worked part-time until 2000.

She had many significant positions at the Pomeranian Academy of Medicine and in scientific societies. Aleksandra Krygier-Stojałowska was the founder (1952) and the head of the Department of Cell Pathology (1983 – 1996), director of the Institute of Pathology (1986-1993) and vice-rector for scientific affairs (1974-1981). She was a member of Polish Academy of Sciences PAN (Committee for Cell Pathophysiology) for many years, the Polish Society of Pathologists, Polish Histochemical and Cytochemical Society (Vice President or President in the period of 1976-1983, Honorary Member and the *Bene Meritus* title – man of merit).

The famous pathologist Prof. Walter Sandritter from Frankfurt am Main (Germany) visited Prof. Alexandra Krygier-Stojałowska in Szczecin in 1959. Thanks this contact she got the Humboldt Foundation Fellowship at Goethe University in Frankfurt in 1959 as the first Polish scientist after the World War II. She received also the scholarship in 1973 and worked with Prof. Walter Sandritter after his moving to the University of Freiburg, Institute of Pathology

(Ludwig-Ashoff-Haus). The cooperation with Prof. Sandritter was very important for her and her team and resulted in common papers e.g.:
Krygier A., Sandritter W., The influence of hydrogen ion concentrations and some other ions on metachromasia in staining mucopolysaccharides with toluidine blue. Acta Medica Polonia, 1961, 2, pp. 123-145.

Prof. Krygier-Stojałowska was a supervisor of 12 Ph.D. theses, her literary output consists of about 200 publications, (45 papers in the SCOPUS database), she also co-authored 3 academic books. She got four Minister of Health and Welfare Awards for her scientific achievements, the Knight's and Officer's Crosses of the Order of Polonia Restituta, the Gold Cross of Merit and the Medal of the National Education Commission.

In 1965 Aleksandra Krygier married Prof. Kazimierz Stojałowski, head of the Department of Pathological Anatomy and later *Doctor Honoris Causa* of Pomeranian Academy of Medicine. Their son Stefan was born in 1968. She died on November, 17, 2015 in Ryczywół and was buried there at the parish cemetery in the grave of Kosmowski and Stojałowski families.

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Associate Professor Krystian Leonard Chrzan

He was in military service in 1975-1977 and finished the professional experience at Wroclaw Electrical Section of Polish Railways for the Adjunct degree in 1978. He graduated from Wroclaw University of Technology in 1983 and joined the Institute of Electrical Engineering Fundamentals. His Ph.D. thesis was finished in 1987. He was awarded the Doctor of Science (D. Sc.) degree at the Electrotechnical Institute in Warsaw in 2013. He finished the professional experience at the Pelelectric Company in Wrocław from January to July 1990. He worked at Stuttgart University as the Alexander von Humboldt scholar (1988-1989), Technische Hochschule Zittau (Germany, 1991-1993) and Cardiff University (UK, 2004-2005). In the frame of different scholarships he worked also at high voltage laboratories in Stuttgart (1985, 1994, 1995, 1996, 1999, 2003), Dresden (1995), Mannheim (1996, 1997, 2002), University of Florida, Gainesville and Lightning Research Centre Camp Blending (2000), Prague (2001), Darmstadt (2002), Cottbus (2007), Stellenbosch, South Africa (2009), Bangalore, Indian Institute of Science (2011). He is the author of about 300 papers, Hirsch's Index HI = 9, 6 patents, a monography „High Voltage Surge Arresters" and 2 student scripts.

Giacomo de Angelis

Legnaro National Laboratories (LNL) of the Italian Institute for Nuclear Physics (INFN),
Italian AvH association

Exotic nuclei for physics, astrophysics and applications

Nuclear physics research is at the dawn of a new era. After the Big Bang and billions years of evolution, the universe has provided us around 200 nuclei. Based on the information from these nuclei, nuclear theory has been established in order to understand the structure of the nucleus. The steady progress over the past twenty years in the development of high intensity stable beams and of beams of radioactive isotopes has allowed to vastly expand the objectives of experimental nuclear research. It is also becoming possible to study in the laboratory a range of nuclear reactions that take place in exploding stars providing crucial information to understand how the chemical elements that we find on Earth were formed. With more than 2000 nuclei produced artificially and around 6000 expected to be produced in the facilities in operation or under construction in China, Europe, Japan and US, the conventional nuclear theory meet serious challenges. For example, the discovery of neutron halo leads to the re-examination of several assumptions widely used in the nuclear models. The disappearance and appearance of the magic number is presently leading to the re-examination of the shell model and also of the path of the nucleosynthesis in Universe. To achieve this ambitious goal one needs to study the characteristics of unstable (radioactive) nuclei through their decays and the various nuclear interactions. Such unstable nuclei have also a wide range of applications (medicine, climate changes etc.).

Giacomo de Angelis: University Degree in Physics - University of Naples 1982, PHD Germany 1986, National Institute of Nuclear Physics 1988, Humboldt Award (Bessel Award) 2001, Research Director (Full Professor) 2002, CERN Scientific Associate 2016, President of the Italian Humboldt Association 2015.

Marwan S. Mousa

Mu'tah University, Al-Karak, Jordan

Twenty two years (1997 – 2019) of Academic Cooperation, Networking and Partnership in changing communities

On January 2nd, 1997 the JCHF has emerged after a meeting at the Goethe Institute in Amman for the colleagues who obtained their Humboldt fellowship. Those colleagues were from Jordan, Palestine and Iraq.

After twenty two years, the few colleagues became 37 colleagues including an Iraqi Humboldtian scientist, two German scientists who came to Jordan on Feodor Lynen Research fellowships and they still collaborate with their Jordanian counterparts and their graduate students.

Members of the JCHF played a constructive role in the life of Jordan and contributed to various aspects of life in Jordan; especially towards higher Education. They occupied effective positions in the country; such as Deputy Prime Minister, Min. of Interior, and Higher Education & Scientific Research (MHE&SR), Sec. General of Assoc. of Arab Universities. Six members occupied the position of President of Universities; one is currently president of Private University in Kuwait, another is president of the largest technical Univ. in Jordan; a third is the president of the largest and eldest university in the north of Jordan. Two, were members of the Higher Education Council of the MHE&SR. Several others occupied and still occupying the position of Universities' Vice President, Deans of Faculties and Heads of Depts. at various Jordanian Universities. One member is in charge of TEMPUS and European Grants programs. Three members were awarded royal medals. A member obtained the Humboldt Reimer Lust Award. Two members served as Humboldt Ambassador scientists.

The JCHF organized a Colloquium in 2009 (under patronage of HM King Abdullah II) and four Int. Conf.s/ Humboldt Kollegs. The first Kolleg in Jordan was held in Amman from 4-6 March 2009. This was followed by Kollegs in 2011, 2014 and 2017.

Those Kollegs were patronized by HRH Princess Sumaya Bint el Hassan (President of the Royal Scientific Society), Prime Minister, Minister of Higher Education & Scientific Research.

Several workshops were also organized, jointly with German institutions like DAAD, Frirderich Naumann Foundation, AGYA, Berlin Brandenburg Academy for Sciences. These workshops dealt with topics like materials, water, Archaeology, Pharmacy, technical and vocational training, higher education, refugees, and networking.

Ten Universities and research institutions take part in the organization of these kollegs. Attendance averages about 100 International Scientists and two hundred local Professors, scientists and graduate students. A peer reviewed refereed proceedings has been published at various Jordanian Specialized and Int. Journals. A society for the Friends of Humboldt has been formed eight years ago with members are the prime target for applications to Humboldt Fellowships.

The JCHF holds very strong cooperation with other Humboldt Associations primarily with Italian Humboldt association, Maghreb-AvH Alumni Association, Egyptian Humboldt Association, Gaza Club of Humboldt Fellows, and the Alumni Club Societas Humboldtiana Polonorum. The JCHF has been a founding member of the Mediterranean AvH network.

The executive committee of the JCHF currently consists of: Prof. Dr. Marwan S. Mousa / Mu'tah University; President and Director of the Conferences and Workshops. Prof. Dr. Yaseen Al-Soud / Chairman of Science Committee of the Science Research support Fund, former Dean of Sciences and also Scientific Research Faculty / Al al-Bayt University (AABU); Vice

President of JCHF, Prof. Dr. Mohammad El-Khateeb / former Dean of Sciences / Jordan University of Science and Technology (JUST); Finance Officer of JCHF.

Prof. M. S. Mousa is a Materials Technology scientist, Prof. of Physics at Mu'tah University, Al-Karak, Jordan. He obtained his PhD from the Univ. of Aston in Birmingham on1984. Then, he established his research group with strong int. cooperation. He has been awared several prizes and int. fellowships such as: Max-Planck fellowship (1988), Fulbright Post-Doctoral Research Fellowships: (1991/1992) at Stanford Research Inst., San Francisco and (1999/2000) at Florida Int. Univ., Miami, FL., Alexander von Humboldt Stiftung (AvH) Fellowship (1992-1993), Deutscher Akademischer Austauschdienst (DAAD) Post-Doc. Fellowship (1997), King Hussein Medal (1998), Post-Doc. Res. Award at ORNL, Oak Ridge TN, USA (2000/2001), Sci. Res. at Imago Sci. Instruments Madison, Wi, USA (2001), AvH Res. Award/Fellowship with accompanying research graduate student (2010) and finally he was appointed as "Humboldt Ambassador Scientist" to Jordan on 2010 for six years). He has a patent; U.S. Provisional Patent Application Serial: 60/220, 862 (26 July 2000) and Comissioner of patents issued patent for joint invention with Prof. Thomas F. Kelly, "Resin-coated carbon-fiber cathodes: superior electron source" (5 Feb. 2001). He already published 104 research papers in Int. Journals. He is a member of several scientific intitutions such as Institute of Physics (UK), European Physical Society (Switzerland), International Field Emission Society (IFES), President elect of the Jordanian Physics Society, Senior member of the IEEE, Elected member of inaugural class of Int. Field Emission Society (IFES) 2015, and "IFES Fellow" title (elected) of the IFES on June 16th, 2016 at Gyeongjo, South Korea which has been awarded: *"For recognition as an eminent and outstanding scientist in the field of field emission, field ionization, and related phenomena"*. Elected as Academician of the Euro Mediterranean Academy of Arts and Sciences (EMAAS) in 2019.

Tešić Miloš[1], Martinov Milan[1], Djatkov Djordje[1], Babić Mirko[2]

Department for Biosystems Engng, University of Novi Sad, Serbia (1)
Department for Agricultural Engng, University of Novi Sad, Serbia (2)

Results and Knowledge of Research Activities in International Research Projects in Novi Sad, Serbia and Beneficiary Countries

The process of European integrations, an integral part of globalization and geopolitical redefinition of the world system, has been slow in Serbia and leaves the country at the outskirts of scientific events. Unlike economic and political approaches, a sociological approach should include a critical consideration not only of a more efficient system, but also wider issues of reformation and change within the scientific system and its implementation in other countries. Such consideration should additionally include the issue of how researchers perceive and understand the processes and the state of scientific research, or how they can affect such processes.

Novi Sad is the second largest city in Serbia with the population of 400,000. The Autonomous Province of Vojvodina, with its capital city Novi Sad, has the population of 2.4 million. University of Novi Sad was established in 1960 and today it has 55,000 students. Two organizational units that research and teach agricultural technical engineering have 35 teachers and associates, 12 of which are involved in research activities and teaching dealt with in this paper.

The initial encouragement for the development of science and teaching in the field of agricultural technical engineering was a ten-month specialized training at the Institute for Agricultural Engineering in Stuttgart-Hohenheim, awarded in 1968 to the first author of this paper under DAAD Scholarship. A two-year research fellowship at the University of Göttingen was then awarded by Humboldt Foundation, which was followed by several research grants and conferences. At that time the contacts with researchers in Germany were made, and since then 9 associates working on agricultural technical engineering in Novi Sad have used them for 40 years to collaborate in over 20 international projects.

After 2000, Serbia gradually started being included in the educational and scientific system of the European Union. There were also many mobility programs with the USA (USDA). The activities regarding the improvement of teaching within the EU project Tempus significantly motivated younger and middle-aged teachers. This was followed by Instrument for Pre-Accession Assistance (IPA) projects, Erasmus projects and finally the EU framework research projects. Several facilities and installations were set up under these EU-funded projects at institutes, e.g. for fruit drying, tractor testing, sprayer testing, biodiesel laboratory and biogas laboratory.

Faculty of Agriculture, University of Novi Sad has organized many diverse scientific and professional conferences aiming at the transfer of research and knowledge into practice. Especially important are a series of international conferences on sustainable postharvest and food technology (INOPTEP) which are a successor of traditional national conferences on processing and energy in agriculture (PTEP). These biennial international conferences have been regularly organized for the past decade. The last such conference was held in April 2019, with 143 papers (72 from foreign authors) with 170 participants (50 foreigners) from 22 countries of the world.

Research results show that Serbia undoubtedly has a huge potential for biomass as a renewable energy source. This is especially true for harvest residues, i.e. agricultural biomass which will play a significant role as a renewable source of energy and materials in Serbia. International projects, that Chair of Bio-System Engineering at the Faculty of Technical Sciences, University of Novi Sad has participated in so far, have had elements of research, but the final goal was the implementation of results into practice, which was beneficial. The funding primarily came from the EU sources and bilateral cooperation mostly with institutes in Germany. The advantage of such projects was also monitoring and inclusion in research and development trends with the leading European institutions in the field of biomass, with which the Chair of Bio-System Engineering has established cooperation. The disadvantage of such projects was the fact that constructing the facility or implementing the technology was the focus of the project outcome, and the equipment supplier came from the project funding country or the EU; however, there was no possibility to conceive the project according to the needs and conditions in Serbia or to include locally-available capacities (experts) into the project, or to develop the existing capacities. Another drawback was

demanding paperwork and financial justification of the used funds, which seemed more important to the financing institution than the essence of the project and results gained, considering the sheer volume of the paperwork and requests for reporting. The list of projects will be provided upon request to the authors of this paper.

After 2000, we started working on international projects within the German program Stability Pact for South Eastern Europe.

- "Advanced education in agricultural engineering for South-eastern Europe", 2001-2006, funded by DAAD, this was a low-budget project which encompassed partners from region countries and immediate neighbouring countries.
- "Independent Expert for Project Evaluation" Sixth and Seventh Framework Programmes (FP6 and FP7), 2005-2010
- "Danube INCO NET 2015-2016", FP7 Subcontract for the project "S3Biom"
- "Proposal for the Method for Assessment of Biogas Potentials Generated for Waste - Case Study Serbia", 2015, with Join Research Center JRC, Ispra, Italy
- "Establishing the cross-border development of biogas industry via joint potentials, education, research and innovation" 2011-2013.
- Interreg projects, Bilateral Projects between Germany and Serbia

Our experiences were generally positive, although we have many remarks and suggestions for the improvement of projects that we shall present at the Congress in Szczecin.

Tešić Miloš

Born in 1941. He graduated at the University of Novi Sad, Faculty of Mechanical Engineering, Department of Mechanization, and received his Master's degree in 1974 at the same Faculty. He received his PhD from the University Georg August of Göttingen. He worked in a construction company Neimar from 1966 to 1968. He started his academic career in 1969 and remained at the University of Novi Sad, Faculties of Agriculture and Technical Sciences until retirement in 2009. His academic field was agricultural mechanical engineering and he went through all academic titles from a teaching assistant to a full professor. He served as the Head of Agricultural Mechanical Engineering Department for two decades. He is a corresponding member of Vojvodina Academy of Sciences and Arts since 2004, and a full member since 2013. He also served as the Secretary General of the same Academy for ten years.

He published circa 300 papers in national and international journals, mainly from the areas of harvesting machines and renewable energy sources in agriculture. He co-authored around 40 papers with the colleagues from Germany, where he worked in various institutes for four years. He co-authored 7 technical solutions for machines that have been applied in practice, and 2 approved patents. He mentored 4 doctoral dissertations and served as a member in several for PhD dissertation defense committees at the Universities of Novi Sad, Zagreb, Ljubljana and Munich. He founded and presided over Alexander von Humboldt – DAAD Club at the University of Novi Sad.

Erhabor Idemudia

North-West University, Faculty of Humanities, South Africa
Jacobs University, Bremen, Germany

Globalization, Migration and the Creation of African refuges in Europe

Abstract: Globalization- an acronym for liberalization of international trade and the revolution in communication is arguably one of the most important factors generating increased levels of international migration because trade liberalization, according to statistics has placed developing economies under economic pressures, often generating increased unemployment, reduced social spending and a decline in living standards due to the impact of the Structural Adjustment programme (SAP) the hallmarks of many economies of the continent because of deregulated foreign investment, liberalised imports and removal of currency controls and in consequences have undermined the internal and national productive capacities, social security and democratic integrity of these countries. These pressures no doubt generate political insecurity by creating grievances over limited or inequitably distributed resources, or frustration at the declining capacity of states to provide socio-economic security thereby leading to mass migration. Globalization, they say, has not only increased 'push factors' inducing emigration, but has expanded possibilities for the flow of information, communication and movement between states and also increased the demand for both high and low skilled workers. In fact, the media have described cross-border international migration as 'regionalization and globalization' of migration and as a result, many in Africa believe that life in Europe and other western countries is blissful, thinking they are lands flowing with milk, honey and full of beds of roses. As a result, they travel in droves using unsafe means such as trolleys, dinghies and cargo ships and in some cases, many trek through the valleys and shadows of death of the hot Sahara Desert. In the process, many of them die resulting in world headlines. Those who succeed on arrival, find that the land that was supposed to flow with 'life' actually flow with hardships, police harassments, racism, imprisonment, daily apprehension of deportation and other hosts of hostile life situations. To keep 'body and soul' together, some of them engage in drug peddling and distribution, prostitution, domestic thefts and therefore end in prisons while some engage in petty and menial jobs. This paper will focus on the psychology of the African refugee in Europe- challenges before, during and after migration and the responses of Africans in novel cultural environments, the core assumption being that culture contact is inherently stressful.

Brief Bio of Prof ES Idemudia: *Formerly the Head and Subject Chair, Department of Psychology, Prof (Dr). Erhabor Idemudia is a full professor of Research & Clinical Psychology at the Faculty of the Human and Social Sciences, North-West University, (MC) South Africa.* He has a BSc with honours (Psychology), MSc and PhD in Clinical Psychology from the University of Ibadan, Nigeria. He is an NRF Rated Established Researcher/Scientist in South Africa and a 2015/2016 recipient of the Georg-Forster Life-Time Achievement Award in Research for senior professors by the Alexander von Humboldt Foundation, Germany. He is also an Alexander Humboldt Fellow and Alumni, Germany (since 2003), Leventis Fellow, UK, Salzburg Fellow, Austria, etc. He is currently the General Secretary and Registrar of Membership-World Council for

Psychotherapy (African Chapter) and member of the Board of the World council for Psychotherapy. He is an Associate Editor of the Journal of Child and Adolescent Mental Health, South Africa amongst others and serves as external examiners to several universities in Africa, Europe and North America. He has taught and done research at the University of Ibadan, Nigeria, University of London, UK, Jacobs University, Bremen, Germany, the University of Namibia, Windhoek, University of Limpopo, South Africa and North-West university, South Africa. Prof Idemudia, has over 200 publications in peer reviewed journals and books. Prof Idemudia is a Fellow of Nigerian Psychology Association and Fellow of World Council for Psychotherapy. He is the author (with Prof. Boehnke, Germany) of “I’m an alien in Deutschland: A quantitative mental health case study of African Immigrants in Germany (with an epilogue by John W. Berry)”.

Aleksander Kiklewicz

University of Warmia and Mazury in Olsztyn

Die Gesichter der Globalisierung in den Geisteswissenschaften

Die Globalisierung in der Wissenschaft drückt sich in erster Linie darin aus, dass die neuen Plattformen für den Austausch von wissenschaftlichem Informationsaustausch auf allgemeiner, insbesondere internationaler Ebene entstehen. Internet-Technologien, die die neuen Instrumente für die Suche nach Informationsquellen, den Zugang zu Publikationen, die Verbreitung von Wissen, die Einrichtung von Diskussionsgruppen und die Unterstützung von Forschungsbereichen (einschließlich Foren, Austausch von Publikationen, Empfehlungen usw.) ermöglichen, tragen wesentlich dazu bei.

Der zweite Aspekt der Globalisierung ist die Intensivierung des Phänomens des Wissenstransfers, insbesondere der dynamische Austausch der neuesten wissenschaftlichen Errungenschaften. Die Übertragung ist nicht auf eine wissenschaftliche Disziplin beschränkt. Heutzutage ist eine Tendenz zu interdisziplinärer Forschung an der Grenze zwischen kognitiver Psychologie, Anthropologie, Kulturologie und Linguistik zu beobachten. Dieser Trend hat seine positiven und negativen Aspekte. Einerseits ermöglicht das Studium des Objekts in mehreren Aspekten, z. B. strukturell und funktional, unter Berücksichtigung der natürlichen Gegebenheiten seiner Existenz, seiner Motivation und seiner Implikationen, die Möglichkeit einer authentischeren Modellierung des Objekts, seine Darstellung als funktionales System. Andererseits ist die Übertragung einiger Postulate der Psychologie oder Anthropologie in den Bereich der Sprach- und Textforschung zu oberflächlich und radikal, und die Veredelung der kognitiven oder kulturellen Funktion der Sprache grenzt ihre anderen Funktionen und Eigenschaften ungerechtfertigt an. Der Nebeneffekt der Globalisierung in den slawischen Ländern ist eine ungerechtfertigte Verwestlichung, die insbesondere im Bereich der wissenschaftlichen Terminologie spürbar ist.

Prof. Dr. Aleksander Kiklewicz (1957) graduated from the Belarusian State University (1980). Doctor (1984), habilitated doctor (1995), professor (2006). He works at the Institute of Journalism and Communication at the University of Warmia and Mazury in Olsztyn (Poland). Director of the Research Center of Eastern Europe. Editor-in-chief of the journal “Eastern Europe Review”, and co-editor of the monograph series: “Studies in epistemology and philosophy of language” and “Studies in the theory of communication and media communication”. He is specialized in the field of general linguistics, theory and philosophy of language, stylistics and discourse linguistics, pragmalinguistics, semiotics of the language communication, cognitive semantics, functional grammar, semantical syntax, psycholinguistics, contrastive linguistics, Slavonic studies. Author of over 400 scientific papers.

Ewa Wojno-Owczarska

University of Warsaw

Naomi Klein's Critique of Globalization

In times of problems leading to a "metacrisis" (Claus Leggewie / Harald Welzer) it seems imperative for scientists and writers to deal with the numerous aspects of the course of globalization. Many of their works depict a kaleidoscope of symptoms referring to the global crises of the twenty-first century by pointing out the consequences of the globalization process we experience in the economic, social, and cultural spheres.

Some authors underline the global scale of the social and political problems of our times by choosing migrants as the protagonists of their novels. But contemporary writing does not only concentrate on the suffering of political refugees, migration is also portrayed as the result of ecological disasters and climate change, from Doris Lessing´s *Mara and Dann* (1999) to Cormac McCarthy´s *The Road* (2006).

World literature in the twenty-first century shows globalization as a phenomenon with long-term impact on future generations, resulting in the loss of their cultural roots. Moreover, many authors focus their attention on the influence of economic globalization on the individual life: on the one hand, there is the insecure situation of average people terrified by the economic processes of the "virtual economy" (Jean Baudrillard) and by the interference of global players; on the other hand, small businesses try to profit from the new opportunities of the global economy, but often fail to manage the difficult conditions of the free market. Furthermore, many authors see flexibility (as characterized by Richard Sennett in *The Corrosion of Character*) as the essential human quality needed to survive the strong competition of the neoliberal job market.

