Re-enlightenment?

Truth, reason & science
in a global world

Global Young Academy International Conference of Young Scientists

and Anniversary Annual General Meeting

at the German National Academy of Sciences Leopoldina

Halle (Saale), Germany, 29 April – 3 May 2019

Member Lightning Talks

Schedules and Abstracts

Member Lightning Talks – Truth, Reason & science in a global world

2 May 17:00 – 18:45

Each member lightning talk will consist of a 4-minute presentation. After all members have presented, there will be some time for questions and discussion.

Three parallel sessions:

Session I

Member Lightning Talks – Leopoldina

2 May 17:00 – 18:45

Each member lightning talk will consist of a 4-minute presentation. After all members have presented, there will be some time for questions and discussion.

Name	Title of lightning talk
Mona Abdel-Mottaleb	Nanoparticles for enhanced treatment of Cancer, inflammatory diseases and Vaccination
Anindita Bhadra	Street-smart: The ability of stray dogs to read humans
Sophie Carenco	"Borderline Chemistry": Inorganic Nanoparticles from the Bench to the Synchrotron
Meron Zeleke Eresso	Sisters on the move: Ethiopia's gendered labour migration milieu
Alex Godoy Faúndez	Why sustainability science in the south?
William Godsoe	Predicting climate changes effects on biodiversity needs a common language not just big data
Hong Ching Goh	Coastal communities and mangrove conservation
Tyrone Grandison	Using Data & Computing for the Greater Good
Sandeep Kaur	Designing and developing alternative renewable energy resources
Stefan Kohler	Precision Medicine in Global Health
Sergey Kostyrko	Self-organization of stressed surfaces in nanoscale materials
Vanessa MacDonnell	The Government's Functions under a Constitutional Bill of Rights
Fatemeh Mohammadipanah	Innovative modalities in drug discovery from bacterial resources
Felix Moronta	Ensuring the safe use of biotechnology products in developing countries

Session II

Member Lightning Talks – Leopoldina

2 May 17:00 – 18:45

Each member lightning talk will consist of a 4-minute presentation. After all members have presented, there will be some time for questions and discussion.

Name	Title of lightning talk
Syed Ishtiaque Ahmed	Computing for Voice: Understanding People and Building Technology for Sustainable Development
Shalini Arya	Novel energy efficient HC processing of liquid foods
Wei Gao	Wearable sweat sensors
Lisa Herzog	What's human about human decision-making? Dividing labour between humans and AI
Anna Harris	From critical thinking to critical making in medical schools
Malan Ketcha Armand Kablan	Analysis of anthropic factors of a flood by overflowing of a drainage system along an evacuation channel in Cocody-Riviera, Abidjan, Côte d'Ivoire, and its related sanitary risk associated
Benjamin Hennig	Re-Enlightening Views of the World
Daniel Limonta	Fighting against dengue and zika viruses
Marian Asantewah Nkansah	Heavy Metals in Unusual Places
Anina Rich	Yellow tomatoes and red bananas: Exploring the interaction between what we see and what we know
Moritz Riede	Flexible Solar Cells?
Henri Tonnang	Pathway for Scaling Up Agriculture Proven Technologies in Africa
Chang Da Wan	University Rankings as a Quality Indicator?
Martijn Wieling	The beauty of language variation

Session III

Member Lightning Talks – Leopoldina

2 May 17:00 – 18:45

Each member lightning talk will consist of a 4-minute presentation. After all members have presented, there will be some time for questions and discussion.

Name	Title of lightning talk
Cristina Blanco Sío-López	Navigating Schengen. Historical Challenges and Potentialities of the EU Free Movement of Persons, 1985-2015 (NAVSCHEN)
Kok-Keok Chong	Dense-array concentrator photovoltaic system
Eqbal Mohammed Abdu Dauqan	Medicinal and Functional Values of Natural Antioxidants
Thomas Edison E. dela Cruz	Biochar-Fungi-Bacteria (BFB) soil amendment for food security and sustainable agriculture
Alison Flynn	Reshaping postsecondary science education to equip learners to address complex 21st century challenges
Robert Lepenies	The Politics of SDG Indicators
Boon Han Lim	A Breakthrough for a Water-Cooled Solar Photovoltaic System Operating in the Tropical Region
Vanny Narita	Microbes in my research: recombinant protein production, antibiotic resistance genes, and microbial diversity
Dipak Vitthal Pinjari	Role of Energy Intensified Techniques for Industrial and Rural Engineering: A Cavitational Approach
Abel Polese	The SCOPUS Diaries and the (il)logics of Academic Survival: A Short Guide to Design Your Own Strategy and Survive Bibliometrics, Conferences, and Unreal Expectations in Academia
Filippo Rossi	Formulated hydrogels and nanoparticles for spinal cord repair
Michael Saliba	Novel perovskite materials for a sustainable energy future
Velia Siciliano	Synthetic Biology: an opportunity to tackle unmet medical needs