Based on the work of the US-American author Naomi Klein, my paper aims to present examples of the far-reaching consequences of globalization. I intend to analyze Klein´s publication *No Logo* (2000), which focuses on economic as well as on cultural processes. Klein criticizes the exploitation of the poorest world regions, the deterioration of working conditions, the violation of human rights, and, in particular, the negative impact of cultural globalization on young people. In an age marked by such severe global crises, international cooperation is deemed indispensable.

Ewa Wojno-Owczarska, PhD., leader of the projects *Topographien der Globalisierung / Topographies of Globalization* and *Globalisierungsdiskurse in Literatur und Film des 20. und 21. Jahrhunderts* (cooperation with Humboldt-Universität zu Berlin and ELTE Budapest)

Last publications

Global Crises and Twenty-First-Century World Literature, edited by Hansong Dan and Ewa Wojno-Owczarska. The Pennsylvania State University Press (2018)

Literarische Katastrophendiskurse im 20. und 21. Jahrhundert, edited by Ewa Wojno-Owczarska. Peter Lang: Berlin (2019)

Globalisierungsdiskurse in Literatur und Film des 20. und 21. Jahrhunderts, edited by Ulrike Stamm and Ewa Wojno-Owczarska. Peter Lang: Berlin (2019)

Theophilus, Clavell Davies

Department of Geosciences, University of Lagos, Akoka/Yaba, Lagos, Nigeria

Application of professional ethics in geoscience education in Africa

Interest in professional ethics in the geosciences, including geological mapping, mineral and oil exploration and exploitation, and geophysical surveys, has grown dramatically in the last decade; and recent research has confirmed that the geoscience profession considers ethics to be of prime importance for all its practitioners. The ethical principles to be observed in conducting geoscientific fieldwork are encapsulated in the ethical policy that applies to all professional practice in science, but here, we develop codes to reflect the specific needs of geoscience departments throughout Africa. An overview of the current thinking on scientific integrity and ethics in Africa is presented from academic and professional perspectives, with particular attention to the geosciences and their fieldwork components. The guidelines address common issues such as gender relations, fieldwork participants with special needs and disability, and geoconservation.

Keywords: Geoethics; Fieldwork; Gender; Disability; Addressing Issues; Africa

Professor **Theophilus Clavell Davies** is a chartered geologist who currently holds the position of visiting professor of medical geology at the University of Lagos in Nigeria. His teaching and research activities encompass three main themes: combating environmental health impacts of mining in Africa; isolating and obviating the effects of climate change on human health in African megacities, and improvement of ethical standards in African geoscience practice. He is the founder of *Medical Geology in Africa*, the new and exciting discipline that has, within a relatively short time, contributed so immensely towards the improvement of diagnoses and therapies for many of the environmental diseases that have been plaguing the African people, especially residents in the neighborhoods of major mining centers.

His work includes both field studies and laboratory studies that have led to more than 200 publications and editorship of six special issues of high-impact journals. Before joining the University of Lagos, Professor Davies was a Research Professor at the Faculty of Natural Sciences at the Mangosuthu University of Technology in South Africa and latterly a visiting professor at the University of Nigeria at Nsukka. He is the recipient of several distinguished fellowships and research awards, including the prestigious Alexander von Humboldt Foundation Fellowship of Germany and the 2014 Nigerian Mining and Geosciences Society's Shell Petroleum Award. He holds or has held executive positions in a number of international geoscientific steering committees including Member of the Governing Council and Board of Trustees of the Geological Society of London, U.K. (1996 - 2000); Member of the Scientific Board of the UNESCO International Centre for Global-Scale Geochemistry (2016 - 2021), Regional Councillor for Africa of the Association of Applied Geochemists (2006 - Present) and Councillor for Geoscience of the International Medical Geology Association (2011 - 2015).

Christa Rautenbach

North-West University, Potchefstroom, South Africa

Legal Science in the Age of Globalization: the Influence of German Precedent on South African Constitutional Court Judges

Introduction

Judges involved in constitutional adjudication, often engage in comparative analyses of foreign cases. The judges of South Africa's Constitutional Court do so too. It is generally believed that the interpretation clause in the Constitution has been instrumental for them doing so. Section 39(1)(c) states that the judicial interpreter *may* consider foreign law when interpreting the Bill of Rights. Since its establishment in 1994, this is exactly what the Constitutional Court judges have been doing. Until the end of 2017, they have cited foreign cases at least 2,841 times. German case law is the 4th most cited jurisdiction. From 1995 to 2011, German cases have been cited 116 times. An analysis of these cases provides interesting results regarding the (possible) influence of German precedent on post-apartheid constitutional law in South Africa.

The main aim of this contribution is to analyse the readiness of the South African Constitutional Court to consider German case law in its reasoning, thus contributing to global discussions between constitutional court judges.

German Precedent in the South African Court

In its first year the South African Constitutional Court delivered two judgements that cited German case law 45 times, viz.: *Ferreira v Levin; Vryenhoek v Powell* 1996 (1) SA 984 (CC) and *S v Makwanyane* 1995 3 SA 391 (CC).

In 1996, Justice Kentridge in *Du Plessis v De Klerk* 1996 3 SA 850 (CC) focused on the analogies between German and South African constitutional law which he regarded a good enough reason to follow the German approach of direct vertical application. As he explained: Against this background, particularly having regard to the explicit wording of Art 1(3) of the GBL [German Basic Law], it behoves us to consider carefully why, on textual, teleological and policy grounds, German constitutional jurisprudence has rejected the direct application of the basic rights in the GBL to private legal relationships. In total, this case had 13 German case law citations.

There is no single explanation for the considerable German case law citations in the South African Constitutional law but number of events probably contributed to this phenomenon, namely:

- Regular academic exchanges between South African and German legal scholars, especially those scholars who were eventually involved in the Constitution-making process.
- South African scholars writing about various aspects of the South African transition to democracy acknowledged German sources.
- In the process of actual constitution making, both during the negotiations and by including similar provisions of German Basic Law in the 1993 Constitution. A number of provisions of German origin somehow found their way into the South African constitutional text.
- South African legal scholars received funding from German institutions such as the Alexander von Humboldt Foundations to conduct legal research in Germany amid increasing academic isolation elsewhere. This trend continues, with judges such as Justice Laurie Ackermann who visited the Max Planck Institute in Heidelberg regularly.
- The involvement of German technical advisors during the making of the South African Constitution.
- The ANC's main advisor was a prominent member of the German SPD, the social-democratic ANC's kindred soul in Germany.
- The constitutional significance in the German transition to full democracy, the *Wiedervereinigung*, set the example for the first step in the South African transition to a Bill of Rights and the first democratic elections.

These are only some of the reasons why the Constitutional Court judges are willing to consider German precedent in spite of the fact that they are published in the German language, which is a foreign language to most of the judges. Although German jurisprudence is inaccessible to most South African judges as a

result of the fact that they are written in German, the availability of English textbooks on German law and other scholarly works, and the accessibility of the Internet have contributed to the seepage of German precedent into the Constitutional Court's jurisprudence.

Conclusion

Considering the fact that all of the judges who used to cite German precedent, with the exception of Justice Van der Westhuizen, have now either retired or passed away, it is doubtful that the trend to consider German case law will continue. As a matter of fact, the statistics already show a decline in numbers. From 2008 to 2010 there were no German case citations and in 2011 only two, coming from Justice Van der Westhuizen. Even Kentridge is mindful of the fact that comparison with German precedent is likely to decline in future when he says: "Now that he has retired [Justice Ackermann], I wonder whether we shall continue to see German material in the judgments of the [Constitutional] Court."

If a court follows foreign law, the latter of course has an effect in and on the legal system within and according to which such a court functions. Though foreign law is not binding on South African courts, it can still contribute to shaping and developing South African law – constitutional and human-rights law in particular. Everything depends on the manner in which a court has recourse to foreign law, and what it does with the information it gleans from such law. The importance of a properly developed Comparative Constitutional Jurisprudence in this context can hardly be overstated. Let us hope that the flame of comparitivism will keep on burning in South Africa, kindled by similar flames throughout the world – and not the least in Germany.

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Christa Rautenbach has more than 30 years of experience as a legal scientist. She has the degrees B Iuris (cum laude), LLB (cum laude), LLM and LLD. She was a public prosecutor in the employ of the Department of Justice before she became an academic scholar at the faculty of law, North-West University (Potchefstroom) where she currently holds an appointment as Full Professor. She also holds a number of other positions such as the honorary treasurer of the Society of Law Teachers of Southern Africa, secretary of Juris Diversitas and Ambassador Scientist of the Alexander von Humboldt-Foundation. In addition, she serves on the Board of the Commission on Legal Pluralism and on the Advisory Board of the African-German Network of Excellence in Science (AGNES).

She has published extensively on subjects dealing with legal pluralism, customary law, mixed jurisdictions, cultural diversity, judicial comparativism and the law of succession. She is co-editor and co-author of two leading books in South Africa, namely *Introduction to Legal Pluralism in South Africa* published by LexisNexis (4th ed) and *The Law of Succession in South Africa published* by OUP (2nd ed). She is the editor-in-chief of the peer reviewed, open-access electronic law journal – the Potchefstroom Electronic Law Journal, accessible at https://journals.assaf.org.za/per/index. She has been appointed as an advisory committee member in the South African Law Reform Commission: Project 144. The project is titled "Single Marriage Statute Including Measures against Sham Marriages" in 2018. Also see https://orcid.org/0000-0001-6641-0123.

Jiajia YU

KoGuan Law School of Shanghai Jiao Tong University, China

The Protection of Copyright by Criminal Law in the Digital Era – Based on the Observation of Chinese Law

Entering the 21st century, cyberization and digitalization penetrates every aspect of social life and brings great threats to copyrights. Nowadays, piracy can be done without difficulty due to wide-ranging usage of software for fast scanning that is set up in computers or smartphones. Pirated works stored in digital format have almost the same quality as original works and can be disseminated instantaneously over the internet on a large scale. New technologies, such as peer-to-peer file sharing and data compression, enable third parties easily to access digitalized content of copyrighted works stored on a virtual space online. As a result of the rapid development of those digital and internet technologies, copyright infringement has become easier and its scale uncontrollable. What's more, new types of illegal acts of infringing on digitalized contents have come into being.

Against this background the activities of making laws or rules to protect digitalized contents with copyright become very active on the global scale. And especially, the level of the protection by criminal law reflects the level of a nation's fostering the creation. In the world, the Art 61 of the Agreement on Trade-Related Aspects of Intellectual Property Rights (the abbreviation form is TRIPs) has set the basic standard of criminalizing acts against copyright for all member countries of the World Trade Organization. China is one of those member countries and therefore its protection of copyright by criminal law is unavoidable judged according to this standard.

This research aims to analyses the measures taken by rule makers in China for responding to the new types of actions against copyright in the digital era. The analyses are based on judicial explanations and their application in specific cases. In the end, the research refers to the fact that the level of protecting the copyright of digitalized contents by China's criminal law has not only reached the level required by TRIPs but also been higher than that especially in the case of punishing acts of infringing on online games' copyrights and acts of making digitalized contents available on the internet without permission.

Jiajia YU: Associate Professor at KoGuan Law School of Shanghai Jiao Tong University in China. She is specialized in criminal law and cybercrime. **Education Background:** Ph.D Jur.(magna cum laude) und LLM from the University of Tokyo in Japan(Apr. 2008-Jul. 2013); LLM from Peking University in China(Sept.2006-Jul.2008). **Research Experiences:** Alexander von Humboldt Foundation Research Fellow in Germany(since Oct. 2018); Invited Researcher at Waseda Institute of the Policy of Social Safety in Japan (since Nov. 2017); Collaborator on the comparative law research of Revista Penal in Spain(since Sept. 2015); Visiting Scholar at Law School of the University of Washington in America(Jul.-Sept. 2015); Scholarship Holder at Max Planck Institute for Foreign and International Criminal Law in Germany (Jul.-Oct. 2010 & Jul.-Sept. 2017); Japan Society for the Promotion of Science Research Fellow in Japan (Apr. 2012-Mar. 2014). **Publications:** Two books respectively published in Japanese and in Chinese; One Book translated *from Japanese to Chinese; and Papers published in Chinese, Japanese, English or Spanish.*

Máté Szabó

Eötvös Loránd University, Faculty of Law, Institute of Political Science, Hungary

1968 in Hungary-half of a century have passed

For the countries of the former "Eastern bloc", however, the modernization and democratization shock is not primarily the result of 1968. On the contrary 1968 is the end of the alternative experiences and a start of an era of stagnation. The change of regime, the democratization and the liberation of civil society and the movement sector as well as the protest culture succeeded in Eastern Europe in 1989.

At the fiftieth anniversary, a new series of debates will emerge on the global and the European level, which will be influenced and influenced by both the "here and now", the state of the Zeitgeist in 2018, the social and political constellations of today, and especially what role the movements, the protests and the civil society play in the different regions and territories of the globe.

The protest tradition we have in Hungary before 1989 is the one of the protest of younger, urban, professional ,white collar workers, especially of students, artists, scientists, clerks, social workers, educators, the “dissent”, “opposition”. This social structure allowed some identification with the Western tradition of 1968, without its Marxist, or Utopian Socialist character.

The situation 1968 in Hungary was different very much to the countries of the West with upheavals and turbulences, and the countries of the East where mobilisations and elite changes occurred as Poland, Czechoslovakia, China and Romania/Yugoslavia. Hungarian intellectuals and artists, especially their younger, Western-oriented groupings were following the conflicts and fights in abroad.

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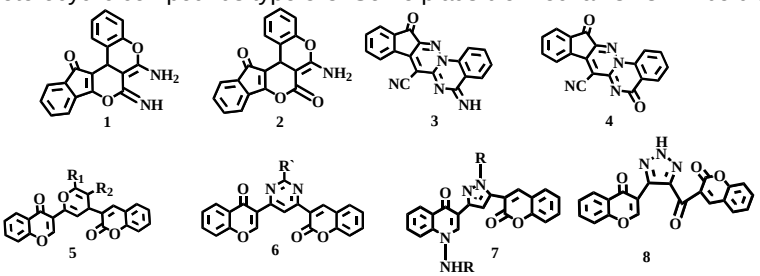
Máté Szabó (1956) is a professor of political science of the University Eötvös Loránd, Faculty of State and Law, Institute of the Political Science, Budapest, Hungary. He was a research fellow of the in Germany on many universities He is specialized in civil society, social movements and political protest and theory of law , politics and human rights as well. He published more than 300 scientific contribution in Hungarian, English and German.

Abdelrazek, Fathy M.

Chemistry Department, Faculty of science, Cairo University, Giza 12613, Egypt

Studies of New Biologically Active Heterocyclic Compounds

Heterocyclic compounds generally manifests marked biological and pharmaceutical activities as calcium channel blockers, anti-congestive heart failure agents, anti HIV-1 reverse transcriptase agents and antagonists of P2 receptors for neurotransmitters. In continuation with our previous work in this area [1-5], we report in the present presentation the synthesis of some novel pentacycline heterocyclic analogues type 1-4 and of some chromonyl-coumarinyl substituted heterocyclic compounds type 5-8. Some plausible mechanisms will be discussed.



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Prof. Dr. Fathy M. Abdelrazek (1949) has been graduated at the Faculty of Science, Cairo University, (Egypt) in 1971 and got his Ph. D. (Org. Chem.) at the Faculty of Chemistry, Moscow State University (Russia) March 1981. He has been promoted to full Professor of Organic Chemistry at the Faculty of Science, Cairo University 1991. He is specialized in the synthesis of heterocyclic organic compounds of biological, medicinal and/or pharmaceutical interests. He is a Humboldt fellow since 1987. He has obtained Cairo University prize of superiority in 2006. He has supervised more than 40 master and doctoral theses. He served as a referee for many international organizations and scientific journals. He is a member of the Permanent Scientific Committee for Promotion of Egyptian University's staff members (Organic Chemistry). He has published >110 publications in renowned scientific journals all in heterocyclic synthesis.

Yaseen A. Al-Soud[1,*] and Mohamed R. Aouad[2]

[1*]Department of Chemistry, Faculty of science, Al al-Bayt University, Al-Mafraq, Jordan
[2]Department of Chemistry, Faculty of Science, Taibah University, Al-Madinah Al-Munawarah, Saudi Arabia

Recent Applications of Triazoles in Medicinal Chemistry

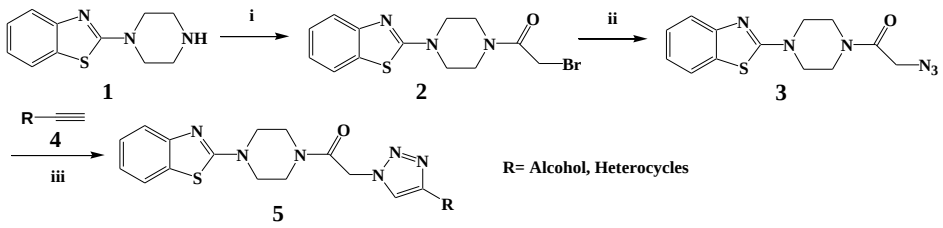
Abstract: *A library of novel regioselective 1,4-di and 1,4,5-trisubstituted-1,2,3-triazole based benzothiazole-piperazine conjugates were designed and synthesized using the click synthesis approach in the presence and absence of the Cu(I) catalyst. Some of these 1,2,3-triazole hybrids possess in their structures different heterocyclic scaffold including 1,2,4-triazole, benzothiazole, isatin and/or benzimidazole. The newly designed 1,2,3-triazole hybrids were assessed for their antiproliferative inhibition potency against four selected human cancer cell lines (MCF7, T47D, HCT116 and Caco2). The majority of the synthesized compounds demonstrated moderate to potent activity against all the cancer cell lines examined. Further, we have established a structure activity relationship with respect to the in silico analysis of ADME (adsorption, distribution, metabolism and excretion) analysis and found good agreement with in vitro activity.*

Introduction

Nitrogen containing heterocycles comprising of triazoles, benzothiazoles, benzimidazoles, indoles etc. constitute an important scaffold in biological science and medicinal chemistry, and has fascinating, applications in drug discovery and development. In particular, the synthesis of triazoles has attracted considerable attention during the last years. Several potent pharmacological properties such as anti-bacterial, antioxidant, anticancer, and antitubecular of 1,2,3-triazole derivatives have been reported. Some clinically and commercially approved drugs including Carboxyamidotriazole, Tazobactam, and Cifatrizine were found to possess the 1,2,3-triazole core in their structure. In continuation of our research on the synthesis and biological evaluation of benzothiazoles and 1,2,3-triazoles, we here report the click synthesis and antiproliferative evaluation of new series of benzothiazolepiperazine-1,2,3-triazole hybrids incorporating different functionalities and/or heterocyclic moieties on the 1,2,3-triazole ring. [1-2].

Main theses

The synthetic protocols used for the synthesis of the desired bioactive compounds have been depicted in Schemes 1. The precursor 2-azido-1-(4-(benzo[d]thiazol-2-yl)piperazin-1-yl)ethanone **3** required for the 1,3-dipolar cycloaddition reaction has been synthesized via, first base assisted acylation of 2-(piperazin-1-yl)benzo[d]thiazole **1** with bromoacetyl bromide, to afford the bromoacetylpiperazine intermediate **2**, which upon treatment with sodium azide furnished the targeted azide **3**. 1,3-dipolar cycloaddition reaction of the synthesized azide 3 with alkynes resulted of novel benzothiazole-piperazine-1,2,3-triazole hybrids **5**.



Scheme 1. ***Reagents and conditions:*** *i*. $BrCH_2CuBr$, DCM, Et_3N; *ii*. NaN_3, acetone:water ; *iii*. $CuSO_4$, Na-ascorbate, DMSO:H_2O.

Conclusion

Novel 4,5-diester-1,2,3-triazoles were synthesized using an efficient and quick green free solvent click synthesis in the absence of the copper catalyst. The synthesized compounds were evaluated against four different human cancer cell lines representing breast and colon cancers. Majority of the hybrid molecules displayed substantial antiproliferative activity. Among them, compound **5b** ($R=(CH_2)_3OH$) exhibited the most potent antiproliferative activity against all examined cancer lines.

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Prof. Dr. Yaseen A. Al-Soud (1967), got his Ph.D. in Organic Chemistry from Konstanz University, Germany 1998 and both M.Sc. and B.Sc. in Chemistry from Jordan University, 1992 and 1985 respectively. He held the following administrative jobs. Dean/faculty of Science, Dean/Academic Research, vice Dean/Faculty of Science, Chairman/Chemistry Department. Prof. Al-Soud publish so far about 75 publications on International Journals and attend more than 45 conferences. He served in the pure-Sciences Committee Scientific Research Fund (Ministry of higher Education and Academic Research), Editorial Board Member of Jordan Journal of Chemistry, Editor-in Chief of ALMANARAH Journal for research and studies published by Deanship of Academic Research (Al al-Bayt University). Higher Research Committee of Al al-Bayt University. He got the following awards: DAAD Scholarship/Germany. Abdul-Hamid Showman Award for Young- Arab Researchers, Alexander von Humboldt Fellowship.

Dénes Lóczy, Marietta Rezsek and József Dezső

Department of Physical and Environmental Geography, University of Pécs,
7624 Pécs, Ifjúság útja 6. Hungary

Crop diversification for sustainable farming in Hungary

Monocropping is a global environmental problem, which can be solved by crop diversification. The impact of crop diversification on the provision of ecosystem services can vary with the pedoclimatic regions. The globalization of environmental science means that useful practices can be imported not only from European countries, but also North American and Australian farming experiences can be utilized. The hypothesis is that if monocropping is replaced by diversified crops, there would be detectable improvement in soil properties even in the short term. There are many possible ways of introducing diversified cropping systems: in the case of horticulture, for instance, cereal intercropping could be an alternative, while in vineyards the grassing of inter-row alleys will provide environmental benefits. The study areas of the Hungarian partners, the Gere Attila Winery in Villány (loess-covered foothills) and the Nedel-Market Ltd. (engaged in vegetable and fruit production in a blown-sand region) in Jakabszállás, are eminent in environmentally low-impact and sustainable practices, present contrasted environments for the evaluation of alternative cropping solutions. Their efficiency is judged from the results of the analyses of a wide range of soil properties. The geographical aspects of the project include the opportunities of raising the level of ecosystem services (soil erosion, prevention of contamination and soil structure deterioration, enhancing biodiversity and carbon sequestration etc.) and the extension of plot observations to microregion scale. Here the first results of research in both study areas are presented. The globalization aspect means that results are to some extent comparable with those from other continents.
Authors are grateful for the European Commission for funding the investigation in the framework of the Horizon 2020 Programme Diverfarming project (no. 728003).

Dénes Lóczy (PhD) is full professor in Geography. He did his CSc. (PhD.) dissertation in agroecological zoning by computer method and his DSc thesis on the hydromorphology and landscape ecology of the Kapos River (Hungary). He participated in research projects of the Hungarian Academy of Sciences (agroecological zoning, application of remote sensing, landscape evolution, soil erosion), in the MEDALUS Programme (climate change in Hungary), in the National Research and Development Programme (open-cast mine reclamation) and led projects financed by the Hungarian National Sciences Fundation (OTKA): impact of land privatization, structure of agricultural landscape, floodplain evolution and ecology. At present he coordinates a work package of the Horizon 2020 project Diverfarming on crop diversification for sustainable farming in Europe.

Moemen S Hanafy[1], Mohamed Matter[1], Mohsen S. Asker[2], MR Rady[1], Mohamed E El Awady[2]

Plant Biotechnology Department, National Research Center Dokki, Cairo, Egypt (1)
Microbial Biotechnology Department, National Research Center Dokki, Cairo, Egypt (2)

Hairy root cultures of *Catharanthus roseus*: a promising approach for the production of antitumor alkaloids

Catharanthus roseus (Madagascar periwinkle) of family Apocynaceae is very important medicinal plant. The plant contains several indole alkaloids which possess antitumor activity such as vincristine and vinblastine. These alkaloids are produced at extremely low levels within the plants and remain resistant to feasible chemical synthesis due to their complex structures. The hairy root system, using *Agrobacterium rhizogenes* K599 strain harboring p35SGFPGUS$^+$ plasmid to enhance the production of indole alkaloids in *C. roseus*, is developed in our laboratory. The transgenic nature of the established hairy roots was confirmed by PCR analysis. The root initials were segmented and subcultured in liquid Murashige and Skoog medium. The proliferated transgenic hairy roots were evaluated for growth, morphology, alkaloid content, its antimicrobial, antioxidant and anticancer activities. The antioxidant activities of the organic extracts of the hairy roots were evaluated in term of their free radical scavenging activity by 1-diphenyl-2-picrylhydrazyl (DPPH). In addition, the antioxidant activity was closely related to the content of phenolic compounds. On the other hand, hairy roots cultured in liquid MS medium for four weeks exhibited the highest inhibition ratio (68.9%) against Ehrlich Acites Carcinoma Cells (EACC) among the other culture periods. Hairy root extracts were also examined for its ability to have anticancer activity against different human cancer cell lines. The hairy root extracts after 4 weeks of culturing in the liquid medium were found to have higher cytotoxic effect on Hepatocellular carcinoma, Breast carcinoma cells and lung carcinoma with an IC_{50} 227, 245 and 206, respectively. This study revealed that hairy roots of *C. roseus* may have a great potential to produce high-value compounds. A comprehensive investigation of the hairy root system of *C. roseus* would help in developing a viable process for the production of antitumor alkaloids such as vincristine. The efficiency of the scaling up systems still needs optimization before industrial exploitation becomes viable.

K. Snini[1], H. Rahmouni[2], F. Ben Jemaa[1], M. Ellouze[1], K. Khirouni[3]

1 Laboratoire des Matériaux Multifonctionnels et Applications (LMMA), Faculté des Sciences de Sfax (FSS), Université de Sfax, Route de Soukra, km 3.5, B.P. 1171, 3000 Sfax, Tunisia
2 Unité de Recherche Matériaux Avancés et Nanotechnologie, ISSAT Kasserine, Université de Kairouan, 3100 Kairouan, Tunisia
3 Laboratoire de Physique des Matériaux et des Nanomatériaux appliquée à l'Environnement, Faculté des Sciences de Gabès cité Erriadh, Université de Gabés, 6079 Gabès, Tunisia

Electrical and dielectrical properties of $Pr_{0.67}Ba_{0.22}Sr_{0.11}Mn_{1-x}Fe_xO_3$ ($0 \leq x \leq 0.2$) perovskite

In the present work, we have studied the structural, electrical and dielectric properties of $Pr_{0.67}Ba_{0.22}Sr_{0.11}Mn_{1-x}Fe_xO_3$ ($0 \leq x \leq 0.2$) materials pre- pared through the solid-state reaction. This study has been performed using admittance spectroscopy technique over a wide range of temperatures (80–340 K) and frequencies (40 Hz–10 MHz). The variation of conductivity with temperature shows a metal–semiconductor transition for x = 0 and 0.05. A semiconductor behavior is noticed for the others compositions. The transition temperature T MS was found to be about 220 and 90 K for samples with x = 0 and 0.05, respectively. It is also found that the conductivity decreases with Fe concentration, such behavior is related to a reduction of double exchange mechanism. The conduction mechanism is described by thermally activated hopping of small polaron. The activation energy of such process is sensitive to the iron concentration. This energy increases with increasing Fe content from E_a = 22 meV for x = 0 to E_a = 67 meV for x = 0.20. The dielectric permittivity as function of the temperature is characterized by the appearance of dielectric transition which is described by the Curie–Weiss law. The dielectric transition temperature Td change with the iron concentration and it is found to be 100, 170, 140 and 180 K for x = 0.05, 0.10, 0.15 and 0.20, respectively.

Keywords: Perovskites, Electric and dielectric properties

Mohammed M. Shabat

Department of Physics, Islamic University of Gaza, Gaza Strip, Palestine

Simulation of artificial waveguide structures for solar cell energy

Metamaterials or negative index materials are newly artificial materials have unusual properties which could efficiently be used in design future solar cells for energy applications. The aim of this communication is to present various waveguide structures containing metamaterials which are acting as solar cells to minimize the reflection of the light incident on the proposed structures and to increase both transmission and absorption of light. Computational modeling and simulation based on the transfer matrix method are used to investigate the effects of other physical parameters of the proposed waveguide structure model and the angular incident of the light on the transmission, reflection and the absorption. The computed results are displayed, analyzed and discussed. The obtained results are promising, and the new artificial metamaterials are very good candidates in design future solar cells.

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CV of Prof. Dr. Mohammed M. Shabat

Mohammad M. Shabat, was born in Beit Hanoun, Gaza Strip, Palestine in 1960. He received his B.Sc. in Physics from Al-Aazhar University, Cairo, Egypt in 1984 and the Ph.D. degree from the University of Salford, U.K. in 1990. He was a Research Fellow at the University of Manchester Institute of Science and Technology, UK, from 1989 to 1992. In April 1992, he joined the Physics Department at the Islamic University of Gaza (IUG) as an Assistant Professor of physics. He became an Associate Professor in 1996 and a Professor of Physics in 2000. In the period 2001-2005, he was the Vice President for Administrative Affairs at IUG and the Vice President for the Academic Affairs at the IUG between 2009-2013. He was awarded the Shoman Prize for a Young Arab Scientist (Jordan) in 1995, and the Humboldt

Research Fellowships in 1998-99 at the Center of Semiconductor Technology and Opto-electronics, Duisburg-Essen University, Germany. He was a visiting scientist at Bochum University, Germany, in 1994; at the Institute National Polytechnic de Grenoble, (INPG), France, in 1995; at Salford University, U.K, in 1997; ICTP, Trieste, Italy, in 1996,1997 and 1998, 2000, 2001, 2003, 2004; Duisburg-Essen University, Germany, in1998, 1999 and 2002, 2003, 2004 and 2006, and 2007; Technical University of Warsaw in 2012; Frankfurt University in 2012 and the Institute of Energy Research and Phyiscal Technologies (IEPT) at the Clausthal Technical University (TUC) in 2015, 2018. From 2006-2008, Prof. Shabat was a visiting Professor in Max Planck Institute for the Physics of Complex Systems, Dresden, Germany. Professor Shabat had received "Galileo Galilei" Award of the International Commission of Optics (affiliated to ICSU and IUPAP) in 2006. He was the Vice President for the Research and Graduate Studies at the IUG between 2013-2015. Professor Shabat became the first Distinguished Professor in the IUG in 2011. He was awarded the Distinguished Scholar Award, the Arab Fund Fellowship Program, Kuwait, 2007. He had been awarded the ISESCO Science Prize, 2010. He published more than 380 papers in international journals in optical science, physics, mathematics and education and presented many papers at local and international conferences. His research interests include solar cells, Renewable Energy, opto-electronics, numerical techniques, mesoscopic systems, energy, and applied mathematics, Nanotechnology and physics education. He supervised more than 45 postgraduate students (M.Sc and PhD) in mathematics and physics at Palestinian, Sudanese, Algerian and Egyptian universities. Recently he has established a Palestinian Optical Society (POS). He is an external examiner for BSc examinations, Msc dissertation and PhD theses in physics and mathematics at Palestinian and Egyptian universities. He is a senior member of IEEE, member of the Optical Society of America, fellow of TWA and fellow of the Islamic World Academy of Sciences (IAS).

Barbara J Gabrys

Department of Materials, University of Oxford, Parks Road, Oxford OX1 3PH, UK

Plastic: Fantastic, blessing or curse?

Can you imagine modern life without plastic? A ubiquitous, yet, in recent years, increasingly maligned material. From being heralded a revolution in materials' processing, to current end-of-life concerns, I will consider the pros and cons of plastics use, and ask what science is doing to revamp the image of this societally life changing product.

While plastics are produced commercially since early 1900's, all plastic accumulated to date dates back to 1950. This amounts to about 8.3 billion tons (1). The global extent of the problems of disposal, adverse effect on wildlife and the environment, and sustainability of production has come recently into a sharp focus (2,3). This impacts all countries, as the amount of land needed to bury discarded waste is very limited.

While there is a tendency to vilify 'plastics', there are complex links to other big problems facing us such as climate change. The burning question is not just how to clean up rivers, beaches and oceans from plastic waste, but how to bring the situation under control – to minimise the damage, and maximise the benefits of plastic usage.

Conclusion

New way of thinking and acting is necessary in order to manage the use and production of plastics. This includes designing new, degradable materials; new polymers from which monomers can be recovered; improved waste management; new ways of processing waste, and incineration for production of energy; recovery of feedstock from discarded objects; stricter legislation. Science cannot do it alone – a close interaction with other disciplines such as engineering, wider societal and environmental streams is essential.

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Dr Barbara J Gabrys CPhys FInstP FHEA

She held the post of Divisional Academic Advisor in the Mathematical, Physical and Life Sciences (MPLS) Division of University of Oxford in the years 2007 - 2015. This post combined academic, mentoring and administrative duties. She has substantial experience in exploring different science disciplines via research, teaching and learning activities. Her first degree is in physics from University of Wroclaw, Poland; she holds a PhD with great distinction from Katholieke Universiteit Leuven, Belgium. In 2015 she retired from the position of Academic Advisor in order to pursue her other interests.

She has founded Zenspace.org.uk in 2015 as Zen Master in Rinzai-Inzan lineage. She is an Academic Visitor in Department of Materials where she conducts her research.

Over the years she had many international collaborations, most notably with US, Japanese and Polish scientists (the Royal Society Fellowship in 1985, and Japanese Society for the Promotion of Science Fellowship in 1996 in Kyoto, ECU 'Go East' 1992, Wrocław, Poland).

She has authored and co-authored over 70 research papers, book chapters; edited two books on neutron scattering. She is the lead author of 'How to succeed as a scientist: from postdoc to professor' (jointly with J.A. Langdale), CUP 2012.

Ildiko Tulbure

University “1 December 1918” Alba Iulia, Romania
and Clausthal University of Technology, Germany

Innovative Approaches in Technology Assessment in the Globalizing Age

In last centuries humanity registered scientific advance succeeding in developing technological applications meant for improving its quality of life. But about half a century ago humanity began to realize also potential dangers and undesired effects of diverse human activities, especially industrial ones. After the Conference for Environment in Stockholm in 1972 and the first report of the Club of Rome „The Limits of the Growth“ (Meadows 1972) was understood that besides wanted effects of technological advance, undesired even thoughtless effects can appear. After this time the environmental awareness in the Western World began changing. It was clear that the arisen regional and global problems, not only environmental ones are very serious and need to be solved. Currently we confront us with a series of global problems, which can be grouped in three parts: world population growth, growth of energy and natural resources consumption and environmental pollution (Jischa 2005). Worldwide began debates on political, scientific and social levels in order to find best answers for the created challenges, which could be applicable by specific regional differences to developed as well as to developing countries. The Brundtland Report of the World Council on Environment and Development represented a result of these worldwide debates, where the concept of sustainable development was defined for the first time (Hauff 1987). The concept of sustainable development was accepted as a possible answer for the global complex ecological, economic and social problems and later very large discussed on the Conference for Environment and Development in Rio de Janeiro 1992 as in the closing document “Agenda 21”, continuing with debates 10 years later on the “Rio + 10” - Conference in Johannesburg and 20 years later in 2012 on the “Rio + 20” – Conference held again in Rio de Janeiro. All these actions have emphasized that the evolution of technical, environmental and social systems has to be analysed in synergetic relation. Applying the concept of sustainable development for real concrete situations means for engineers to analyse and assess diverse technological applications used in everyday life by applying Technology Assessment, TA (Tulbure 2013). Often a concrete sustainability problem is to be solved by carrying out a TA-study. Or a TA-study has as a goal to research if a technology has negative effects on different domains, what means if the effects of a technology application do not conflict with the goals of sustainable development. Studies in the field of mobility and sustainability or in the field of using ICTs and sustainability can be mentioned at this point. Methodical challenges appear especially because of the complexity of the analysed processes or do to the complexity of the analysed entities, during sustainability modelling and evaluation when carrying out a TA-study (Tulbure 2013). In the process of concretely describing and analysing, as well as assessing diverse technologies on regional or local level difficulties appear do to the missing possibility for a formalistic description of the influencing factors or of the interdependences among them. Shortly said methodical difficulties do result when approaching potential environmental and social impacts of new technological applications because there are questions about handling complexity and uncertainties, integrating quantitative and qualitative aspects as well as designing new indicators. There are several methods used in TA, some of them being of qualitative type, others of quantitative one. As current used technological applications have global impacts and influence in a decisive manner our life in globalizing age, there is a need for developing integrative methods in order to approach all these new and not pretty well-known phenomena to be found in the globalizing age. For applying this concept there is a need to evaluate systems in an integrated and interdisciplinary way, from technical, economic, environmental and social points of view. It is more than clear that there is a need to define new sustainability patterns, because the question “what is enough?” could have different answers, as there are several regional differences (Jischa 2005). The present development tendencies in the developing countries have the same direction as in the developed world and do not always show a trend in the sustainability direction, because the energy consumption is

increasing, the population consumption tendency is also increasing and ethical aspects are almost not considered anymore. There is the danger, that sustainability will be put into question, because of resources scarcity, environmental pollution, as well as social discrepancies. It clearly follows that there is a need for new thinking ways and new visions for assuring the sustainability of our human society, where social factors are very important (Tulbure 2013). In order to operationalise Sustainability by Technology Assessment, actually to find an answer to the question about potential impacts of using different technologies, it is necessary to consider different interdisciplinary aspects in the form of new innovative approaches, such as Integrative Modelling and Simulation, Dynamic Assessment Methods, Decoupling, as a Strategy for assuring Sustainability and not least Holistic Education for Sustainable Development.

Conclusion

The heightened awareness for potential impacts on environment and society of different technological applications and products has increased the interest in the development of new integrative methods of Technology Assessment in order to better comprehend these impacts with the final goal of assuring the sustainability of our human society. It follows that education is the driving force in the Globalizing Age for assuring the Sustainability of our human society and consequently social aspects are relevant for developing innovative approaches in Technology Assessment.

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Ildiko Tulbure, born in Romania, is currently working at the University "1 Decembrie 1918" in Alba Iulia, Romania, is a doctoral thesis supervisor at the Technical University of Cluj-Napoca, Romania and docent at the Clausthal University of Technology, Germany. She made her PhD thesis 1997 at the Clausthal University of Technology in the field of environmental engineering and her Habilitation 2002 for Systems Engineering also in Germany. She is coordinator of the international Network for Sustainability in South Eastern Europe, NESSEE, member of the coordinating team of the Romanian Humboldt Association and Associate Member of the Club of Rome. She obtained several scientific prices for her work in scientific field on national and international level. Her special interest goes to the field of sustainable development monitoring and evaluation by Technology Assessment, sustainable mobility, as well as to modeling and simulating dynamic systems by using soft-computing methods.

Ewa Graczyńska

Opole University of Technology

Globalization of Mathematics and Bureaucracy

Generally known examples of an international cooperation and my own experiences and scientific results in the domain of mathematics, especially in universal algebra, permit to admit that a globalization of science to some extent is performing a long time already. Among others, many well-known and widely recognized results of polish mathematicians proves that, despite of the fact that some of them were not appreciated and well recognized in time (cf. [1], [2]).

Recently, not only my own results in some field of general algebra, obtained after receiving a PhD in mathematical sciences, were presented in [3].

In opposite to many examples of well prospering globalization of mathematics, a contra productive and unfortunately well developing bureaucracy is in evidence that it can destroy many years' work of an individual in a modern society.

In consequence one can compare some educational systems not only in Europe but also worldwide. We concentrate especially on relations between Poland, Hungary and Germany taking into account what is there called a habilitation. This problem will be presented on the base of [4].

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Ewa Graczyńska

Graduated from the University of Wroclaw, Poland. PhD from the Mathematical Institute of the Polish Academy of Sciences in Warsaw. Alexander von Humboldt Fellow. Doctor habilitatus of the University of Szeged, Hungary, since 1997 and then a Professor of the Opole University of Technology, Opole, Poland.

Igor Shevchenko

Institute of Bioorganic Chemistry and Petrochemistry, Kiev, Ukraine

Influence of Solar Energy on Self-Organization of Water Molecules

Abstract: Solar energy exerts a strong influence on the ability of water molecules to self-organization. This influence is manifested on the chemical reactivity of water clusters. The rate of hydrolytic reactions involving water clusters can vary within very large limits over the course of minutes, hours, days, months and years. The results of regular 4-year (2015-2018) investigations of the hydrolysis of triethylphosphite indicate that the rate of this reaction with all other conditions being equal displays diurnal and annual variations and may be also modulated by the 11-year cycles of solar activity.

Introduction

In 2014 it was found that an electric field exerts an unusual influence on the rate of hydrolysis of triethylphosphite in acetonitrile. It can both accelerate and slow down the reaction depending on the position of the Earth with respect to the Sun [1]. A detail investigation of this phenomenon unexpectedly led to another fundamental discovery.

Main theses

We have found that at constant temperature, concentration and other conditions being equal the rate of hydrolysis of triethylphosphite in acetonitrile is highly dynamic and varies throughout the year over a very wide range [2]. This was shown by regular measurements for over 4 years (2015-2018). For example, in 2015 and 2016 the difference between the reaction rates in January and July reached 50 times.

The change of the rate of hydrolysis of triethylphosphite is accounted for by the ability of water molecules to form clusters $(H_2O)_n$. The chemical reactivity of water clusters depends on their size, which is greatly influenced by solar activity and may vary in a very wide range.

One more important conclusion is that this reaction is in constant dynamics and also demonstrates diurnal variations because of the rotation of Earth around its axis. These variations are not chaotic. In the morning the rate is usually lower and rises in the day time and then it slows down again. The range of diurnal changes can reach 4-5 times, however, it is not constant either and varies on different days throughout the year. In the periods of low solar activity the reaction rate decreases and the diurnal variations become insignificant.

However, the picture of rate changes is different every year. Moreover, from 2016 to 2018 a general deceleration of the reaction took place, which correlates with the decrease of solar activity in the course of the current 24-th 11-year cycle.

The hydrolytic cleavage of P-O bond in triethylphosphite can be considered as a simplified model system of the conversion of adenosine triphosphate (ATP) to adenosine diphosphate (ADP) which is known to underlie bioenergetics processes in living organisms. The dependence of biochemical processes on solar activity during the rotation of the Earth around the Sun and around its axis is well known as circannual and circadian rhythms. For example, owing to the 11-year cycles of solar activity, the annual growth rings in trees have different thickness and are arranged in 11-year sequences. Taking into account that water is a necessary constituent in all forms of life, one can suppose that the discovered diurnal and annual variations of the water reactivity may underlie the circadian and circannual rhythms.

Conclusion

Thus, the self-organization of water molecules and their chemical reactivity are extremely sensitive to extraterrestrial influence associated with the variations of solar energy. This influence obviously has a complex mediated mechanism and requires detailed study.

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CV of Igor Shevchenko

Education: University of Kiev, Ukraine, Chemistry Department, 1974-09-01 - 1979-06-01.
Invited Positions:
1. University of Brunschweig, Germany, Institute of Inorganic and Physical Chemistry, Humboldt Foundation Fellow, 1990-01-01 to 1993-03-01.
2. Southern Methodist University, Dallas, Texas USA, Chemistry Department, Invited scientist, 1993-03-05 to 1995-03-01.
Employment:
1. Institute of Organic Chemistry, Kiev, Ukraine, 1979 to 1988.
2. Institute of Bioorganic Chemistry and Petrochemistry, Kiev, Ukraine, 1988 to present.

Young Researchers lectures


Science in the age of globalization
11th Congress of the Societas Humboldtiana Polonorum

Al-Suod Hossam [a,b] **Ratiu Ileana-Andreea** [a,b,c], **Buszewski Bogusław** [a,b]

[a] Interdisciplinary Centre of Modern Technologies, Nicolaus Copernicus University, Toruń, Poland
[b] Department of Env. Chemistry and Bioanalytics, Nicolaus Copernicus University, Toruń, Poland
[c] Babeş-Bolyai University, Faculty of Chemistry and Chemical Engineering, Cluj-Napoca, Romania

Optimization Accelerated solvent extraction parameters for sugars and cyclitols

Cyclitols are phytochemicals naturally occurring in plant material which attracted an increasing interest due to multiple medicinal attributes, through the most important are the anti-diabetic, antioxidant and anti-cancer properties. Sugars are used in food industry due to their valuable properties which act like sweeteners, preservatives, texture modifiers, fermentation substrates, flavoring and coloring agents.

In this study, cyclitols and sugars were obtained as a mixture from *Medicago sativa* L., in a comparative study by using maceration, as a conventional method, and pressurized liquid extraction (PLE), as a modern and green extraction method. The influence of extraction parameters for PLE including: extraction temperature, time and number of cycles on the content of sugars and cyclitols were investigated based on Response Surface Methodology (RSM) with Box-Behnken design. The highest total amount of sugars and cyclitols (62.27 ± 2.30 and 50.35 ± 0.77 mg/g of dry material, respectively), was obtained when it was extracted at 88 ◦C, for 22 min, in two cycles. The methodology used involved PLE, SPE purification, selective separation (using yeast and Dowex anion exchange resin) and derivatization, followed by sugars and cyclitols analysis by using GC-MS.

Conclusion

PLE a fast, sensitive, efficient, and environmentally friendly method has been successfully optimized and applied for the extraction of cyclitols and sugars from *Medicago sativa* L. Higher amounts were obtained using optimized PLE compared with maceration. The separation of cyclitols by sugars was achieved as well. The methodology used involved PLE, SPE purification, selective separation (using yeast and anion exchange resin) and derivatization, followed by sugars and cyclitols analysis by GC-MS. The optimal conditions found for the extraction process using PLE are: temperature: 88 ºC, time: 22 min and two extraction cycles. The study of cyclitols' extraction and their selective separation from alfalfa plant can lead to value economic benefits, beside the medical advantages. Considering that cyclitols plays an important role as curative agents, they are the perfect candidates to be used in pharmaceutical industry as food supplements. Moreover, the results presented in this study can represent valuable information for food, medical or cosmetic industry interested in cyclitols extraction, in order to involve them in the manufacture of medicines or cosmetics as well.

CV of Al-Suod Hossam
Education:

- 2016-2019: PhD of Analytical Chemistry, Nicolaus Copernicus University- Poland.
- 2009-2011: Master of Science (M.Sc.) Chemistry, Al al-Bayt University- Jordan.
- 2003–2009: Bachelor of Science (B.Sc.) Chemistry, United Arab Emirates University – UAEU.
- 2003: High School Diploma - Scientific Track, Prince Hamza Bin Alhussein Secondary School, Jordan.

❖ **Title of Master Thesis:** Synthesis of New Imidazole Derivatives Via Suzuki-Coupling.
❖ **Title of PhD Thesis:** Complex analytics of biologically active compounds including cyclitols from plant materials.