Sabrina Daniela Silva Wurzba	Molecular profiling to understand oral cancer progression

Mona Abdel-Mottaleb

Egypt

Ain Shams University

Nanoparticles for enhanced treatment of Cancer, inflammatory diseases and Vaccination

The use of nanosystems for drug delivery applications has been the focus of many researchers in the last few decades. Due to their nanosize, all nanomaterials acquire new properties compared to their macropeers. One major property is their ability to accumulate in different diseased tissues especially cancerous tumours and inflammatory lesions in a phenomenon called Enhanced permeation and retention effect (EPR). utilizing this phenomenon helps to design different carriers with high targetability towards diseased tissues with minimal exposure of healthy unaffected body areas which consequently leads to higher therapeutic efficiency of the administered drugs with minimal undesirable side effects on the healthy tissues.

Similarly, successful application of nanocarriers to the field of immunotherapy of cancer has been achieved. In addition, their use for the manufacture of more efficient vaccines is another major area of research that might minimize the use of adjuvants which could be the solution of a major problem in the current period. Adjuvants have been used for years to enhance the vaccination efficiency of different vaccines of many serious illnesses. The side effects of adjuvants which led to the various calls for rejecting vaccines would lead to the reappearance of some epidemic catastrophic diseases allover the world. Hence major efforts are invested in this field aiming at finding a potential solution for this problem.

Syed Ishtiaque Ahmed

Canada

University of Toronto

Computing for Voice: Understanding People and Building Technology for Sustainable Development

The top Sustainable Development Goals of the United Nations, including poverty alleviation, literacy, and gender equality, are closely tied to the problem of exclusion from core economic, social, and cultural infrastructures. As a potential tool for sustainable development, technology has the responsibility to make these infrastructures more inclusive. However, to date, many of the world's biggest technological advances have primarily benefited only a small fraction of the developed world. The goal of my research is to leverage ethnographic methods to understand the underserved populations in low-income regions, and design and develop appropriate technologies to bring sustainable positive change in their lives.

In this talk, I will describe my general research approach that combines ethnography and design. I will focus on two projects to explain how understanding the communities through a deep ethnography can result in effective technologies. In addition, I will briefly discuss my ongoing work on privacy right, the refugee problem, technology repair, and e-waste to show how ethnographic studies have opened up novel spaces for design and other creative interactions mediated by computing technologies. Through these projects, I will also explain how "voice", which I defined by better access, visibility, and freedom, can empower marginalized communities to combat the problem of exclusion, and contribute towards sustainable development.

Shalini Arya

India

Institute of Chemical Technology Mumbai

Novel energy efficient HC processing of liquid foods

Despite the abundance of fruits; every year huge post-harvest losses (40-50%) are reported in India. The reason is lack of proper processing facilities. There are quite a large number of indigenous and underutilized fruit crops, which are being used by the local inhabitants (jackfruit, bael,jamun, carambola, phalsa). These fruits are rich in vitamin C, flavonoids, antioxidants, phytochemicals and cancer, diabetes prevention ability. Thus, utilizing these fruits through HC is needed. Global demand for health promoting foods with high nutritional and nutraceutical values is increasing. This trend requires the development of novel minimal processing technologies. Most of conventional food processing technologies are based on contact heating and involve multiple processing steps that introduce fruit to the atmosphere and therefore accelerate oxidation. ‘‘No additives and preservatives ‘‘and ‘‘pure natural’’ food concepts led to the development of novel technologies that are able to keep food safe and fresh with minimal thermal processing. Yet promising underexplored novel food processing technology is HC. The significant microbial reductions in very short treatment times due to cavitation, the energy efficiency, cost efficiency, and its great flexibility in industrial scalability are some of the major benefits of this technique. This method is clearly efficient to inactivate microorganisms, but its potential on commercial juices has not been explored.