Conferences: 14 local and international conferences
Prizes and Awards: 3 awards for the best participating poster in a conference
Projects: Plantarum project (No. BIOSTRATEG2/298205/9/ NCBR/2016), PRELUDIUM-14 grant ((Nr. 2017/27/N/ST4/00354)

Bilińska Lucyna[1], Gmurek Marta[2], Ledakowicz Stanisław[2]

Bilinski Factory of Colour, Konstantynow Lodzki, Poland (1)
Faculty of Process & Environmental Engineering, Lodz University of Technology, Lodz, Poland (2)

Electrocoagulation system for closing textile wastewater loop. From a lab to an industrial scale

Abstract: *Based on laboratory experiments the technology of textile wastewater purification by electrocoagulation (EC) was established. The EC treatment was implemented in one of the largest textile plants in Poland. Purified wastewater is used as a source of brine and recycled in dyeing processes.*

Introduction

In 2017 the Organization for Economic Co-operation and Development (OECD) revealed data concerning textile manufacturing. According to the OECD report, the textile industry is one of the most water-consuming industrial branches. At the same time, the report points out the necessity of preventive and corrective actions in the area of water management within the textile branch. Closing the water loops in textile processing was recommended as the most advantageous approach, which builds a sustainable circular economy [1].The guidelines of the circular water management were the basis of the closed-loop water system implemented in one of the Polish textile companies. The idea was to reuse the same water a few times in the production plant after cleaning it by a suitable treatment.

Results

The main issue of the study was a treatment method selection and determination of the operating parameters. The object of the study was the most contaminated wastewater originated from textile dyeing on black color with reactive dye. This kind of effluent is especially burdensome for the environment because of intense residual color, extremely high alkalinity and extreme salinity. Even though these characteristics make the biological treatment impossible, they can promote chemical treatment such as electrocoagulation (EC) because of high salt content.

The EC is a treatment method which provides effective pollutants removal though the action of the in situ electro-generated coagulant. The laboratory investigation proved the high effectiveness of EC process. The 90% of color was removed within a very short time of 8 minutes.

The laboratory scale experiments carried out in extremely high pH and salinity, characteristic to dyeing wastewater, revealed how complex issue the EC treatment was. The results of this study brought us to new, not published before, conclusions:

- contrary to the aluminous electrodes, which were chemically dissolved in alkaline reaction medium, the iron electrodes ware more advantageous for the EC and allowed us to stabilize the process conditions,
- the current density fixed on 5 mA/cm2 was the value ensuring passing the border electrode over-potential with a minimal current consumption,
- the optimal treatment time was equal to 8 minutes, and after that time a specific equilibrium between pollutants in liquid and solid phase appeared and further purification was not possible,
- some specific dye decomposition pathway could be observed during the process, • the pH of the reaction was alkaline and impossible to change because of the secondary electro-chemical NaOH production (the wastewater pH adjustment was pointless because during the first seconds of the EC the secondary alkalization took place).

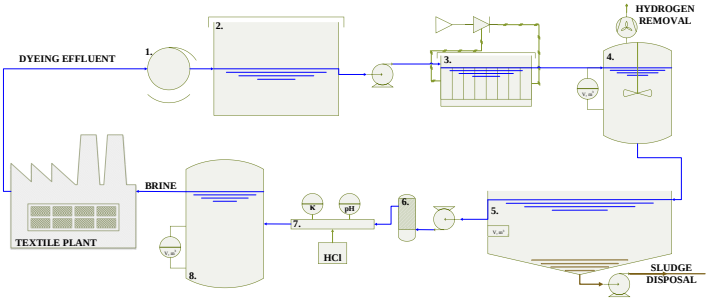

Fig. 1. Schematic presentation of dyeing effluent EC treatment system for brine recycling in an industrial scale: 1. rotating filter, 2. equalizing tank, 3. EC reactor with AC-DC power supply, 4. hydrogen removal tank, 5. horizontal settler, 6. filter, 7. flow reactor for pH adjustment, 8. purified brine collector

Based on the laboratory results the most optimal operating conditions were determined and the industrial installation was established. Figure 1. presents a simplified schematic of an industrial EC installation implemented in the textile plant as a part of a closed wastewater circuit. At first, the dyeing wastewater is preliminary filtrated (1.) and collected in a tank (2.). Then EC treatment takes place. The laboratory established operating parameters enforced the construction of the electrochemical reactor (3.) of 300 L of the volume and the input volumetric flow equal to 2200 L/h. The EC reactor (3.) is followed by a mixing tank for residual hydrogen removal (4.), and a horizontal-flow settler (5.) and a filter (1 μm) (6.) for sludge removal. After the final pH adjustment in flow reactor (7.) the purified, but still salty, wastewater is being stored in the collector (8.) and used as a source of brine for next dyeing on the production site.

The presented EC-based installation for brine production from textile wastewater is the first appliance in the world of this kind and it is covered by the patent application no. P.416334.

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Lucyna Bilińska is an environmental engineer, a specialist in industrial wastewater treatment (advanced oxidation, ozonation, electro-processes, coagulation). She is a textile engineer, a specialist in chemical processing and the head of a research team (projects leader). She is a specialist in industrial implementations.

Lucyna graduated her Ph.D. in environmental engineering in 2017. She graduated her master degree in textile engineering (chemical processing) in 2008. Since 2008 she has been an employee of Biliński Factory of Colour, one of the largest textile company in Europe. Since 2014 she has been the head of the R&D department in this company. A research team member in PBS NCBR project on the Lodz University of Technology in 2014 and 2015.

Additionally, she works as a volunteer in the Society of Polish Colourists as vice president.

Michał Bonisławski

West Pomeranian University of Technology, Szczecin, Poland

Contactless power supply system for rotating telemetry applications

The paper presents an inductive wireless energy transfer system for a telemetry measurement device which is fixed on the rotating shaft or a mechanical element. Measured quantities can include vibrations, angular speeds, temperature or mechanical stresses. Based on these measurements further parameters can be determined (e.g., torque, mechanical power, shear force). For reliable and continuous operation of the telemetry system a reliable and controllable power supply is needed, because of the movement of the object it is necessary to develop a wireless power system allowing power delivery while the object is moving as well as in the zero – speed operation. The publication presents an inductive power system that does not require integration into shaft structures nor requires disassembly of the shaft. The method of optimization of the system components will be discussed and laboratory tests will be carried out in a wide range of system operation parameter change.

Michał Bonisławski graduated from Szczecin University of Technology, Electrical Department in the year 2009. He received his PhD degree in Szczecin in 2015. His research focuses on power electronics, measurement systems, and industrial control systems.

Blatkiewicz Michał, Ledakowicz Stanisław

Faculty of Process and Environmental Engineering, Lodz University of Technology,

Continuous methods of biosynthesis and purification of fungal laccases

Abstract: *Several methods of upstream- and downstream processing of laccase from* Cerrena unicolor *were investigated for efficient biosynthesis, concentration, and purification of the enzyme. Batch bioreactor biosynthesis was developed into repeated discontinuous fed batch mode, and microparticle-enhanced cultivation was successfully implemented for enhanced biosynthesis efficiency. Aqueous two-phase extraction and foam fractionation were investigated as alternative methods of concentration and purification of the enzyme with promising results.*

Introduction

Laccases (EC 1.10.3.2, p-diphenolic oxidases) are oxidoreductase enzymes found in many natural sources, such as higher plants, bacteria, and insects, but most abundantly as extracellular products of white-rot fungi [1]. Although their role in nature is mostly to decompose lignin in wood, laccases have been found to catalyze a broad spectrum of organic compounds, such as phenols, thiols, or aromatic amines [2].

Any bioprocess aiming to obtain a specified product can be divided into two major sections: the upstream part, leading to the formation of the product, and the downstream part, in which the product is separated from impurities and the excess water. Usually, enzymes such as laccases are produced in batch bioreactors and separated by chromatography. This approach is, however, very cost-ineffective. In our work, we investigated several processes that might improve the process of biosynthesis and downstream processing of laccase from *Cerrena unicolor*.

Main text

The major improvement in the upstream processing part was extending the batch mode of laccase biosynthesis into repeated discontinuous fed batch (RDFB) mode. In this approach, during the production phase, a portion of the bioreactor contents (culture supernatant) are withdrawn via a sterile filter and exchanged by a fresh portion of the medium. This allowed to prolong the production phase, and thus to obtain more of the highly active culture supernatant from already-existing biomass without the necessity to restart the batch process.

Another investigated concept for the improvement of laccase production was the use of microparticle-enhanced cultivation (MPEC) in order to shift the morphology of biomass into a more developed form. This approach, relying on addition of inert microparticles into the culture medium, allows the mycelia to take star-shaped form, in which the biomass pellets have lower mass transfer limitations, and thus produce extracellular products more efficiently. Using MPEC for laccase production from *C. unicolor* allowed to achieve 40-50% higher enzymatic activity of the culture supernatant.

The core of the project was the investigation of extraction in aqueous two-phase systems, known as aqueous two-phase extraction (ATPE). Aqueous two-phase systems are formed when certain water-soluble component couples (e.g. polymer and salt) are mixed with water in high enough concentrations to form two immiscible phases, consisting mostly of water. Such extraction systems provide conditions mild enough to process biomolecules without the risk of denaturation. In the project, various polyethylene glycol molecular sizes were examined for phase forming and extraction efficiency in their two-phase systems with phosphate salts. It was determined that high molecular weights of the polymer allow for excellent concentration of *C. unicolor* laccase within the salt-rich phase while leaving the impurities in the polymer-rich

phase. Continuous ATPE was carried out with the use of a mixer-settler unit with results comparable to batch extractions.

As an alternative downstream processing method, foam fractionation (FF) was investigated. This very simple and cheap method of protein purification relies on amphiphilic properties of proteins, which tend to concentrate on gas-liquid interfaces. By dispersing air in a protein solution, foam is created, allowing its efficient removal from the bulk liquid. Although refolding of the tertiary structure on the interface was shown to subject the enzyme to denaturation, the low investment and operational costs make this method very promising. In continuous mode, gas and liquid flows were optimized for highest concentration factor and recovery of the enzyme.

Conclusion

According to the results of the conducted experiments, it is possible to suggest a process of continuous biosynthesis of *C. unicolor* laccase in RDFB mode, possibly further intensified by MPEC, coupled with such continuous novel downstream processing methods as FF and ATPE, which have been proven effective for this enzyme.

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Michał Blatkiewicz graduated with distinction at Cracow University of Technology as master of engineering in the field of chemical and process engineering. Afterwards he did his PhD at Lodz University of Technology, Faculty of Process and Environmental Engineering, where he was also employed as a scientific project contractor. After graduation he worked at Technical University of Hamburg for a year as a post-doc. During his PhD studies, his work concerned continuous processes of biosynthesis, concentration, and purification of fungal laccases, in which he focused mostly on novel downstream processing methods, such as aqueous two-phase extraction and foam fractionation. During his postdoctoral fellowship he investigated the integration of biocatalysis and distillation in the form of a process called enzymatic reactive distillation. He is an author of 9 scientific papers, published in ISI-listed journals (with additional two currently under review), and has presented at 6 international conferences.

Sally F. Desoukey[1], Shereen E.M. EL-Nahas[2], Atef Z.Sabh[1], Z.K. Taha[1], Hattem M. El-Shabrawi[3]

Botany Dept., Faculty of Agriculture, Cairo University, Giza, Egypt (1)
Plant Pathology Research Institute, Agricultural Research Center, Giza, Egypt (2)
Plant Biotechnology Dept., National Research Center ,Giza, Egypt (3)

Antimicrobial effect of Asparagus officinalisL. extract.

Introduction

Pathogenic fungi are one of vital problems of crops. Microbial diseases, 16% (and 70-80% of these losses were caused by fungi). Common chemical fungicides have long been used for the control of fungal diseases. These chemical fungicides lead to an increased risk of contamination of the environment and harmful effects on biodiversity.Thus, searching of newapproaches more effective, eco-friendly and less toxic alternative as fungicides of fungal infections are very important to enhance the resistance to common antifungal agents.Natural chemical strategies for controlling crop diseases are of considerable interest because of environmental and health concerns about the widespread use of chemical pesticides.The potential of secondary metabolites for plant protection could be used in a more recent alternative strategy and safety on environment. Asparagus (*Asparagus officinalis*L.) is one of the encouraging nontraditional horticultural crops in Egypt. Asparagus is a large genus with over 160 different species of herbaceous perennials crop of high economic value. They are grown throughout the world but they originated mainly from Asia, Africa and Europe.

Plant Material: Plant material of (*Asparagus officinalis*L.) (Mary Washington 500 w cultivar) is collected from experimental field in Fac. Agri., Cairo University, Giza, in the growing season, 2018.

Plant material preparation: The collected plant parts were dried completely at 50-60 °C for 48 hrs. in hot air oven.

Extraction of plant

Plant material was extracted with methanol, ethyl acetate, acetone, chloroform and petroleum ether. **Antifungal screening** :The five phytopathogenic fungi, ncluding *Alternaria tenuissima*, *Botrytis cinerea*, *Fusariumoxysporum*, *Macrophominaphaseolina*and *Rizoctoniasolani*were isolated from infected samples. Samples of different plants, *i. e*. strawberry, tomato and cucumber were collected from Beheira and Qalubia governorates, Egypt. The emerged fungi were picked and cultured on another PDA medium and left to grow. The isolated fungi were purified out either by hyphal tip or single spore technique. The identification was confirmed at the Mycological Research and diseases survey Department, Plant Pathology Institute,AR C, Egypt.Pure cultures weremaintained during the experiments on potato dextrose agar (PDA: 200 g grated potato, 20 g dextrose, 20 g agar). *In vitro* antifungal assays of prepared and formulated material against the fungus were performed with the poisoned plate technique.

Results and discussion*:*

*Asparagus officinalis*L was extracted by absolute methanol, ethyl acetate, acetone, chloroform, and petroleum ether as solvents differ in their polarities. The purpose was to evaluate their bioactivity against some pathogenic fungi using the poisoned plate technique as

found in *A. racemosus*. Shoot and root extracts significantly inhibited all of the studied pathogenic fungicompare with the control. Root extracts have more inhibitory effect on the *A. tenuissima*, *B. cinerea*, *F. oxysporum*, *M. phaseolina* and *R. solani* than shoot extracts. Growth reduction percentages ranged between (36.50 to 91.71%) and (35.20 to 69.40%) for *Rizoctoniasolani*; (40.56 to 61.11%) and (27.78 to 68.89%) for *A. tenuissima*and (40.57 to 57.78%) and (36.11 to 66.11%) for *F. oxysporum*in case of root and shoot extracts, respectively at the low concentrations. On the other hand, the root and shoot extracts showed different patterns of effects on *M. phaseolina*and *B. cinerea.* As growth reduction percentages ranged between (16.70 to 33.33%) and (16.67 to 73.89%) for *M. phaseolina*and (16.67 to 86.70%) and (16.67 to 100%) for *B. cinerea*in case of root and shoot extracts, respectively at the low concentrations.

Conclusion

Organ type is playing an effective role in inhibition activity. Root extract is more effective than shoot extract. Extract concentration had positive correlation with inhibition activity against fungal growth. As well as fungus species is considered one of the important factors.

Name: Sally Farag Desoukey, E-mail: asd.sally@yahoo.com

I'm graduated from Cairo University, Faculty of Agriculture, Department of biotechnology (2009). I had master degree at 2016 in Agricultural Botany. My thesis was under the title: Botanical Investigation on *Asparagus officinalis* L. plant. I'm assistant lecturer at Agricultural Botany Department, Faculty of Agriculture, Cairo University since 2016 until now. I'm PhD student at Cairo University, Faculty of Agriculture, Agricultural Botany Department since 2017.

Publication

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Abeer.F. Desouky[1], Hanafy Ahmed A.H[2], Abdel Salam Redaa[1], Hartmut Stützel[3], Moemen Hanafy[1]

National Research Centre, Plant Biotechnology Department Genetic ,Engineering and Biotechnology Division, Tahrir Str, 12311 Cairo, Egypt (1)
Cairo University, Faculty of Agriculture, Agricultural Botany Department ,Plant Physiology Section (2)
Institut für Gartenbauliche Produktionssysteme, Abteilung Svstemmodellierung Gemüsebau. Herrenhäuser Straße 2. 30419 Hannover (3)

Over-expression of a pathogenesis-related protein 10 (PR10a) enhances salt stress tolerance in transgenic faba bean.

Introduction

Faba bean (*Vicia faba* L.) is an important food legume crop, grown for human and animal consumption globally especially in China, North African countries, parts of Europe as well as North and South Americas 2}. Abiotic stresses such as drought and salinity are environmental conditions that have adverse effects on plant growth and crop productivity and can be major constraints to yield Plants respond to changes in their environment by large-scale regulation of their metabolism in order to react with these challenges including stress-avoidance strategies (early maturing, adaptive growth habit and morphological changes). Identification of stress responsive genes involved in tolerance to drought and /or salinity stress and transfer of these genes into commercial cultivars either by traditional breeding or by genetic transformation could therefore significantly increase the agronomic potential of legumes and will thus contribute to improve food security for an expanding population mainly in developing countries.The Pathogenesis-related (PR) proteins comprise a large super-family of plant defense proteins that accumulate in response to various biotic and in many cases, in response to abiotic stresses.

Martials and methods

To evaluate the impact of salt stress on the transgenic *PR10a* faba bean plants; seeds from wild-type and two transgenic lines (T3 and T2) were initially germinated in rock wool for 3 weeks under controlled geenhouse condition near-ideal conditions (23°C) temperature regime with artificial lighting. Transgenic plants were selected based on either BASTA leaf-painting test or by PCR for *PR10a* gene. Positive transgenic plants with complete rooting systems, including lateral roots, were used for this experiments. Wild-type and transgenic seedlings were transferred to hydroponic systems containing FERTY® MEGA 2 (Planta Düngemittel GmbH, Germany) at a concentration of 12.5/25 litre of water. Physiological measurements were performed after 5 days from transferring the plants to hydroponic culture system and before salt stress application (0 day). Gas exchange measurements, including photosynthetic rate (A, µmol $m^{-2}s^{-1}$), stomatal conductance (g_s) , transpiration- rate (E, mmol $m^{-2}s^{-1}$), (ETR) Electron Transport Rate, intercellular CO2, were determined on light-adapted leaves { 8} using an infrared open gas exchange system LI-6400 version 6 software (Li-Cor, Inc., Lincoln, NE, USA) coupled with an integrated fluorescence chamber head (Li-6400-40 leaf chamber fluorometer; Li-Cor Inc., Nebraska, USA). Afterwards, at least 4 replicates from both wild-type and transgenic lines were exposed to different salinity conditions in which NaCl was added to the hydroponic culture system at 0, 50 and 100 increments every 72 h until a final concentration of 150 mM was reached and maintained for two weeks.

Results and discussion

Wild-type plants displayed progressive chlorosis, reduced leaf size, and general growth inhibition with the increase in NaCl concentration. Wild-type plants grown at 150 mM NaCl treatment displayed severe reduction in size. However, the transgenic plant lines looked healthy after the treatment with 150 mM NaCl, and still grew. These results suggested that over-expression of a PR10a gene in faba bean plants promotes sustained growth and development under salt stress at 150 mM NaCl

treatment. The difference in salt tolerance between wild-type and transgenic plants was bigger with longer treatment. Net photosynthesis was higher in all transgenic lines, compared to wild-type plants. A strong tendency to damaged net photosynthesis in the presence of salt stress was also observed in all experiments of wild-type and transgenic faba bean plants. The resulting data clearly also demonstrated the less damaged effect in transgenic plants, comparing to in wild-type plants after salt stress application. In the treatment with 150 mM NaCl the inhibitory effect on net photosynthesis in leaves showed more significantly in wild-type than in transgenic plants. Wild-type leaves suffered a 82% decrease in net photosynthesis, compared with a 65 % and 37.1% % in transgenic leaves of line T2 and T3, respectevily. The values of net photosynthetic rates between wild-type and transgenic plants were significantly different. The Photosynthetic electron transport was examined during salt stress period and after removing the slat stress, the linear electron transport rates in the WT and transgenic lines T2 and T3 decreased by about 42.3% and 27.7%, 14.1%, respectively, of those in the non-stressed plants, indicating a significant difference between the control and transgenic plants. During the salt stress, chlorophyll fluorescence decreased by 25.4%, 18.6%, 9.6% in WT, T2 and T3, respectively, on day 21 of salt stress application. The obtained results demonstrated that Electron transport rate declined under salt stress condition and the plants tolerate the salt stress condition through maintaining higher efficiency in photosynthetic electron transport in comparison with salt sensitive plants (WT). Similarly results were observed for stomatal conductance and transpiration rate under salt stress condition. Obtained results from gas exchange measurements proved that transgenic faba bean line T3 can maintain photosynthetic rate, ETR (Electron Transport Rate), Stomatal conductance and transpiration rate under salt stress condition in comparison with transgenic line T2 and WT. Finally we can conclude that the expression of potato PR10a gene in faba bean causes enhanced tolerance to salt stress.

Abeer Farag Desoukey, Email address: Abeerbiotech@yahoo.com. Country: Egypt. Bachelor degree in Agricultural bioechnolgy at 2009 from Cairo university –Faculty of agriculture by excellent with great honor grade. My current employement as research assistant at National research center - genetic engineering and biotechnology and i had registed for master degree in plant physiology department – Faculty of Agriculture - Cairo University under title (improvement of faba bean tolerance to abiotic stress by genetic modification). my thesis work is part of project (improvement of faba bean tolerance to Abiotic stress (salt /drought stress) using genetic engineering. This project is funded by Alexander von Humboldt from 2015 to 2019. I had three training - research work visits at (2016 - 2018) and period of each visit from 2 to 3 months to horticulture institute – Hannover University, Germany (from 20/11 to 24/12 -2018). I had attended genome editing training course - Institute of Plant Genetics – Leibniz Universitaet Hannover.

K.M. Golasiński, E.A. Pieczyska

Institute of Fundamental Technological Research, Polish Academy of Sciences, 02-106, Pawińskiego 5B, Warsaw, Poland, email: kgolasin@ippt.pan.pl

Polish-Japanese Joint Research on a Multifunctional Titanium Alloy Gum Metal

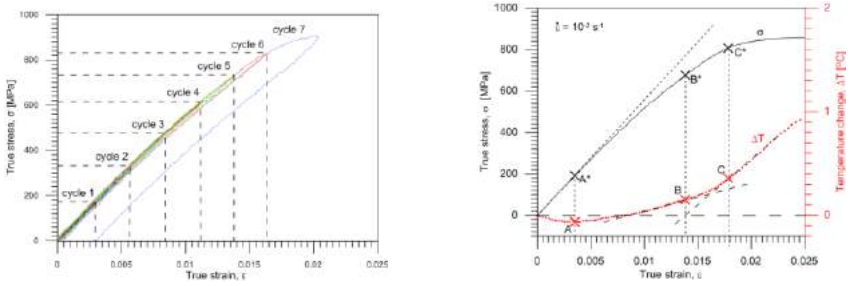
Titanium alloys are well known for high specific strength (material's strength/density ratio) and excellent corrosion resistance when compared to other metals. They have paved their way towards implant applications such as total hip replacement thanks to excellent biocompatibility and good fatigue performance. However, Young's modulus of conventional titanium alloys, which is even over six times higher than a Young's modulus of cortical bone, poses a significant drawback. The mismatch in elastic properties between the implant and the bone can lead to so-called stress-shield effect, which results in a gradual loss of the bone density and fracture at the bone/implant interphase. Thus, the development of titanium based materials with low Young's modulus for biomedical applications has been of particular interest in recent decades. One of them, called Gum Metal, is a relatively new β-type titanium alloy. The alloy was developed at Toyota Central Research & Development Laboratories in Japan at the beginning of the 21st century [1]. Gum Metal is fundamentally composed of Ti_3 (Ta, Nb, V) + (Zr, Hf, O). The superior performance of Gum Metal includes a relatively low Young modulus (around 60 GPa), large recoverable strain (around 2%), high strength (around 1000 MPa) and Invar and Elinvar-like thermal performance [1, 2]. This set of outstanding properties is caused by activity of unconventional deformation mechanisms in Gum Metal, which have been recently discussed in several publications. It was found that a local lattice distortion around oxygen atoms, named nanodomains, which is an intermediate phase between the β phase and the α" martensite, is responsible for the large recoverable deformation of the Gum Metal.

The presented research aims at investigation of mutual correlation between mechanical and thermal characteristics, called thermomechanical couplings, of Gum Metal under selected loadings. The temperature changes determined during the deformation of the alloy serve to look into thermodynamic nature of its unconventional deformation mechanisms [3]. To this end, an experimental set-up combining a testing machine with an infrared system was used. Cyclic loading of Gum Metal with an incremental strain step was performed in order to determine the mechanically recoverable deformation. Stress vs. strain curves of Gum Metal under cyclic tension at a strain rate of $10^{-2}s^{-1}$ with a strain step of around 0.003 are presented in Fig. 1a. The results indicate the large nonlinear recoverable deformation of the alloy. The limit of recoverable deformation of Gum Metal is presented in cycle 5 and equals around 0.014. Stress and temperature change vs. strain curves of Gum Metal under monotonic tension at a strain rate of $10^{-2}\ s^{-1}$ are shown in Fig. 1b. Selected stages of the deformation correlated to the critical temperature change values of the alloy are marked:

1) limit of purely elastic deformation of Gum Metal (A*) determined based on Lord Kelvin's formula and corresponds to maximal drop of temperature (A);

2) limit of recoverable deformation of Gum Metal (B*) related to a moderate growth of temperature (B);

3) onset of dominant plastic deformation of Gum Metal (C*) correlated to faster growth of temperature starting in point (C).



(a) (b)

Fig. 1. (a) True stress vs. true strain curves for Gum Metal under cyclic tension at strain rate of $10^{-2}s^{-1}$ cycles 1-7; (b) Stress and temperature change vs. strain curves of Gum Metal under monotonic tension at a strain rate of 10^{-2} s^{-1}.

To conclude, the analysis of Gum Metal thermomechanical behavior under tension served for investigation of thermodynamic nature of deformation mechanisms active during loading of the alloy. The limit of purely elastic deformation of Gum Metal corresponding to maximal drop of temperature was determined. The unconventional deformation mechanisms active during large recoverable deformation of Gum Metal were found to be of dissipative nature. The onset of dominant plastic deformation of Gum Metal was accompanied by a faster growth of temperature.

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Karol Golasiński is a PhD candidate at the Institute of Fundamental Technological Research, Polish Academy of Sciences. His scientific interests embrace mechanics and characterization of superelastic materials in particular multifunctional, smart titanium based alloys. His PhD dissertation entitled "Analysis of thermomechanical couplings in Gum Metal under selected loadings" is planned to be defended shortly. He coauthored 10 research articles published in international journals listed by SJR.

Grochocki Paweł

Department of Power Systems and Electrical Drives,
West Pomeranian University of Technology Szczecin, Poland

Hybrid Excited Machine with Magnetic Barriers for Electric Vehicles

Presently, permanent magnet (PM) electric machines are ordinarily used as a drives in vehicles and other variable speed applications. Unfortunately, usual PM machines have a significant drawback related to the low effectiveness of flux-weakening (FW) at constant power operating region. Fundamentally, a flux-weakening strategy is used to extend the motor speed range by using *d*-axis stator current produced additional losses in the power supply unit. Therefore, in the world nowadays there are many concepts of hybrid excited machines and its control strategies for variable speed drive systems. This paper, therefore presents a prototype hybrid excited electric machine with embedded permanent magnets, magnetic barrirs and excitation windings in the rotor structure to electric vehicle drives. The results of experimental research of back-emf and the cogging torque waveforms have been achieved at different DC field excitation current compared with FEA results. The experimental result shows that in the proposed machine the induced voltage control range from 77.6V to 129.8V and field control range (FCR) is 1.67 is obtained. Minimum values of cogging torque are approx. T_{cmin} = 0.3 Nm in the range of current density from j_{exc} = 4 A/mm^2 to j_{exc} = 6 A/mm^2. The maximum value of the cogging torque obtained by FEA predictions T_{cmax} is 0.65 Nm at the current density of j_{exc} = 8 A/mm^2. The cogging torque maximum value obtained by experiment is varied, and it is from 0.28 Nm to 0.50 Nm. The obtained results confirm that the proposed machine design with hybrid excitation allows to extend the PM machine speed range and increase the drive unit efficiency at different loads and speeds. The results revealed that the presented machine prototype permits to control the machine flux in the voltage range up to 2:1.

M. Sc. Eng. **Paweł Grochocki** is a PhD student at West Pomeranian University of Technology, Szczecin and IEEE Poland Section Student Representative. Laureate of the Huawei Global competition "Seeds for the future", scholarship holder of Minister of Science and Higher Education and President of the City of Szczecin.

Jurgielewicz Paweł[1], Mindur Bartosz[1], Szypulska Małgorzata[1], Hottowy Paweł[1]

AGH University of Science and Technology(1)

Scalable real-time DAQ system for neural signal analysis

Abstract: *We present an efficient data acquisition (DAQ) system that is able in real-time to process, save and non-trivially visualize data from in vivo neural activity experiments. The measurements are based on multielectrode arrays (MEAs) readout using a dedicated front-end electronics and controlled by a standard personal computer (PC).*

Introduction

While the idea of the recording of the brain activity with MEAs, in principle, allows getting data with an unprecedented spatial and temporal resolution with even single neuron accuracy it also requires carefully designed electronics as well as versatile DAQ system that will allow experimenters to make prompt decisions based on the data visualization. The visualization of neural signal activity is a complex task if experimenters want to be able to easily identify the spatial and temporal activity of neurons online. Thus, such a DAQ system should operate efficiently and its architecture should be flexible and provide possibilities of extensions if any new experimental needs arise.

DAQ System Design

Our DAQ system is the part of the complex measurement setup consisting of a) custom readout electronics [1] which amplifies, filters and digitizes the electric signals recorded by the microelectrodes, b) National Instruments 6537 DIO card, which is an interface between electronics and PC, c) simplified LabView software module, d) the DAQ system which is the final consumer of measurement data (streaming of data between LabView and DAQ is performed over Ethernet).

The parameters of custom electronics imposed the requirements for DAQ capabilities. The DAQ has to simultaneously acquire and save data from up to 512 data channels at the rate of 40 MSamples/s each (in total 312,5 Mb/s), it also must provide convenient means of real-time signal visualization including the definition of on-screen plot layouts, data filtering and synchronization with the external trigger sources.

To meet these requirements, our DAQ system is decomposed into several modules, running on separate processes and interacting with each other. Raw data coming from the LabView software is distributed between the save process and Visualization Objects (VOs). Visualization Object is a set of processes spawned for every single Visualization Window, which prepare and render plots according to the parameters chosen by the user. Hence, there is the possibility to have many Visualization Windows, all with a different set of visualization parameters - for example, one may have side by side comparison of data and its FFT.

Our DAQ has been programmed with Python language with extensive usage of NumPy [2] for fast data transformations. The visualization part is based on PyQtGraph [3]. The tests show that such an architecture is sufficient for presenting the measurement data in real-time on an average PC.

Conclusion and Future

Neural activity experiments require constant, accurate and reliable signals monitoring that is easy to use during an experiment. Our DAQ system has been created with actual biologists' needs in mind and has already become a vital part of the neural activity measurement setup being used in pilot experiments.
It is worth to mention that the hardware setup, we are using, is not only able to measure neural cells' activity but also to electrically stimulate them at the same time using any electrode channel. This feature opens entirely new experimental horizons but also requires a piece of software that would allow to intuitively build stimulation protocols. Thereby, we are currently focused on creating such software which combined with the discussed DAQ system will greatly enhance experimental possibilities and as a result, will lead to a better understanding of the way brain works.

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Paweł Jurgielewicz received the M.Sc. degree in technical physics from the AGH University of Science and Technology in 2018. He is currently a Ph.D. student, also at the AGH.
During his first and second cycle studies, he was rewarded by ABB Jurgen Dormann Foundation with the 5-year scholarship which is granted to talented students from the entire world. At the same time, he was actively contributing to research projects at CERN, Switzerland and also got there a 1-year contract as a Technical Student.
His research interests are in computer graphics, effective data processing and visualization. In his free time, he is devoting himself to the passion of the photography.

Kaczmarczyk Adriana[1], Nosek Michał[2], Miszalski Zbigniew[1]

(1)The Franciszek Górski Institute of Plant Physiology, Polish Academy of Science, Niezapominajek 21, 30-239 Kraków, Poland

(2)Institute of Biology, Pedagogical University of Cracow, Podchorążych 2 St., 30-084 Kraków, Poland

Cadmium uptake from polluted soil by C_3/CAM intermediate halophyte *Mesembryanthemum crystallinum* L. performing different types of photosynthetic metabolism

The pollution of the environment with toxic heavy metals (HMs) is mainly the result of many anthropogenic activities such as mining, operations in foundries, smelters and other metal-based industrial processes, but also domestic and agricultural use of metals and metal-containing compounds. HMs are serious problem because of the ease they can be uptaken by plants and then included in the food chain of animals and human. In plants, these metals may either directly or indirectly cause a broad range of physiological and biochemical dysfunctions culminating ultimately in the sharp decline of crop production. Symptoms of their toxicity in plants are mainly chlorosis, growth inhibition, browning of root tips and subsequently – death. Many areas polluted with HMs simultaneously exhibit increased concentrations of soluble salts. That is why halophytes may play important promising role in process of HMs soil bioremediation , called phytoremediation. A plant which may have great potential in this process is common ice plant (Mesembryanthemum crystallinum). Though the common ice plant is native to East and South Africa, it has managed to spread with human to almost all continents. *M. crystallinum* is a facultative halophyte with an ability to change its photosynthetic metabolism from C_3 to CAM (*Crassulacean Acid Metabolism*), mostly as a result of abiotic stressors (drought, excess light, high salinity) occurrence. As the crop the ice plant's unique feature is the ability to function on soils exhibiting high salinity (mostly NaCl); it is related among others with mechanisms of salt ions detoxification through their excretion or storage in vacuoles and also antioxidant system stimulation and also water resource management. In addition, plants of *M. crystallinum* have so called epidermal bladder cells – a specialized microscopic-size cannisters covering leaves and shoots, where dissolved salts can be stored.

In this study the response of common ice plant to increased doses of Cd (0.8 - 800 µmol per pot) was analyzed. Plants performing C_3 and CAM metabolism were exposed to Cd treatment for 8 days. No visible symptoms of Cd toxicity has been observed after treatment. None of tested Cd doses affected growth parameter or tissue water content in both C_3 and CAM performing plants. Analysis of chlorophyll a fluorescence exhibit high tolerance of photosynthetic apparatus in both groups of plants to Cd treatment. In addition, analysis of carbon isotope discrimination ($\delta^{13}C$) confirmed that Cd is not capable to induce photosynthetic metabolism shift from C_3 to CAM. Plants in both states uptaken significant amount Cd only above specific threshold dose (8 µmol) and the most it was accumulated in roots, what may suggest that M. crystallinum respond to high Cd concentrations launching the excluding strategy. Despite the similar amount of bioavailable Cd in soil, at the highest Cd treatment, plants performing C_3 metabolism accumulated much more Cd. Moreover, in CAM plants treated with the dose of 80 and 800 µmol the amount of Cd accumulated in the roots was similar.

These results show that CAM-performing plants, despite increasing the quantity of bioavailable Cd, could limit its uptake. We suggest that CAM plants may present specific mechanism modulating and limiting Cd uptake by roots which is not observed in plants performing C3 photosynthetic metabolism.

CV – Adriana Maria Kaczmarczyk

My name is Adriana Maria Kaczmarczyk and I am PhD student of third year in the *Franciszek Górski* Institute of Plant Physiology in Polish Academy of Sciences in Cracow and specialize is stress biology. Since June 2017 I am employed in the NCN project - OPUS 11 entitled „Does remediation of cadmium depends on photosynthetic metabolism?". My research concerns determination of high cadmium doses on the halophyte *Mesembryanthemum crystallinum* L. as dependent on the type of photosynthetic metabolism. To accomplish my research I cooperate with Plant - Microorganism Interactions Group in Malopolska Centre of Biotechnology of Jagiellonian University. My scientific interest focuses on molecular biology, especially methods of gene expression regulation. As for my hobby, I take part in worldwide postcards exchange, so called „postcrossing".

Kafa' A. Al-Helal

Al al-Bayt University, Jordan, Almsaedk8@gmail.com

Synthesis and Anti-tumor Activity of 5-(Substituted Piprazinyl) Imidazole Derivatives

Imidazole is one of the important heterocyclic compound in the aromatic world of medicinal chemistry. It is also an important constituent of several natural products including purine, histidine and nuclic acid. The nitroimidazoles have shown great promise for targeting different types of cancers. 5-Halogeno-4-nitro-1H-imidazoles, as the most interesting class of these compounds, showed important biological activity as antibacterial agents and potential radiosensitizers. In our previous studies some new compounds containing 4-nitroheterocycles with different substituent's at the C5-position of the imidazole ring were synthesized and evaluated for activity against several viral and tumor species.

In view of the wide continued interest in the activity spectrum and profile of the nitroimidazoles and in continuation of our research on the synthesis and biological evaluation of imidazole analogs [1,2]. We envisaged to prepare novel heterocycles incorporating the imidazol moiety, with evaluation of their anti-tumor and antibacterial activity.

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Ms. Kafa A. Al-Helal (1990) is a chemistry teacher / Ministry of Education. She obtained her high school diploma from Amra secondary school in Al-Mafraq, Jordan. Then she joined Al al-Bayt University in 2010 and she obtained her bachelor's degree in chemistry in 2013. She joined Al al-Bayt university, Jordan in 2016 as MSc student (organic chemistry). During her MSc. study she taught general chemistry labs for the undergraduate student at chemistry department / Al al-Bayt university, Jordan.

Kopeć Przemysław

The Franciszek Górski Institute of Plant Physiology, Polish Academy of Sciences
Niezapominajek 21, 30-239 Kraków

Understanding the mechanisms of cereals response to soil water deficit

Cereals are the most important food crops in the world. Soil water deficit currently is a real problem that limiting plant growth and agricultural productivity. Stable crop production is a major challenge in the current fast global climate change. An excellent experimental model plant to study the cereals mechanisms of responses to environmental stresses is barley, economically important crop with high genetic plasticity. Barley has one more important feature, it is relatively easy to produce its doubled haploids (DH), fully homozygous plants. The doubled haploid plant originates from a plant with one set of chromosomes, in which each chromosome has been doubled. The doubled haploid technology shortens the time of plant breeding by at least ten years. Populations of DH lines of barley obtained in the Department of Cell Biology IPP PAS are used to observe changes in the phenotype, proteome, and transcriptome of flag leaf under the influence of soil water deficit. Between DH lines occurred considerable differences in drought stress responses. This stress has a huge impact on the profile of proteins accumulation. Proteins involved in responding to drought stress participate in many different metabolic processes. Differences in the proteome between drought-resistant and drought-sensitive plants are unique to the compared accessions. Unraveling the complexity of plant response to water deficits one of the essential areas in plant sciences to derive strategies to develop stress-resistant cultivars.

Przemysław Kopeć

I work at The Franciszek Górski Institute of Plant Physiology PAS in Kraków. My scientific interest is focused on explaining the mechanisms plant responses to various stresses, that are important for plant breeding. At the beginning of my scientific activities, I studied androgenesis, gynogenesis and polyploidization process in Miscanthus genus. Currently, I have focused on two problems: the base of microspore embryogenesis and mechanisms of plant responses to environmental stresses. Specifically, I investigate changes in the proteome, the activity of key enzymes and the role of antioxidant defense system to combat oxidative stress. The object of my research is crop plants: barley, wheat, buckwheat, lupine.

Kulikova Irina

Penza State Technological University (Penza, Russia)

Multilingualism as a study object

The notion of multilingualism is closely related to the idea of living in the world which is due to political, economic, scientific, social and cultural interconnections resembles a 'global village' more and more. Being a diversified phenomenon, multilingualism has become a subject matter of different academic spheres. It is interesting to see what aspects attract researchers' attention and what challenges scientists see in them.

Historically, active application of more than one language is associated with periods of spread of political and economic influence. After the Norman Conquest French started to be extensively used within the territory that later became Great Britain. In their turn, British civil and military officers helped to distribute English across the then British Empire. The French language was and is used in those regions of Africa that used to be French colonies. Learning Russian was obligatory in most schools of Eastern Europe after the Second World War. The languages mentioned had strong political and cultural impact on the countries involved.

Social sciences discuss multilingualism as a phenomenon stipulating cross-cultural interaction, mutual enrichment of national experience, better communicating complex ideas as well as introduction and adoption of global humanistic values. The researchers also regard such personal benefits as broadmindedness, empathy, tolerance and ability to cooperate with people irrespective of their nationality, race or religion. Those who can speak more than one language have better career choice and perspectives, e.g. in international organizations, transnational corporations or educational institutions, and essentially are considered to be more successful and 'educated' people.

Psychologists consider cognitive processes involved in multilingualism and evaluate their effectiveness supporting general (but not exceptional!) belief that using more than one language contribute positively to a person's creativity, metalinguistic awareness and analytic skills. R.M. Diaz and C. Klingler (1991) mention better results in verbal and nonverbal tasks, better control of language processing, better verbal mediation skills and others. M. Saville-Troike (2006) focuses on the fact that multilinguals perform cognitive tasks in a way which distinguishes them from monolinguals. Explaining what accounts for 'different thinking' is a challenge for researchers in the sphere.

International educators link multilingualism to creativity and problem solving, to emotional intelligence (EQ) and social skills development, to multitasking and divergent thinking. The abilities mentioned are critical for addressing complex issues and problems at all levels in rapidly changing global environment (Stein-Smith 2016). Scientific teams and institutions supported by private, governmental and international (including the UN) funding are working at projects aimed at improving the abilities with the help of language learning.

Language teachers, having in mind to facilitate their students' correct and fluent non-native language using, debate diverse aspects of a new language (L2) acquisition, among them – differences in learner's cognitive styles and strategies and various teaching approaches. They compare and contrast learning a mother tongue (L1) and an L2 and also discuss the impact of microsocial and macrosocial factors on the process success. They deal with communicative competence and its constituent parts, with components of language knowledge. They invent, test and adopt receptive and productive activities for efficient L2 acquisition.

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Irina Kulikova,
PhD in Pedagogy (Language Teaching Methods), Associate Professor
Head of Foreign Languages Department
Penza State Technological University (Penza, Russia)
i-kulikova@list.ru irvalkul@gmail.com

Kulikova Natalia

Jagiellonian University, Cracow

Problem of terminological mistakes in translated scientific texts (on the example of pharmaceutical terminology in the A.C. Celsus' treatise "De Medicina")

Abstract: *The paper concerns the problem of the scientific texts translation. On the one chosen example, possible reasons for translators' errors were indicated.*

Technical translation always demands some different requirements than, at the same time, does fiction translation. If the literary translation allows some liberty and interpretability, then this is absolutely impossible in the technical translation.

A.L. Pumpyansky wrote: "Translation of scientific and technical literature is a special discipline that arose at the junction of linguistics, on the one hand, and science and technology, on the other. Therefore, the translation of scientific and technical literature should be considered both from linguistic, and scientific and technical positions, with the primacy of the first in the study of common language issues and the second - when considering narrow terminology" [1, p. 25].

Since the leading form of scientific thinking is the concept, almost every word in a scientific text is expressed by special lexical units - terms. The term is a denoting word or phrase characteristic of this branch of science and technology, and it has strict semantic boundaries. Accordingly, terminology is a system of concepts of the given science, fixed in the corresponding verbal expression. If in a common language (outside of this terminology) a word can be polysemantic, then, coming into a certain terminology, it becomes monosemantic, and the translation uses a meaning different from that used in everyday life. Therefore, the main mistakes that a translator (especially non-professional) can make translating a scientific text are related to the reluctance or inability to use dictionaries and, not least, a lack of understanding of the subject – lack of knowledge of what the term means, even in the native language.

History keeps many cases when errors in translation distorted an original text, and such translation was taken to be true. Hence there are discrepancies in different editions of the same text. As an illustration of the problem, we present in the paper, an example of a recipe borrowed from Latin language of classical period (the famous treatise of the Roman Encyclopedist Aulus Cornelius Celsus "On Medicine", Book V). [2]

Comparing three translations – Russian, Polish and English – of the same recipe, we found that the translators used different meanings of the same word. And as a result, we have obtained different recipes. Thus if in the recipe is changed at least one ingredient, then it is already a completely different remedy.

In such situation it is logical to put the questions: is there an error in one of those translations? Which of translations we will take for the correct, and which of them is wrong?

Having carried out a linguistic analysis of the text, we can state that only two translations (Polish and English) are plausible. Specialists in the field of linguistics can see what the error is, and how to correct it. And then, what should non-professional readers and users have to do in the case of error?

So, summing up, we may conclude that for a successful translation of scientific literature, translator needs to have a certain lexical reserve, including special terms; to know the specific grammatical constructions of the scientific style of a foreign language; to know the lexical, grammatical and stylistic rules of translation; properties of creating dictionaries and to be able to use them, and to be guided in the specific field of scientific knowledge to which the translated texts belong.

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Natalia Kulikova – former Assistant Professor at Penza State Technological University, Penza (Russia). Fellowship of Queen Jadwiga Foundation (2009), then Erasmus fellowship (2015-16) at the Jagiellonian University, Cracow. Now a PhD-student at the Institute of Classical Philology, Jagiellonian University, Cracow. Author of over 20 scientific and didactic papers and communications.

Main topic of scientific interests: lexicology, lexicography, translation theory, classical languages.

Tomasz Jacek Lis

College of Social and Media Culture in Toruń

Austrian Universalism – the 19th Century Heritage of the Central and Eastern Europe

Although the term of globalization has not been popular earlier than since the 20th century, its presence could have been observed few centuries earlier, when due to geographical discoveries, various parts of the world started to liaise with each other. However, it was the 19th century and the colonial expansion that cause globalization to be shaped the way it is currently perceived. Competition of great colonial world powers caused that the western ideas reached the farthest corners of the world starting from the African savannah and ending at the Asian markets.

However, not only Africa or Asia were subject to colonialism yet also Europe. It pertained to Austria (from 1867 Austria-Hungary) which led a policy similar to colonialism towards its provinces. An example may be the Kingdom of Galicia and Lodomeria from the beginning of the 19th century, and subsequently Bosnia and Herzegovina till the 1980s of the 19th century. Since a colony is not a geographically remote land, yet a civilization-wise. Even though the Austrian colonialism was derived of certain colonial elements such as i.e. racism, yet it was introducing towards its provinces certain elements deriving from the colonial policy of oversea empires.

These were most of all a common army, administration and architecture. The first one was sharing universal values related to the respect of dynasty and emperor what could be observed during the course of I World War when even the Serbs from Vojvodina decided to stand out against their fellows from Serbia in order to protect the emperor. In turn, the administration guaranteed a similar level of services in every country, and for that purpose some office workers were transferred from the centre into the province – Czechs and Austrians to Galicia in the first half of the 19th century, and subsequently Czechs, Poles and Austrians to Bosnia and Herzegovina after the Congress of Berlin (1878). The last most prominent element of the Austrian Universalism is deemed to be the architecture which elements till now connect the countries entering once into the composition of the dualistic monarchy with each other.

The Central and Eastern Europe, as well as part of the Balkan peninsula has got a common heritage in the form of a cultural and architectural heritage after the Habsburgian monarchy. It is the element permanently conglomerating the territories with each other, even though over 100 years has passed from the decay of Austria-Hungary.

Tomasz Jacek Lis

In 2010, I defended a BA in Journalism and Social Communication at the College of Social and Media Culture in Toruń. Three years later, at the Nicolaus Copernicus University, I defended my master's thesis under the direction of Professor Jarosław Wenta. In the same year, I got a doctoral study. In 2018, I defended my doctorate with honors. During my Master's and PhD studies, I was twice a scholarship holder at the University of Sarajevo (Faculty of Political Sciences), and also spent half a year as part of the Erasmus scholarship at the Faculty of Philosophy of the University of Split, where I obtained the language certificate from Croatian (C1). During my doctoral studies I have had a lot of research in Poland and abroad, among others Bosnia and Herzegovina, Croatia, Ukraine and Austria. In addition, in 2011 I was an apprentice at the Embassy of the Republic of Poland in Sarajevo.

I was a participant in two scientific projects. In 2015, as the project manager for the digitization of Polish documents from the Federation of Bosnia and Herzegovina, financed by the Embassy of the Republic of Poland in Sarajevo, a year later I participated in the project "70 years since the return of Poles from Bosnia". In 2015, I received a Scholarship from the Minister of Higher Education for the Best Doctorates. In 2017, I took the third place in the poster competition at the Humboldt Societas Polonorum Congress in Krakow. In my previous scientific activity I published one scientific monograph, and also authored or co-authored three source editions, including two in Croatian. In addition, I published a dozen or so articles in scientific journals (including foreign journals) as well as chapters in monographs. I participated in many Polish and foreign conferences in the USA, Bosnia and Herzegovina, Serbia and Croatia.

Lytvynenko Anton[1,2], Mishura Andrey[1], Brzózka Agnieszka[2], Kolotilov Sergey[1], Sulka Grzegorz[2]

L.V.Pisarzhevskii Inst. of Physical Chemistry of the National Academy of Sciences of Ukraine, (1)
Jagiellonian University, Faculty of Chemistry, Kraków, Poland (2)

Nanoporous metal foams: "inverted" nanomaterials for catalytic applications

Abstract: *Superior electrocatalytic activity of nanoporous silver foam in reductive dehalogenation of organic halides compared to smooth silver was shown, essentially lesser (3 orders of magnitude) masses of silver were required for creation of the foam-based electrode compared to bulk one. Formation of stable nanocomposites of nanoporous silver and copper foams with metal-organic frameworks particles was demonstrated.*

Introduction

Metal nanoparticles and similar nanostructured forms of metals typically reveal superior catalytic activity in various chemical reactions compared to corresponding bulk metals both due to excessive surface energy that amends the properties of superficial atoms as well as due to high specific surface of nanomaterials. However, separation of finely dispersed catalyst (even deposited on porous support such as activated charcoal or Al_2O_3) from the reaction products constitutes a challenge (especially crucial for such toxic metals as Ni or Pd) and prevents their utilization in flow reactors. Nanoporous metals foams (NMFs) [1] that can be described as result of interconnection of metal nanoparticles and/or nanorods into *a unitary whole* in a way that leaves place for nanoscale porosity can be applied to mitigate these issues. The **aim** of this work was to **evaluate catalytic properties of NMFs** on example of Ag NMF in reductive electrochemical dehalogenation (comparing to smooth Ag) as well as to **elucidate possibility of NMFs modification** by particles of metal-organic frameworks (**MOFs**) thus covering NMF surface by microporous matter that can serve as a molecular-level "sieve".

Main theses

Ag and Cu NMFs were prepared by electrochemical deposition from acidic solutions – aqueous $AgBF_4$+HBF_4 (the reported procedure improved by us) and $CuSO_4$+H_2SO_4 [2] – accompanied by excessive H_2 evolution. The H_2 bubbles served as "soft templates" blocking growth of metal crystallites and leading to formation of the hierarchically porous metal structure with the nano- or submicroscale-sized smallest elements (*e.g.* Ag filaments' diameters were *ca.* 150 nm in average). Variation of conditions of Ag NMF synthesis revealed that the only factor significantly impacted the morphology of the NMF was Ag^+ concentration in the electrolyte.

Comparison of cyclic voltammograms of various organic halides in dimethylformamide on smooth Ag and Ag NMF revealed that potentials of the reduction peaks associated with dehalogenation processes were systematically shifted toward less negative values on Ag NMF (the largest shift was about +350 mV for bromobenzene). These results suggested superior electrocatalytic activity of Ag NMF compared to smooth Ag which, in turn, is an established electrocatalyst for these reactions. Electrolysis of 1-fluoro-4-bromobenzene on Ag NMF led to fluorobenzene, less than 1 mg of Ag NMF exhibited efficiency comparable to those of 0.5 g of the silver wire (the significant decrease in the required silver amount was attributed to its nanostructuring).

Ag and Cu NMFs readily formed nanocomposites with particles of MOFs (HKUST-1, MOF-5, MIL-101(Cr) and MIL-53-FA(Al)) upon dropcasting of the suspension of the latter onto the

surface of the NMF. The composites were stable to washing out by solvents (partial MOF exfoliation was observed for MIL-101(Cr) on Ag NMF only). Such materials can be considered as “inverted” version of well-known “metal nanoparticle / porous support” composites, the advantage of the former is the abundance of catalyst separation stage and possible usage in flow chemistry.

Conclusion

The nanoropous Ag foam revealed essentially higher electrocatalytic activity compared to smooth Ag in reduction of organic halides (up to +350 mV peak potential shift on cyclic voltammograms for bromobenzene). Nanostructuring led to a significant decrease of the Ag amount required for creation of electrodes with similar performance. Variation of synthetic conditions did not considerably influenced the NMF structure except Ag^+ concentration. Formation of stable NMF-MOF composites was demonstrated.

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Lytvynenko Anton

PhD in Physical Chemistry (2016), L.V.Pisarzhevskii Institute of Physical Chemistry of the National Academy of Sciences of Ukraine. Co-author of 18 papers in scientific journals, 4 patents of Ukraine, abstracts of 33 reports on international and local conferences. Postdoc in Jagiellonian University, Kraków, Poland (2018–2019, via Visegrad Scholarship). The work is devoted to study of 3d metal coordination compounds and nanostructured metals, their composites; structure, magnetochemical, catalytic, electrochemical and electrocatalytic properties of these materials, in particular, in hydrogenation by gaseous hydrogen and electrochemical reductive dehalogenation of organic compounds. Supervisor of 2 student (bachelor and master) theses, research leader of a State Fund for Fundamental Research project (2018). Winner of the Prize of Ukrainian Parliament for the most talented young scientists in fundamental and applied research and scientific-technical developments (2016) and the Prize of the National Academy of Sciences of Ukraine for young scientists and students for the best scientific works (2019).

Mametov R. Radik [a,b], **Ratiu Ileana-Andreea** [a,b], **Buszewski Bogusław** [a,b]

[a] Department of Environmental Chemistry and Bioanalytics, Faculty of Chemistry, Gagarina 7, 87-100, Torun, Poland
[b] Interdisciplinary Centre for Modern Technologies, Nicolaus Copernicus University, Wileńska 4, 87-100, Torun, Poland

Volatile organic compounds associated with colorectal cancer biomarkers

Colorectal cancer is through the most recurrent type of cancer, associated to high mortality rates1. As demonstrated, after the analysis of fecal samples originated from 30 healthy persons, leading into a total number of and 297 compounds, it was found that 80% of these were common2. Changes in stool VOC profiles can result as an alteration process induced by pathogenesis and changes in gut microbiota, when compare healthy with diseased patients. Furthermore, the analysis of VOC emitted from stool samples proved their ability to reveal the disease etiology, as well as for the identification of biomarkers associated with specific diseases, including colorectal cancer3. In this sense, studies regarding the investigation of volatiles associated with biomarkers of colorectal cancer have been developed in attempt to discover a fast and non-invasive screening method suitable to be used for early diagnosis of this disease. Various analytical methods, both online and offline, have been employed for the analysis of volatiles emitted from stool samples collected from patients with colorectal cancer4. Solid phase microextraction (SPME) or thermal desorption (TD) sorbent tubes were used for pre-concentration of such compounds[5]. The volatile biomarkers of colorectal cancer detected from faeces proved to be compounds with polar characteristics and also they can be associated with bacterial metabolites. However, a stool sample is a complex matrix and this is the reason why the data processing may imply a laborious statistics and modelling computational methods. As conclusions, the analysis of volatile biomarkers represents a bright perspective of a new screening method, suitable to be used in clinical practice prior to the recruitment for other detailed and invasive exams.

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Radik Mametov
PhD student Nicolaus Copernicus University, Interdisciplinary Center for Modern Technologies, Torun. Phone: +48 575 460 883
E-mail: mametov.radik@gmail.com

Education

Bachelor of Engineering Sciences in Chemistry in Al-Farabi Kazakh National University
Graduation work: «Preparation of powder materials based on borides in the combustion mode» 2011-2015
Master of Engineering Sciences in Nanomaterials and Nanotechnologies in Al-Farabi Kazakh National University 2015-2017
Master Thesis: «Synthesis of refractory nanopowders of zirconium boride by SHS method»
PhD student Nicolaus Copernicus University 2018-present

Research experience

Researcher in the laboratory of Self-propagating high-temperature synthesis (SHS) materials in the Institute of Combustion problems, Al-Farabi Kazakh National University
Website: icp.kz 2012-2017
Tasks:
Participant of the project “Synthesis of refractory powder materials from boric raw materials of the Republic of Kazakhstan” 2012-2015
Participant of the project “Development of scientific foundations of ceramic materials based on borides of transition metals in mode of solid flame combustion” 2015-2017
Trainee in laboratory «Ecology of Biosphere» in Center of Physical Chemical Methods of Research and Analysis in the project: “Monitoring concentrations of organic pollutants in ambient air of Almaty using GC-MS and SPME” 2017-2018

Publications

Self-propagating high-temperature synthesis of borides of transition metals. (2016) // Proceedings of International Symposium «Physics and Chemistry of Carbon nanomaterials»

Alaa Ibrahim Marzouk[1], Mohamed Kamal El-Bahr[1], Ashraf F. El-Baz[2], Hattem M. El Shabrawi[1]

1 Plant Biotechnology Department, Genetics Engineering and Biotechnology Division, National Research Center (NRC), Egypt.
2 Industrial Biotechnology Department, genetic Engineering and Biotechnology Research Institute (GIBRI), University of Sadat City, Egypt

Effect of Lights Spectrum On Antioxidants Production as A Natural Hepatoprotective Agent from Chicory Cultivars InVitro

Introduction

Egyptian and European Chicory "Chicorium endive Spp.Pumbilum, and Chicourium intybus" "C. endive, and C. intybus" are edible important plants that belongs to the family Asteraceae. (Vermeulen et, al, 1994), (Saffaf,2012). Most of Asteraceae species are used as sources of medicines, edible oils, and vegetables etc (Mushtaq et., al., 2013). Recently, hepatic disease is curing using treatment according to plant-based preparation (Vishwanath Jannu et, al. 2012). It had been found that they have a potential therapeutic material for treating chemically induced or viral hepatitis, and enhance immune system (Al-Malki et al., 2013). In this context, a relatively limited number of studies have been carried out to assess the possibility of using plant biotechnology techniques for enhance the production of Hepatoprotective agents in vitro cultures of Herbal and Medicinal plants (El-Bahr et, al.,2018). (Wu M-C et, al, 2007 and Qian H et, al. 2016) proved that the application of LEDs to seedling plants gave beneficial effects related to the enhancement of bioactive compounds. Thus, the present work was carried out on The Egyptian, and European chicory to produce the hepatoprotective agents in cell cultures of these plants. Different types of light qualities and duration were subjected aiming to enhance Hepatoprotective agent's accumulation in cell cultures of Chicory plants.

Matirals and Methods

In this work we tested two explants from Chicory plants "Leaf and Root" on several commercial MS medium contains different hormonal combination for callus production. The selected explant was Leaf for its huge callus production, and the selected Medium were containing 4.4g/L MS medium including modified vitamins, 30g/L commercial sucrose, 6g/L Phyto-Agar, 0.5mg/L NAA and 4mg/L 2ip under 5.8pH. It incubated under light regime 16/ 8-hour light/dark at 25 ± 2ºC. The callus produced after one week of culture and the best harvest were after 30 days.

Light elicitation and period of examination

We used three different colors of light intensity (White 2720 lux, Blue 2620 lux, Red 2640 lux). For three different examination period (12, 24, and 36) days respectively (L.Jaakola & A. Hohtola, 2010) (Szopa & Ekiert 2,2016), (El-Baher et, al., 2018). The control was the intact plant of both Egyptian and European Chicory. We investigate nine treatments for each cultivar, each treatment contains three replicates. The treatments have collected three times once each 12 days of experiment. Three replicate each time within (12,24,36 days) to compare it with the initial time before exhibition. The incubation Room was highly controlled with fixed temperature and high containment level of light. Each light effect differently on the callus culture, the effect exchange according to the examination period and the light color. The Morphological effect

appeared on callus size, shape, and mostly its color. Qualitative analysis of phenolic acids using HPLC analysis:

The test done by FSQC Lab at Cairo university, Faculty of agriculture, El-Gammaa St, Giza. Standers used in HPLC showed in Table S1 (see supplementary data).

Conclusion

This study proved for the first time that the callus culture of Egyptian Chicory “C.endivea” produced a high content of Hepatoprotective agents when heeded to red light for 12 days as it have a curative medicinal values against various types of liver diseases. This is the first evidence reported about the importance of light quality on in vitro production of natural Hepatoprotective agents from Chicory plants.

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I had Finished my Bsc in Biochemistry as a Major Specialization, Chemistry Department, and Microbial Biotechnology Science as a Minor Specialization, Microbiology Department, From Faculty of Agriculture, Cairo University, with "Very Good" in June, 2006. I got a Master of MAICh with 60 ECTS in Horticulture Genetics and Biotechnology in Sept.2014, Mediterranean Agronomic Institute of Chania, Chania, Creete, Greece. From July 2006 till now Research Assistance at National Center Research in Group of Molecular Genetics (Nobel Project), (work on Genetics transformation in plant using bacteria and other methods, Gene, Protein, DNA Isolation, PCR, Isozymes, etc), (plant biochemistry department in Genetic Engineering and Biotechnology Division). I Had attended to the Workshop in "Bioinformatics Approaches for Analysis of High-throughput Biological Data" 2-8 September 2012 " ICGEB Training Course", Istanbul, Turkey. Also Had attended to the Biovision Fourm in 15-16 April 2015, Lyon, France.

Babatola Dominic Olawa[1] & Erhabor Sunday Idemudia[2]

Lifestyle and Disease Niche Area, Faculty of Health Sciences 1,2,
North-West University, Faculty of Humanities, South Africa

Globalization and mental health: Connecting the biopsychosocial conditions of ageing in Europe and Africa

It is known that psychopathological conditions are on the rise across the globe. Due to the discrepancies in cross-cultural meanings and interpretations in research and knowledge about the causes of mental illness in Africa and the East, traditional psychiatry and clinical psychology have often been Eurocentric in the current diagnostic tools such as ICD 10 and DSM V rather than a focus on the global perspectives of mental illness. Although, more recent approach to the classification of mental illness recognized these shortcomings and have included culture-specific syndromes such as "koro" in the ICD-10. However, the Western approach to understanding psychopathology continue to dominate with little concern for cross-cultural explanations. Perhaps, this perspective reflect why the generality of African population challenge the efficacy of traditional psychotherapy and continue to believe that effective treatment for mental illness lies in churches, witch-doctors and other spiritual healers. Noting these inadequacies, new approaches to mental health provisions emphasize a movement from globalization of mental illness to globalization of metal health. Mental health globalization is the understanding of factors that constitute mental health in culturally appropriate ways which may inform designs, policies and treatments. Adopting this perspective, the current study aims to situate the biopsychosocial determinants of mental health of older adults in two culturally different regions of Europe and Africa. Based on these cultural variations, the following research questions are noteworthy: Is there a convergence on the construct of mental health for older adults in the both continents? Are impacts of physical health burdens on mental health outcomes the same? What are the specific psychosocial or cultural contexts fostering or restricting mental health in both regions? Is there a parity in older adults' mental health levels across the two continents? What variations exist in seeking mental health services and management of mental health problems? Providing answers to these questions will involve the utilization of both qualitative and quantitative designs. Outcomes will enable the understanding of cultural convergence/divergence in the mental health of older adults across Europe and Africa, and an exchange of knowledge about strategies that may foster successful ageing in both continents.

Babatola Dominic Olawa holds a PhD in Clinical Psychology from the Ekiti State University, Ado- Ekiti, Nigeria. He specializes in geriatric psychology and teaches courses in abnormal psychology, statistical methods in Psychology and psychopharmacology. Currently, he is a postdoctoral fellow in North West University, South Africa and a visiting postdoctoral fellow at Jacobs University, Bremen Germany. He has published in both national and international journals.

Pariiska Olena, Kurys Yaroslav

L.V.Pysarzhevsky Institute of Physical Chemistry, National academy of sciences of Ukraine

Oxygen reduction reaction on Co-N-C electrocatalysts based on conjugated polymers and graphene materials

Currently, platinum electrocatalysts are considered as the most effective in the oxygen reduction reaction (ORR) - a cathode process, which is implemented in fuel cells, in particular, with a solid polymer electrolyte. But the limited resources of Pt and its high price lead to the fact that Pt-catalysts are one of the main barriers for the commercialization of fuel cells. So-called Me-N-C catalysts (Me = Co and/or Fe), which are usually obtained via high-temperature treatment of various compounds-sources of nitrogen, nanosized carbon materials and cobalt and/or iron salt, are considered as one of the most promising alternatives to platinum-based ORR-electrocatalysts. The advantage of using nitrogen-containing conjugated polymers (N-CP) as a source of nitrogen during synthesis of such Me-N-C nanocomposites is ability of the macromolecular structure to ensure uniform distribution of the nitrogen atoms in a partially graphitized carbon matrix. At the same time, the use of N-CP for the synthesis of Me-N-C electrocatalysts is limited to using mainly polyaniline or polypyrrole, and information on the usage of N-CP together with graphene materials is extremely small, despite the fact that graphene materials due to its unique properties have proven itself as promising materials, including electrochemical applications.

Earlier we have shown that the exfoliation of a graphite electrode in the presence of benzoat anions (or other carboxylate anions) under electrolysis conditions with a pulsed change of the electrode polarization potential makes it possible to obtain multilayer graphene (MLG) with a small content of oxygen-containing defects [1]. We also found that the replacement of carboxylic acid salts in such process to NaN_3 results not only to graphite exfoliation, but also to the simultaneous functionalization of MLG by nitrogen atoms and obtaining of N-MLG as a result [2].

Such electrochemically synthesized MLG and N-MLG, as well as, for comparison, acetylene carbon black and graphene oxide were used by us as carbon components for the Co-N-C electrocatalysts to be obtained by pyrolysis them (800° C, Ar) together with cobalt (II) nitrate and N-CP (poly-*m*-phenylenediamine, poly-5-aminoindole, poly-2,6-diminopyridine, etc.) - as nitrogen donors.

It was shown that obtained Co-N-C electrocatalysts were active in ORR 0,5 M H_2SO_4; the best of the synthesized electrocatalysts was characterized by onset potential (E_{onset}) ~ 800-810 mV and its maximum (E_{max}) ~ 725-740 mV vs. RHE, so they can be considered as good alternative of Pt-based analogues. The influence of obtaining conditions, type of used polymers and carbon materials on the efficiency of the activity of synthesized Co-N-C electrocatalysts in ORR was established. Also, it was shown that the obtained Co-N-C electrocatalysts were characterized by sufficiently high stability during the operation and tolerance to CO or methanol presence.

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Olena Pariiska. In 2011 obtained master honors degree at Chemical Technology Department of Kyiv National University of Technology and Design. From 2011 works at L.V. Pysarzhevsky Institute of Physical Chemistry of NAS of Ukraine, engineer. During September 2017 worked at Jerzy Haber Institute of Catalysis and Surface Chemistry Polish academy of sciences within Internship. Main areas of interest: electrochemical synthesis of graphene materials and composites based on them; synthesis (chemical, electrochemical) of conducting polymers and composites based on them; electrocatalysis; electroanalysis. Author of 12 scientific articles and more than 20 abstracts of reports that were presented at international conferences.

Katarzyna Pauter[1], Małgorzata Szultka-Młyńska[1], Justyna Walczak[1], Bogusław Buszewski[1,2]

1Department of Environmental Chemistry and Bioanalytics, Faculty of Chemistry, Nicolaus Copernicus University, Gagarina 7, 87-100 Toruń, Poland
2Centre for Modern Interdisciplinary Technologies, Nicolaus Copernicus University, Wileńska 4, 87-100 Toruń, Poland

Development of HPLC-DAD method for determination and identification of selected antibiotics and their metabolites for biomedical purposes

Antibiotics are widely prescribed biologically active compounds for therapeutic and prophylactic use against bacterial infections. They can be classify into many different groups of drugs and vary a lot in structure, mode of action and spectrum of activity.

Physicians determine the dosage of antibiotic based on the ability of the patient's body to metabolize and excrete of target compounds. Therefore, new analytical methods are created to facilitate the monitoring of body fluids taking into account content of antibiotics and their metabolites. Developing of analytical methods for clinical use is feacing occurrence more than one antibiotics as well as their metabolites in the tested samples. For this reason, it is necessary to develop methods that enable simultaneous determination of antibiotics from different therapeutic classes and their metabolites. Nowadays, the most frequently used methods in the analysis of antibiotics are chromatographic techniques coupled with different detection systems.

This work aimed to develop and optimize a reliable and sensitive method based on high performance liquid chromatography coupled with diode array detector (HPLC-DAD) for determination and identification of antibiotics and their metabolites from different therapeutic groups. The method was optimized for twelve antibiotics including: amoxicillin (AMOX), ampicillin (AMP), cefotaxime (CEF), clindamycin (CLI), ciprofloxacin (CIP), daptomycin (DAPTO), gentamicin (GEN), levofloxacin (LVX), linezolid (LIN), metronidazole (MET), moxifloxacin (MOXI), tetracycline (TET) and their metabolites: amoxycilloic acid (AMA), amoxicillin diketopiperazine (AMD), 3-desacetyl cefotaxime lactone (CEF-DAC-LAC), clindamycin sulfoxide (CLI-SOx), ciprofloxacin piperazinyl-N4-sulfate (CIP-PS), desmethyl levofloxacin (DEL), levofloxacin N-oxide (LVX-OX), linezolid N-Oxide (LIN-Ox), metronidazole-OH (MET-OH), 8-hydroxy moxifloxacin (8-HYD-MOXI). The separation of measured samples was carried out using four different octadecyl silane packing columns:

ACE 5 C18-PFP, ACE 5 C18-AR, ACE 5 C18-HL and ACE 5 Phenyl with gradient elution of acetonitrile and 0.1% aqueous formic acid with flow rate of 0.5 ml/min.

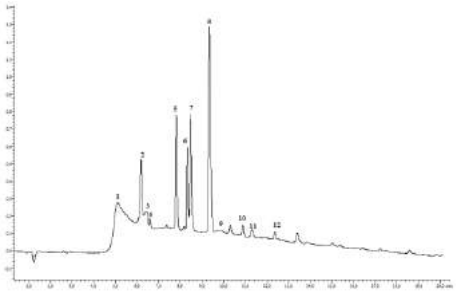

Figure 1. HPLC-DAD chromatogram with the use of ACE 5 C18-PFP column: (1) CLI, (2) GEN, (3) AMOX, (4) MET, (5) AMP, (6) CEF, (7) LVX, (8) CIP, (9) TET, (10) MOXI, (11) LIN, (12) DAPTO.

The elution order of the target compounds was similar for all four HPLC columns applied. The best separation has been echired using column with pentafluorophenylpropyl chain (ACE 5 C18-PFP). In addition in order to optimize parameters of retention elution for the column and to predict the conditions for the best separation of studied biologically active compounds ChromSword software was used. To obtain reliable information of the physicochemical properties and to estimate the relative biological activity of a group of studied analytes, QSRR approach was applied. Moreover, structural descriptors of the target compounds were used to describe their chromatographic retention behavior under the optimized HPLC conditions.

Acknowledgments

This work was supported by research project Opus 11 No. 2016/21/B/ST4/02130 (2017-2020) from the National Science Centre, Kraków, Poland.

In 2018, I enrolled in a PhD program in chemistry at the Department of Environmental Chemistry and Bioanalytics. During the PhD program, I focus on molecular mechanism of metabolic biotransformation of antibiotics for medical application approach. The objective of the PhD program is to develop a selective and sensitive method for the separation and determination of selected antibiotics and their metabolites by using separation techniques (HPLC, CZE). The another focus of my work is establishment of spectrometric method for identification of microorganisms obtained from different biological matrices.

I am a co-author of article Hydrogels based on carrageenan: the effect of sorbitol and glycerin on stability, swelling and mechanical properties. In addition, a co-author of the chapter entitled: Design and characterization of porous collagen/gelatin/hydroxyethyl cellulose matrices containing microspheres based on κ-carrageenanin in Materials Design and Application. I have also participated in several conferences.

Pidluzhna Anna[1], Kostruba Andriy[2], Stakhira Pavlo[1], Baryshnikov Glib[3,4]

[1] Lviv Polytechnik National University, Lviv Ukraine
[2] Stepan Gzhytskyi National University of Veterinary Medicine and Biotechnologies Lviv, Ukraine
[3] Department of Chemistry and Nanomaterials Science, Bohdan Khmelnytsky National University, Cherkasy, Ukraine
[4] Division of Theoretical Chemistry and Biology, School of Engineering Sciences in Chemistry, Biotechnology and Health, KTH Royal Institute of Technology, Stockholm, Sweden

Quantum dots application in inverted solar cell

A great number of publications of last decades in the field of photovoltaics [1], light emitting devices [2], biomedical and ecological area [3] is devoted to synthesis, properties and applications of colloidal quantum dots (QD). Such materials of a nanometric scale as quantum dots possess properties other than of a bulk because of quantum confinement effect. Most studied QD for photovoltaic and organic light emitting diode applications are II-VI semiconductor materials, Cd-containing in particular, which are known to be toxic and cancerogenic. Therefore, the III-V semiconductors can be attractive candidates instead because of suitable optical properties and low intrinsic toxicity.

This work deals with synthesis of InP/ZnS QD with single step synthesis method. The optical absorption of synthesized material was investigated by means of UV-visible spectrophotometer; the crystallinity was evaluated by X-Ray Diffraction technique. The EPLED 340 nm picosecond pulsed light emitting diode as an excitation source was used to measure the fluorescence lifetimes with time-resolved single photon counting (SPC) method. QD photovoltaic devices were prepared with step by step procedure which combines thermal vacuum deposition method and spin-coating technique. Thickness of thin films was controlled and determined by means of a profilometer (Dektak XT, Bruker). The current density-voltage dependences were measured using semiconductor parameter analyser HP4145A. For the first time for our knowledge the properties and applicability of InP/ZnS QD were investigated in inverted solar cell structure.

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Doctor of Philosophy degree in Chemical Sciences **Anna Pidluzhna** earned in February 2014 with the thesis work entitled “Lithium intercalation of chemically modified and defective low-dimensional materials” under supervison of Prof., Dr.Sc. Mykhaylo Nykypanchuk (Lviv Polytechnic National University). PhD Anna Pidluzhna currently is a Fellowship holder (2017-2019) in the Department of Applied Physics and Nanomaterial Science (DAPNMS), Institute of Applied Mathematics and Fundamental Sciences (IAMFS), Lviv Polytechnic National University (LPNU), Ukraine.

Before getting the fellowship Anna Pidluzhna (2008-2017) worked in group of Prof. Dr. Sc. Ivan Grygorchak within State funded projects “DB-Spin", “DB-Energia", “DB-Kvant", “DB-Rutyl", DAPNMS, IAMFS, LPNU.

Fields of interest are:

- Developing new techniques for fabrication of hybrid materials of complex architecture
- Impedance spectroscopy and electrochemical investigation of developed structures
- Organic light emitting devices
- Photovoltaics

The list of publication counts over 15 articles during research career and participation in over 20 international conferences.

Paweł Prajzendanc, Piotr Paplicki, Marcin Wardach

West Pomeranian University of Technology, Szczecin

Axial Flux Hybrid Excited Electrical Machine – design, simulation and experiment

Nowadays, the fast and large-scale development of unconventional permanent magnet (PM) electrical machines with flux-weakening is observed. Much attention is paid to investigation of PM machines with effective flux-linkage control for electric motor drives with wide-speed-range and high-efficiency. Axial-flux machines have many different configurations and types of constructions - the subject of presentation is a low power range generator with one, double-sided stator and two external rotors, where permanent magnets and pole pieces are attached, connected by a steel bushing. An important novel element in the design is the additional excitation system located in the stator (or rotor) magnetic circuit of the machine.

Paweł Prajzendanc received the B.S. degree in electrical engineering from West Pomeranian University of Technology, Szczecin, Poland in 2015 and the M.S. degree in 2017. He is currently pursuing the Ph.D. degree in electrical engineering at the Faculty of Electrical Engineering, West Pomeranian University of Technology, Szczecin, Poland. His research interests include design of electrical machines and drives.

Rodzik Agnieszka[1,2], Rogowska Agnieszka[1,2], Król Anna[1,2], Railean-Plugaru Viorica[1,2], Sagandykova Gulyaim[1,2], Sprynskyy Myroslav[1], Pomastowski Paweł[2], Buszewski Bogusław[1,2]

Department of Environmental Chemistry and Bioanalysis, Faculty of Chemistry, Nicolaus Copernicus University, Toruń, Poland(1)
Center for Education and Research in Separation Methods & Bioanalytics BioSep, Centre for Modern Interdisciplinary Technologies Nicolaus Copernicus University, Toruń, Poland (2)

Immobilization of silver ions onto casein

Proteins are macromolecular biopolymers found in all living organisms. Proteins are composed of amino acid residues connected with each other by peptide bonds. They are the main building material of the organism and constitute about 20% of the human body mass, including mainly the muscular system. Protein has many important functions, ensuring proper state and functioning of the body. An example of protein is casein, which is the predominant protein in milk. And as we know, milk is a wholesome food in the diet of mammals from the first days of life. Casein contains about 80% of proteins in cow's milk and about 40% of proteins in human milk. It belongs to the group of phosphoproteins and forms the rest of ortho- and pyrophosphate in certain places – mainly serine and threonine. In milk, casein colloids occurs mainly in the form of micelles. These micelles are formed from subunits consisting of individual fractions of casein monomer connected by a bridge containing calcium ions and phosphates. Despite a large amount of research on casein micelles, their exact structure and stability are still not fully known and subject to continuous discussion. However, most of the proposed models can be divided into three general categories: coat-core models, submicelles and internal structure models. Each of the several molecular models explains the specific conformation of casein in micelles. In addition, we can distinguish four main fractions of casein. These are α (α_{S1}, α_{S2}), β, κ. The fractions differ in, among others, phosphorus content, amino acid composition, molecular weight, saccharide content and properties. Casein possess a strong metal-affinity properties.

The combination of proteins with metals cations creates new possibilities for their application in medicine or nutrition. Obtaining biologically active protein-metal complexes serves as a perfect tool to determine their influence on the metabolism of the examined organism.

This work focuses on the synthesis of complex casein-silver compounds. Characteristics of protein by spectrometric, spectroscopic and microscopic methods as well as examination of the kinetics of silver immobilization on casein will allow to formulate conclusions concerning the course and mechanisms of formation of silver-casein complexes. Knowledge of processes and mechanisms of silver-casein bonding creates a potential application in medicine and pharmacy.

Acknowledgment
This work was financially supported by National Science Centre in frame of Opus 14 project No. 2017/27/B/ST4/02628 (2018-2021).

I am a first year PhD at the Faculty of Chemistry of Nicolaus Copernicus University in Toruń. I perform my PhD in the Department of Environmental Chemistry and Bioanalysis under supervision of Professor Bogusław Buszewski. My scientific interests are in the area of protein separation using electrophoretic techniques combined with spectrometric methods. In addition, isolation and identification of bacteria using the MALDI TOF MS method and molecular biology methods such as 16S rDNA and synthesis of metal nanocomposites. The results of my work have been presented so far at national and international conferences, including the Metabolomic Circle 2018. Additionally, I am co-author of a publication entitled „*Analysis of bacteria associated with honeys of different geographical and botanical origin using two different identification approaches: MALDI-TOF MS and 16S rDNA PCR technique*".

Estela Rukseniene

Military missions in Lithuania: British and French peace-keeping attempts during Lithuanian- Polish conflict in the 1920's

Abstract: The peaceful settlement of the Lithuanian–Polish conflict was one of the main goals of the French mission led by Reboul and British military mission led by Turner.

Introduction

During French military mission stay in Lithuania, Reboul made consistent efforts to resolve this conflict. His aim to direct the joint armed forces of Poland and Lithuania against the Bolsheviks coincided with the views of Rowan-Robinson (Turner-led mission), as regards the possible ways of settling the Lithuanian–Polish conflict.

However, contrary to Reboul, who believed that the main obstacle to reach an agreement was the reluctance of Lithuanian Government to negotiate with Poland, Rowan-Robinson blamed more the Polish side for the situation.

Main text

In 1920's Gen. A. J. Turner's mission renewed independent military intelligence work in Lithuania and in broadened it to the whole Baltic region. By this time, Rowan - Robinson was mostly dealing with Lithuanian problems. The main aim for him was to help to control the conflicting Polish-Lithuanian conflict and, if possible, to use Lithuanian and Polish military forces to fight against the Bolsheviks. It was also the task of the French military mission led by Col. Reboul.February 1920 Rowan-Robinson observed the Polish actions in the territory of Lithuania (Alytus, Širvintai). Rowan - Robinson with French Col. Reboul jointly put a lot of effort jointly to influence the Polish government to resolve the conflict with Lithuania by diplomatic means, "to prevent the repetition of the Polish presence in the former [POW]."Rowan - Robinson quite actively contributed to the peacekeeping (or reconciliation) of British military missions in the Baltic States. In the 1920s, the Poles intend to break the demarcation line between Poland and Lithuania. March 22nd Col. Rowan - Robinson went to Warsaw and together with the head of the British military mission in Poland Gen. Adrian Carton de Wiart informed Josef Pilsudski about the global consequences of such actions.In fact, the French military mission in Lithuania led by Colonel C. Reboul, responded not only to the Lithuanian–Polish conflict, but to various issues in Lithuania's foreign and domestic policies. The analysed the withdrawal of German military squads, and relations with Soviet Russia. France, as well as the Great Britain provided the military and humanitarian aid, which in long term, aimed to broaden the French economic interests. Reboul linked military aid to the creation of the alliance between Lithuania and Poland against the Bolsheviks. When it became obvious that such an alliance is not possible, Reboul's mission stopped advocating military support for Lithuania and limited its activities, being content with the involvement in the training of Lithuanian army.Col. Rowan - Robinson worked intensively with the Lithuanian government. He was acquainted with the needs of the Lithuanian Armed Forces and its real military situation. In the early 1920's Col. Rowan – Robinson responded to Lithuania's military downsizing. He has made proposals to the Lithuanian government how to reorganize the Lithuanian Armed Forces. In his opinion, Lithuania had to focus not on the quantity, but on the quality. British Col. Henry Rowan-Robinson and General Frank Percy Crozier also provided some limited support on the training of the military personnel.British mission did research also on the mood of Lithuanian soldiers and officers. He traced how pulling the Germans from Lithuania and being under pressure facing tense Lithuanian - Polish relations influenced the military personnel. He shared this

information with the British Foreign and War offices, informing Col. S. Tallents (the head of the British military mission sent to the Baltic States from Foreign Office) and French - Col. C. Reboul's mission. This analysis of the Lithuanian Armed Forces' capabilities, morals, and reactions to internal and political changes carried out by Rowan - Robinson was apparently needed for the authorities in the British Ministry of Military, the members of the British delegation at the Paris Peace Conference and also for the Lithuanian government.

Conclusion

Despite of the British and French representatives often expressed the different viewpoints; the results of the activities of both missions influenced both - Poland and Lithuania.The Entente faced complicated problems related to the Polish- Lithuanian conflict and set two main tasks – to seek the best ways to ensure stability and peace-making – reflected on the activities of these missions.

Dr. Estela Rukseniene

I am an independent early career researcher. In 2011 I was awarded a doctoral degree for my dissertation 'The activities of the Foreign Military Missions in Lithuania in 1919-1920's'. From 2012 I was focused on raising my son born that year. Currently I live and work in London, planning to renew my career as an academic researcher. In May 2019 I attended the conference 'The global challenge of peace: 1919 as a contested threshold to a new world order' (Newcastle) with my paper 'British Military Missions as intermediaries between Western Europe and Lithuania in 1919-1920's'.While working at Vytautas Magnus University (Lithuania), I had been actively participating in several EU and local projects such as "Baltic Fort Route". I was also a member of the research cluster "War Theory, the History of Lithuanian Army and Military Heritage".In 2009 -2011 I worked as a junior researcher in the Centre of Kaunas' History at Vytautas Magnus University.

Gulyaim Sagandykova[1,2], P. Pomastowski[2], J. Walczak[2], M. Szultka-Młynska[1], B. Buszewski[1,2]

Department of Environmental Chemistry and Bioanalytics, Faculty of Chemistry(1)
Interdisciplinary Centre for Modern Technologies, Nicolaus Copernicus University, Toruń, Poland(2)

SARs of selected flavonoids by electrochemical system hyphenated with various ionization methods

Natural bioactive compounds have many beneficial properties for human health and rich structural diversity, thus attracting much attention as perspective drug candidates. Flavonoids are defined as plant secondary metabolites and derived from chromone, differing by number, position of attached OH-groups and glycosidic residues. To the best of our knowledge, flavonoids possess antioxidant, anticancer, antibacterial, antiviral, immunomodulatory etc. activities. One more argument for interest to them as drugs is their ability to scavenge free radicals, according to well-known hypothesis that the basis of certain diseases mechanisms is oxidative stress [1]. However, low bioavailability defined by low solubility in water, oral absorption, rapid metabolism by phase I, ingestion with other food compounds, undergoing metabolic conversion and interaction with colon microflora [2] makes their application as drugs challenging. Moreover, to evaluate whether bioactive compound can be used as a drug, it is crucial to study its interactions with receptors (also known as drug targets) as to suggest its mechanism of action. Computational and instrumental approaches include utilization of modern instrumental techniques and modelling tools for this goal [3].

Structure-activity relationship (SAR) as a part of computational approach allows to reveal how activity of the compound is dependent from its structure. Thus, compounds with similar structure possess similar activity. SARs of flavonoids were studied for different activities, based on instrumental measurements using biological, spectroscopic (spectrophotometric, fluorimetric, circular dichroism), electrochemical (cyclic voltammetry) assays. The goal of current work was to represent structure-activity relationships for selected flavonoids from point of view of their fragmentation patterns after electrochemical treatment. Fragments generated as a result of electrochemical reactions and ionization were studied in acidic, alkaline and neutral pH values by MALDI, LDI and ESI ionization methods.

Conclusion

Fragments generated as a result of electrochemical reactions and ionization were studied in acidic, alkaline and neutral pH values by MALDI, LDI and ESI ionization methods.

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PhD student in Interdisciplinary Centre for Modern Technologies, University of Nicolaus Copernicus, e-mail: sagandykova.gulyaim1@gmail.com

Education

Bachelor of Natural Sciences in Chemistry, Al-Farabi Kazakh National University	2011 - 2015
Master of Natural Sciences in Chemistry, Al-Farabi Kazakh National University	2015 - 2017

Shereen E.M. EL-Nahas and M.S.A. Felaifel

Plant Pathology Research institute ,Agricultural Research Center, Giza, Egypt

Effects of soil treatment by dimethyl disulfide on the population densities of some microorganisms and activity in strawberry fields

Introduction

A great number of soil-borne microorganisms, nematode and weeds are responsible for the most destructive disease in different crops. The root-knot nematode is the most critical yield-limitation to numerous crops. Nematodes elimination from some crops is essential (1). Addition to crop losses due to weeds (2). Production under greenhouse or nursery production of some vegetable crops such as strawberry unprofitable unless the greenhouse and the nurseries soil are disinfested. Fumigant nematicides have achieved abroad spectrum efficacy against a wide range of soil-borne pests such as insects, diseases nematode and weeds. Fumigants have been used for several decades for preplant soil fumigation in high-value agricultural and horticultural crops (3). Several fumigant nematicides are available used to control such as 1,3-dichloropropene, chloropicrin, metam sodium, dimethyl disulfide (DMDS) and Allyl isothiocyanate. Dimethyl disulfide (DMDS) has demonstrated good to excellent control of nematodes and disease but poor to fair control of annual grasses and requires the use of a herbicide for adequate control (3). When applied to the soil fumigant compounds reach to the target and non-target organisms in gas form that moves through the open spaces between soil particles or by dissolving into water film that surrounds soil particles (4). May be the fumigation have a toxic and undesirable effects on non-target species.

Material and methods

Effect of Dimethyl disulfide (DMDS) as soil treatment on population densities of some soil microorganisms, i.e. total fungi, actinomycetes, cellulose decomposers bacteria, phosphate solubilizing bacteria, free-living nitrogen-fixing bacterium (Azotobacter species), Azospirillium bacterium, nitrite-oxidizing bacteria (Nitrobacter species) count. The resulted suspensions were used to estimate the total number of different soil microorganisms using the standard dilution plating technique (5). The bacterial density was determined in liquid media by using the M. P. N technique (6).

Media used:

Martin's agar medium (7) for total number of fungi, Jensen's agar medium (8) for actincmycetes count, Nitrobacter broth medium for Nitrobacter spp, ammonium-oxidizing bacteria broth, medium for Nitrosomonas spp count(9), Nitrogen free bromothymol blue medium (10) for Azospirillum bacterium, Base medium 77 broth (9) for free-living nitrogen-fixing bacterium (*Azotobacter* spp.), Dobos cellulose broth medium (11) for Cellulose decomposer bacteria and Phosphate solubilizing bacteria medium (12).

Results and discussion

Fumigation treatments caused significantly reduction for the total count fungi compared with control after treatmeat (17 x 10^2 CFU), (51.5x 10^2 CFU), respectively. Also the lowest total count was found at the end of experiment(3). The total count of actinomycetes was reduced by using the tested fumigant 0.27x10^3 CFU compared with control 0.90 x10^3 CFU, while the total count of actinomycetes 90 days after transplanting was recorded (2.92 x 10^3 CFU), compared with control (3.99 x10^3 CFU). On the other hand, fumigation treatment caused non-

significantly reduction the total count Nitrobacter spp. compared with control after treatmeat but it caused reduction of ammonium-oxidizing bacteria compared with control after treatment (0.29 x 10^5 CFU) and (3.5 x 10^5 CFU),respectively. Moreover, fumigant treatment caused significantly reduction Azospirillium bacterium compared with control after treatment (0.28 x 10^4 CFU), (0.95 x 10^4 CFU), respectively. After fumigation treatment as soil treatment caused reduction free-living nitrogen-fixing bacterium (Azotobacter spp.) (0.26 x10^5 CFU), compared with control (0.32 x10^5 CFU) while the Azotobacter species 90 days after transplanting was recorded (0.074x x10^4 CFU) compared with control (0.094 x10^4 CFU). Phosphate solubilizing bacteria recorded 146.67 x10^2 CFU befor treatment, while after treatment reduction count to 73.33 x10^2 CFU after treatment. Otherwaise, increased count phosphate solubilizing bacteria recorded 79.67 x10^2 after 15 days the soil was fumigated. After 60 days recorded that (19.12 x 10^4 CFU) compared with control (26.57 x10^4 CFU). Cellulose decomposers bacteria significantly reduction (0.055 x10^5 CFU) compared with control 0.12 x10^5 CFU(13).

Conclusion

Fumigation treatment caused in general, considerable reduction in population of total microbial counts on the other hand, showed that slight recovery in this microorganism count, but was continued in less values than the initial count.

Name: Shereen El-Sayed Mohamed El-Nahas
E-Mail address: Shereen.nahas@gmail.com
Sh_el_nahass@yahoo.com
Nationality: Egyptian

CV of the Participant

B.Sc. 2000, Faculty of Agriculture, Ain -Shams Univ. Plant protection**,** M.Sc.2006, Faculty of Agriculture, Ain -Shams Univ. Plant protection, thesis entitled " Bio-residual and non-target Activities of certain copper fungicides controlling Downy Mildew Diseases on cucumber ", Ph.D. 2012, Faculty of Agriculture, Ain -Shams Univ. Plant protection , thesis entitled " phytotoxic effects and residues of some triazole fungicides in grape orchards.

Monika Stefaniak

Medical University of Lodz, Department of Synthesis and Technology of Drugs, Lodz, Poland

Application of ‘click’ cycloaddition for synthesis of new macrocyclic systems

Macrocyclic compounds including crown ethers are a continuously and rapidly growing part of organic chemistry. The most interesting point of these structures is the presence of different sizes of cavities, which may be complexed by metal ions or other species, for example: medicaments [1]. For this reason scientists are trying to find novel and effective methods for the preparation of a wide variety of macrocyclic systems.

The goal of the presented study was the synthesis of macrocyclic systems containing a 1,2,3-triazole ring. The main tool which was used during this project was a Huisgen 1,3-dipolar cycloaddition reaction of the 'click’ type, between azide and acetylene derivatives [2]. A set of new macrocyclic systems was obtained containing two 1,2,3-triazole rings using alkyne-azide cycloaddition catalyzed by Cu(I) ions. It was established that the best results can be achieved using non-aqueous conditions of 'click' reactions (CuI, DIPEA, acetonitrile) and the high dilution method (1 mg/ml) [3].

In the last stage of research the selected ligands were subjected to tests of their complexing properties toward silver(I) ions. The results confirmed the coordination of the silver ion is mainly achieved by the sulfur atoms of the ethylene bridge and by the nitrogen atoms of the 1,2,3-triazole ring [4].

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Doctor of chemical sciences **Monika Anna Stefaniak** was born on October 18, 1988 in Zgierz. She is a graduate of the Faculty of Chemistry at the University of Lodz, where she defended her PhD thesis in 2016: "Synthesis and properties of new macrocyclic systems with a built-in 1,2,3-triazole system" at the Department of Organic and Applied Chemistry, Faculty of Chemistry, University of Lodz under the supervision of dr hab. Jarosław Romański. During her doctoral studies she participated in the implementation of OPUS and Preludium grants. In addition, she received research funding from the Ministry of Science and Higher Education three times as part of the "Young Scientists" grant, and in 2015 she was the head of one of such projects. Currently, she works as an assistant at the Department of Synthesis and Technology of Drugs at the Medical University of Lodz.

Marta Śliwa-Cebula[1], Paweł Kaszycki[1], Zbigniew Miszalski[2]

1. Unit of Biochemistry, Institute of Plant Biology and Biotechnology, Faculty of Biotechnology and Horticulture, University of Agriculture in Krakow, Kraków, Poland
2. The Franciszek Górski Institute of Plant Physiology Polish Academy of Sciences, Kraków, Poland

Phytoremediation potential of Mesembryanthemum crystallinum L. for removal of heavy metals from industrially degraded soils and contaminated bottom sediments

Within recent years, due to progressive pollution and technical problems with keeping the environment clean, biotechnologists have been trying to find efficient ways to remove toxic compounds from contaminated soils. In this context, phytoremediation appears as a challenging solution. This process is based on the use of specific, environmentally robust and stress-resistant plant species, especially phytoextractors able to accumulate high concentrations of the most recalcitrant pollutants, including, in particular, heavy metals. The aim of this study was to demonstrate biotechnological potential of the common ice plant, *Mesembryanthemum crystallinum* L. (Aizoaceae), in bioremediation of heavy metal pollution in soils affected by industrial activity as well as in bottom sediments. *M. crystallinum* is a C3/CAM intermediate halophyte, tolerant to environmental stressors such as salinity, drought, high temperature, or oxidative stress. In soil-reclamation attempts, this fast-growing and low-demanding plant with its extensive root system can be helpful either in phytostabilization or phytoextraction of heavy metals, depending on the metals mobility and biological availability. Among the main sources of environmental contamination with heavy metals and metalloids are mining, metallurgy, transport, tanneries, paint and wood protection industries, production of plastics and mineral fertilizers. Apart from heavy metals, numerous other industrial processes lead to soil degradation by negatively influencing critical properties of soil environment such as chemical, physical characteristics and biological activity. Bottom sediments, in turn, are considered as ecologically important parts of the aquatic environment since they act as the final targets for deposition of a variety of substances, including toxic pollutants. It is thus important to examine the quality of these sediments and to undertake remediation actions if they are found anthropogenically polluted. In such cases, efficient phytoremediation with *M. crystallinum* is expected to lower the environmental risk associated with the presence of contaminants. The studied plant can grow under harsh conditions and is capable of hyperaccumulating heavy metal ions such as Cu^{2+}, Ni^{2+}, or Zn^{2+}. As shown in the presented work, it is also highly tolerant to cadmium salts and chromium compounds, and upon treatment with chromate, is capable of accumulating chromium in its aerial parts. It is concluded that the common ice plant reveals strong application potential for use in environmental projects aimed at removal of heavy metal pollution and recovery of degraded soils and sediments.

CV of the Participant

My name is Marta Śliwa. I graduated from the Jagiellonian University in Kraków, Faculty of Chemistry, with the master's degree in environmental protection. I am a PhD student in the Institute of Plant Biology and Biotechnology, Faculty of Biotechnology and Horticulture at the University of Agriculture in Cracow. I specialize in phytoremediation processes. The purpose of my research is to gather information about heavy metals influence on the plants and soil environment. I cooperate with the Plant - Microorganism Interactions Group in Malopolska Centre of Biotechnology of Jagiellonian University where, since August 2017, I participate in the NCN OPUS 11 project entitled „Does cadmium remediation depend on the type of photosynthetic metabolism?". My main research object is a halophytic plant *Mesembryanthemum crystallinum L.*

Trzpil-Jurgielewicz Beata, Dąbrowski Władysław, Hottowy Paweł

AGH University of Science and Technology

Low-distortion CMOS preamplifier for neuroelectronic interfaces

Abstract: *We present a design and analysis of nonlinear distortions for low-area integrated neural preamplifier with pseudoresistor-based AC coupling. We describe a preamplifier design in 0.18 μm SOI CMOS technology with Total Harmonic Distortions (THD) below 1% in the full range of frequencies and amplitudes of extracellular neural signals. The preamplifier occupies silicon area of 0.0046 mm^2 and is suitable for recording systems.*

Introduction

Multichannel neural recording interfaces are widely used in neuroscience research and for the development of next-generation biomedical devices. An ideal neural amplifier is expected to exhibit various design parameters. However, it remains a huge challenge to obtain an optimized combination of all of these parameters. The acquired neural signals are in the range 1 Hz – 5 kHz with amplitudes up to 10 mV peak-to-peak. The chemical interaction of electrodes and tissue generates a large DC voltage offset, and thus requires a low-frequency high-pass filter (<1Hz) to be eliminated.

Neural amplifier design - simulation result

Most of the multichannel integrated neural amplifiers are based on the architecture proposed in [1]. The gain is defined by the ratio of the input capacitor to the feedback capacitor. The low-frequency high-pass filter pole is set by the feedback resistance and capacitance product. Due to silicon area restrictions, the feedback capacitance is typically in the range of tens to hundreds of fF, and the feedback resistance in the TΩ range. Such resistance is realized by transistors. A weak point of such a pseudoresistor is its poor linearity. However, in this work, we explore a new approach to implement these elements to achieve better characteristics.

The neural amplifier will be designed in 0.18 μm SOI CMOS technology from XFAB which provides high ohmic polysilicon resistors. We propose to use the fixed-VGS pseudoresistors in the first AC-coupled amplification stage. We used a telescopic cascode architecture for the design of the preamplifier. Since the cutoff frequency scales exponentially it can be tuned in a wide range (0.1-10 Hz) [2].

We analyze the performance of an AC-coupled preamplifier with a gain of 20, as a reasonable compromise between the noise and signal distortion. The full-bandwidth thermal noise from the feedback resistors is quite high, however, a significant fraction of this noise is generated below the cutoff frequency. The simulations of the nonlinear distortion have been prepared using Cadence analog simulation environment.

Conclusion

The small silicon area of our design makes it suitable for future neuroelectronic interfaces with a very large number of channels and a very high spatial density of the electrode arrays. At the same time, the presented circuit is - to our knowledge - the first AC-coupled neural amplifier with reported low distortion level (below ~1% THD) for the full spectrum of frequencies We are

planning to fabricate a test chip consisting of 16 recording channels and measure its real characteristics.and amplitudes of neuronal signals recorded by extracellular electrodes.

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Beata Trzpil-Jurgielewicz received the M.Sc. degree in technical physics from the AGH University of Science and Technology in 2016. Her contribution to the neuroelectronics experiments in collaboration with neurobiologists from Stanford University, USA has been rewarded in the prestigious competition for the best application master thesis - Diamonds of AGH-UST (XVIII Edition).
During her second cycle studies, she had also a 1-year contract as a Technical Student in CERN, Switzerland.
She is currently a Ph.D. student, also at the AGH and is a member of the University Council of the Ph.D. Students of AGH actively contributing to the process of implementation of Act 2.0.

Nadiia Veselova[1], Ravlyk Nazar[2], Volodimir Brzhezitsky[3], Krystian Leonard Chrzan[4]

National Technical University "Kharkiv Polytechnic Institute" (1)
Lviv University of Technology (2)
Igor Sikorsky Kyiv Polytechnic Institute (3)
Societas Humboldtiana Polonorum (4)

The first high voltage laboratories in Ukraine

Abstract: *The report is devoted to the complex research of the establishment and the development of first laboratories in Ukraine in the field of the technique and the electrophysics of the high-voltages. A scientific-historical analysis of the process of technical solutions in electrophysics and the creation of high-voltage installations in leading scientific centers of Kharkiv, Kyiv and Lviv is carried out.*

The generation, transmission and distribution of electrical energy expanded quickly at the end of XIX century especially after the commissioning of 3-phase 25 kV line from Lauffen to Frankfurt/ Main in 1891. The first 3-phase 110 kV transmission lines were built in 1912 in Michigan and also in Germany. The transmission level of 220 kV was achieved in California in 1923. The nominal voltage of transmission line in Poland before WWII was 60 kV and 150 kV. The rated voltage of power transmission lines in Ukraine reached 154 kV in connection with the construction of the Dnieper power plant (Zaporizhzhia), 1932 - 1933. The quality of high voltage equipment during first decades was often not high because the companies had no experience in production of new products. Therefore high voltage laboratories were needed at greater manufactures, power utilities and technical universities to test the materials and finished products or to educate electrical engineers of new specialty.

The first high voltage laboratory on the territory which belong now to Ukraine was established at Technische Hochschule Lemberg just one year before World War I (in 1913). It was and is still equipped in 150 kV Siemens-Schuckert transformer (Fig. 1). A similar 200 kV transformer also from Siemens-Schuckert Company was bought for high voltage laboratory of Technische Hochschule Breslau in 1910 (now Wroclaw University of Technology, Poland). The laboratory was and is still located in the main building of Lviv Polytechnics. Ing. Stanislaw Jasilkowski gave the lectures on high voltage engineering in Lviv in the period 1924-1938.
The creation of a high-voltage laboratory at Kyiv Polytechnics should be attributed to 1923 under Prof. G.L. Epstein leadership. It was located in the main building (Fig. 2). The equipment of the high-voltage laboratory included the same 150 kV transformer (made in Germany), which is shown in Fig. 1.

The research in the field of high voltage engineering in Kharkiv began from the 30th of the XXth century in the Kharkiv Electrotechnical Institute (KhEI) at the Department of Transmission of Electric Energy under the leadership of Prof. V.M. Khrushchev. He began active work in the field of arc and mechanical alternating current rectifiers and high voltage technique. In order to establish the causes of numerous accidents in the electric networks of Donbassenergo in 1934, a unique impulse voltage generator for an output voltage of 3.5 MV was created by researchers of the high voltage department of KhEI (Fig. 3). For the development of accelerator technology, which was inextricably linked with high voltage, in 1928 the Ukrainian Physico-Technical Institute in Kharkiv was created.

Fig. 1. 75/150 kV Siemens-Schuckert transformer at HV lab of Lviv Polytechnics from 1913

Fig. 2. An early-20th century Russian postcard showing the main building of Kyiv Polytechnics [3].

Fig. 3. Pulse voltage generator for output voltage 3.5 MV for lightning resistance tests of aerial power lines Donbassenergo, 1934

Conclusion

A comparative analysis of the development of high-voltage equipment, the importance and uniqueness of high-voltage structures, the conditions of their creation in home industry and sciencein the leading centers of physical science in Ukraine is shown.

The achievements of domestic scientists is determined to be original and significant and significantly influenced the development of science and allowed to apply their research for practical purposes.

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Associate Professor of the Department Engineering electrophysics, Deputy Director of the Educational-Scientific Institute of Power Engineering, Electronics and Electromechanics NTU "KhPI". ORCID iD 0000-0003-3527-8419; Scopus Author ID: 57194717647; Web of Science H-8438-2018.

Marcin Wardach

West Pomeranian University of Technology, Szczecin, Poland
Department of Power Systems and Electrical Drives

Hybrid excited claw pole machine as a generator to wind turbines

Abstract

The subject of the research is a claw pole machine with a rotor with a double excitation: permanent magnets and an excitation coil. Machines of this type are subject in many scientific researches. They can be used in wind farms as well as in motor vehicles. In many known publications, constructions of claw pole machines were shown in which the rotor was made of solid steel. In order to facilitate the construction of the rotor and the use of embedded permanent magnets in its poles, it is proposed to use a laminated rotor design. The work analyzed the influence of excitation coil current on the most important parameters of the machine operating in the generator regime, such as the cogging torque and the induced voltage.

Conclusion

The new design of a hybrid excited claw pole machine has been proposed. The novelty is the use of a laminated rotor core which will significantly facilitate the machine's manufacturing process. This solution also allows the insertion of various and very complicated shapes of the rotor parts. In addition, it is possible to use embedded permanent magnets inside the rotor structure. The obtained results performed on the proposed model show that the maximum value of the cogging torque always increases with the supply of the excitation coil - regardless of whether it is a state of strengthening or weakening the field. When the current in excitation coil was I_{exc} = –10 A the maximal value of cogging torque increased about 19%, but at straightening stage when I_{exc} = +10 A the cogging torque increased about 35%. Moreover, in the presented solution, when the coil was supplied with the current I_{exc} = 10 A, the maximum voltage value was increased by approx. 10%, while when I_{exc} = –10 A, a reduction by approx. 18% was achieved.

Dr. Marcin Wardach graduated and received the Ph.D. degree from the Electrical Department, Szczecin University of Technology, Szczecin, Poland, in 2004 and 2009, respectively. Since 2011 till now he has been an Assistant Professor with the Faculty of Electrical Engineering, West Pomeranian University of Technology, Szczecin, His research interests include design of electrical machines and drives.

Wekesa David[1], Ndeto Martin[2]

Centre for Renewable Energy, Machakos University, Machakos, Kenya (1)
Institute of Environmental Technology, Jomo Kenyatta University of Agriculture & Technology (2)

Influence of earth's magnetic field on the conversion efficiency of polycrystalline silicon solar cell

Abundance of solar energy presents solar PV as the best energy solution for most developing countries to meet the energy needs of their growing population. Solar PV technology is rarely used as the major power source in most developing countries; this is attributable to the poor conversion efficiency which is less than 30% and high production cost. This paper, therefore, investigates the variance of PV parameters for polycrystalline (pc-Si) module when subjected to a static magnetic field equivalent to the earth's magnetic field. The magnitude of the magnetic field B was varied from 0.00 mT to 0.08 mT. An experimental probe on the variance of the pc-Si solar cell parameters when subject to B showed that short circuit current (ISC) and current at maximum power point (Impp) decreased noticeably while open circuit voltage (VOC) and voltage at maximum power point (Vmpp) decreased slightly as a result of an increase in B. This led to a considerable increase in the fill factor (FF) values and a decrease in the maximum power (Pmpp) which consequently led to a 3.354% decrease in the conversion efficiency (η) between the Equator 00 and latitude 500 N/S. The findings revealed increased aperture area per kilo-watt of 0.22 m2/kW of electric power generated translating to installation cost increment of 3.445% due to decreased η.

Dr. David Wekesa has got over 10 years' research experience with in-depth knowledge as a proficient and experienced applied physicist in renewable energy technologies. He is a Humboldtian research fellow from Ulm University of Applied Sciences, Germany; and currently the Director Centre for Renewable Energy, Machakos University, Kenya.

Zaverach Ievgeniia

Department of Chemistry and Chemical Engineering, Khmelnytskyi National University, Ukraine

Electrooxidation of methanol on electrodeposited Ni-Cu alloys

Abstract: *Ni-Cu alloys were electrodeposited from citrate electrolyte under different bath composition and operation conditions. Chemical and phase composition, morphology of Ni-Cu alloys were investigated by XRF, XRD, SEM. Electrodeposited Ni-Cu alloys showed catalytic activity for the electrooxidation of methanol. It was found, that the CH_3OH oxidation is diffusion controlled process.*

Introduction

In recently years, fuel cells are of tremendous interest, from both energy and environmental points of view. Alcohols are potentially renewable and wide-spread fuel sources with numerous advantages [1]. Main of the unsolved problems direct alcohol fuel cells is the slow kinetics of alcohol electrooxidation. The most important Pt-free electrocatalysts for organic reactions are electrocatalysts based on Ni and its alloys [2,3]. The main purpose of this work is to determine the influence of bath composition and operating conditions on the chemical and phase composition, morphology of Ni-Cu alloys and to investigate their catalytic activity to the methanol electrooxidation.

Main theses

Ni-Cu alloys were electrodeposited on carbon steel samples from citrate electrolyte with a composition (in g/l): $NiSO_4 \cdot 7H_2O$ 160, 185; $CuSO_4 \cdot 5H_2O$ 5–6; $Na_3C_6H_5O_7$ 70–80. pH electrolyte was 4–4,5. Operating conditions: current density 1, 2 A/dm^2; bath temperature 35–40 °C. Chemical and phase composition, morphology of Ni-Cu coatings were characterized by X-ray fluorescence spectroscopy (XRF), X-ray diffraction (XRD), scanning electron spectroscopy (SEM). The methanol oxidation on Ni-Cu alloys was investigated by using cyclic voltammetry at different potential sweep rate. Some electrochemical measurements were performed at rotating disk electrode at rotation speed, ν of 300 – 3000 rpm.

The results of chemical composition analysis obtained by XRF showed, that content of Cu in the alloys didn't exceed 10,16%. The Cu content in alloys was controlled by changing pH electrolyte and concentration of $NiSO_4 \cdot 7H_2O$. Current density and concentration of nickel sulphate have apparent influence on morphology of coatings. The XRD patterns showed that all electrodeposited Ni-Cu alloys are solid solutions with face-centered cubic structure and lattice parameter similar to parameter of crystalline Ni metal, a=3,529 Å.

The surface of Ni-Cu alloys has become a mixture of NiOOH and $Cu(OH)_2$ during anodic polarization in 1M NaOH. The voltammograms of Ni-Cu coatings show that anodic peak of methanol oxidation appeared at 0,74–0,8 V. These potentials more positive than potential of transformation $Ni(OH)_2$ to NiOOH, 0,6–0,7 V. It is been suggested that the oxidation of methanol can realize both chemical oxidation with $NiOOH/Ni(OH)_2$ mediator and by direct electrochemical oxidation adsorbed methanol species on active sites by producing many intermediates. Adsorbed CO, CO_2, $HCOO^-$ are the intermediate products of methanol oxidation in alkaline solution [3].

The electrodes with Ni-Cu coatings generate higher current for electrooxidation in alkaline solution in the presence of CH_3OH than electrodes with Ni coatings. In particular, in the presence of 1M CH_3OH anodic peak current of methanol oxidation on Ni coatings was 18 mA/cm^2 and for Ni-Cu coatings was in limits 32–55 mA/cm^2. Higher catalytic activity of Ni-Cu alloys can be explained by higher surface concentration of β-NiOOH form [2].

At reverse sweep a notable peak is observed near 0,8 V. So in the reverse scan the oxidation of CH_3OH continues. Current goes through maximum due to regeneration of active sites for the adsorption of methanol as a result of removal of adsorbed reaction products (especially, CO). So methanol or reaction products can be oxidized again, but rate of oxidation drops when the unfavorable potentials (<0,6 V) are approached.

The anodic peak currents of electrooxidation of methanol on Ni-Cu coatings were proportional to its bulk concentration. It is seems probable that methanol oxidation on Ni-Cu alloys is electrocatalytic process which controlled by diffusion of CH_3OH from solution volume to electrode surface.

The linear proportional relationship between the anodic peak current and the square root of sweep rate also point out, that electrooxidation of methanol is diffusion-limited reaction. The anodic peak current of methanol oxidation depends on rotation rate of disk electrode getting independent at ν>1000 rpm.

Conclusion

Ni-Cu alloys electrodeposited from citrate electrolyte showed catalytic activity for the electrooxidation of methanol, besides response for CH_3OH oxidation for Ni-Cu coatings is larger than the response obtained for pure electrodeposited Ni. Thus Ni-Cu alloys deserve attention as promising electrode materials for fuel cells and chemical sensors.

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Dr. Zaverach Ievgeniia received PhD degree at the Faculty of Chemical Technology of National Technical University of Ukraine “KPI”. She works at the Department of Chemistry and Chemical Engineering of the Khmelnytskyi National University. Her current research interests are mainly focused on electrodeposition of composite coatings and alloys and their applications as catalytic active materials.

Supplement


Science in the age of globalization
11th Congress of the Societas Humboldtiana Polonorum

Andrzej Ossowski

Pomeranian Medical University in Szczecin, Poland

The secret of the Vampire from Kamień Pomorski

In 2014 in a small city in Pomerania, Kamień Pomorski archeologists found strange burial. The skeleton had strange damage to the femur and tibia bones. The next shocking discovery was a brick placed in the mouth of the deceased. The person found was buried on the edge of the cemetery, some distance from the other graves. the burial was called the vampire's burial, and the information about this burial went around the world. The information was reported by such websites as CNN, Daily Mail, The Sun, National Geographic, etc. The anthropological and archaeological analysis carried out showed that the remains belonged to a man, dark-eyed, dark-haired, from a different population than residing in Pomerania. In the media, it was written that the appearance of this man was supposed to provoke fear. Was it really like that? The vampire remains came to the Museum in Kamień Pomorski. After 3 years, the museum turned to the Pomeranian Medical University with a request for further research, the results of comprehensive studies have been surprising.

Andrzej Ossowski. Assistant professor of Medical Sciences, biologist by education, forensic expert practicing forensic genetics, anthropology and criminalistics. Graduate of Faculty of Science and Faculty of Law and Administration of the University of Szczecin, doctoral studies on the Pomeranian Medical Academy in Szczecin. He began his career in 2002 in the Department of Forensic Medicine of the PMA in Szczecin. Currently, head of the Department of Forensic Genetics of the Pomeranian Medical University in Szczecin. Author and co-author of several dozen scientific papers.

He has issued over a thousand expert's legal reports in the fields of forensic genetics, forensic medicine, anthropology and criminalistics. The originator and co-creator of the Polish Genetic Database of Totalitarianisms' Victims project, thanks to which identity is being brought back to the victims of totalitarian systems. He has worked on finding more than 10000 victims of the Second World War and the post-war period all over Europe and identified over 1000 of them. Within his scientific research he takes part in projects in areas of: forensic genetics, forensic anthropology, archaeology, criminalistics and history.

Prof. Dr.-Ing. habil Gerhard Schembecker

TU Dortmund University

Private Public Partnerships - Enabling Synergies between Academia and Industry

The city of Dortmund has gone through a dramatic structural transformation since the decline in the coal-, iron- and steel-industries. TU Dortmund played a major role in overcoming this decline by creating new jobs through transferring academic ideas into industrial practice. More than 10,000 jobs have been created and 280 start-up companies were founded in the technology park located next to the university.

Besides this tremendous success innovation remains being challenging when connecting with future markets. Inventions will have an impact only once the new idea will be implemented. Unfortunately, some business areas like the chemical and pharmaceutical industry need more than a clever idea, a market, a computer and a desktop for success. A proof of concept under industrial conditions presents a conditio sine qua non before industry takes over inventions, requiring infrastructure exceeding the resources of an academic environment. In this context, Private Public Partnerships (PPP) offer opportunities to join forces with companies addressing the needs of both academia and industry.

The presentation will introduce invite GmbH, a PPP between Bayer AG, TU Dortmund and University of Düsseldorf in the field of future production technologies for the chemical and pharmaceutical industry. Implementation challenges and success factors will be discussed. Success stories will demonstrate how synergies could be exploited for the joint benefit of universities and industry.

CV of the Participant

Gerhard Schembecker received his diploma as well as his Ph.D. and Habilitation in Chemical Engineering from TU Dortmund University in Germany. After leaving academia in 1998 he co-founded the consultancy firm Process Design Center (PDC) and worked in more than 120 industrial design projects for the chemical industry. In 2005 Dr. Schembecker was appointed Professor for Plant and Process Design at the Department of Biochemical and Chemical Engineering of TU Dortmund University. His research focuses on the design of (bio)chemical processes with special interest in downstream processes like crystallization and centrifugal partition chromatography and on module based plant design.

Dr. Schembecker received several process innovation awards, has published about 150 peer-reviewed papers and book chapters and is named as inventor on 5 patents. Recently he co-founded the start-up companies inosim consulting, b.experts and b.value AG investing in startups in the field on industrial biotechnology.

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DAAD Deutscher Akademischer Austauschdienst German Academic Exchange Service

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