Anindita Bhadra

India

Indian Institute of Science Education and Research Kolkata

Street-smart: The ability of stray dogs to read humans

A large body of research is focused on understanding the ability of dogs to communicate with humans. However, these studies are based on pet dogs, which are raised and cared for by humans. Free-ranging/stray dogs that are present in many parts of the world, on the other hand, depend on humans as resources and interact with people on a regular basis. Hence, they can provide interesting insights into the nature of dogs and give pointers to how dogs might have evolved from wolf-like ancestors to become man's best friend. We have been engaged in studying the free-ranging dogs in India for nearly 10 years, delving into their ecology, behaviour and cognitive abilities.

I will briefly present two studies; the first showed that dogs are adept at understanding human gestures, being capable of distinguishing between mild and high threat. The second showed that these dogs outperform pets in understanding attentional states of humans. They can differentiate between situations when a human looks at them, turns away from them and leaves the study area. Interestingly, pet dogs in the USA are unable to distinguish between the first two conditions. These studies suggest that dogs are good learners and they learn to engage with humans through their experiences. This behavioural plasticity is likely to have enabled dogs to adapt to living among humans and developing relationships with them.

Cristina Blanco Sío-López

The Netherlands

University of Groningen

Navigating Schengen. Historical Challenges and Potentialities of the EU Free Movement of Persons, 1985-2015 (NAVSCHEN)

This project has been awarded with a EU Horizon 2020 Marie Skłodowska-Curie Senior Global Fellowship – MSCA – IF – 2019 – GF (US-EU).

NAVSCHEN will produce the first dedicated historical analysis of all worldwide available primary sources on the transnational roots, debates and conditions for the implementation of the European Union (EU)'s free movement of persons (henceforth, FMP).

The project's overall objective is to highlight: a) the value of critical historical analysis and b) the normative legacies on human mobility rights in the European integration process to address the current challenges of the EU's FMP. This project aims to bridge this gap via the comparative analysis between the European Parliament (EP) and the European Commission (EC)'s role and impact on the changing modes of implementation of this Schengen Area 'fourth freedom'.

These two cases will be explored as part of a larger study on belonging and displacement in a 'Europe in the making'. The project's timeline will examine human mobility rights in light of the historical analysis of the European integration process from 1985 (the inception of the Schengen Area) to 2015 (a key turning point dominated by the public and private perception management articulation of responses to the so-called 'refugee crisis').

Sophie Carenco

France

Researcher at CNRS and Sorbonne Université

"Borderline Chemistry": Inorganic Nanoparticles from the Bench to the Synchrotron

As a nano-chemist, I will discuss the inputs of molecular chemistry and materials sciences in the design and applications of metal-containing nanoparticles. My research group prepares and studies four families of metal alloys compounds for which unique properties (optical, magnetic, catalytic, etc.) arise when we manage to isolate them as nanoparticles instead of large crystals.

I will highlight the interdisciplinary dimension of this work, which is connected to physics (through spectroscopy and synchrotron-based measurements) and biology (toxicity studies and opportunities in nano-medecine). I will also discuss the perception of this field by the general public and how I personally respond to the ethical implication of this research line.

Kok-Keok Chong

Malaysia

Universiti Tunku Abdul Rahman

Dense-array concentrator photovoltaic system

Dense-array concentrator photovoltaic (DACPV) is a cost effective solar power system capable of producing both electricity and thermal power concurrently. DACPV system consists of non-imaging dish concentrator (NIDC) and an array of cross compound parabolic concentrator (CCPC) lenses coupled to DACPV cells. NIDC is a novel computer generated geometry consisted of flat facet mirrors capable of producing high concentrated sunlight with uniform illumination in rectangular image. The CCPC can provide more space for the interconnection and more flexibility to connect solar cells in dense array photovoltaic module for minimizing power losses. The invention of dense-array concentrator photovoltaic system can achieve ultra-high solar concentration ratio of more than 1800 suns at large collective area (from 25 to 125 m^2) to save the usage of expensive solar cell materials significantly. Various innovative and creative ideas to minimize the cost of renewable energy in power generation are very important to guarantee a good future of the next generation living in sustainable environment.

Eqbal Mohammed Abdu Dauqan

Norway

University of Agder

Medicinal and Functional Values of Natural Antioxidants

Antioxidant compounds play an important role in our body defense system against Reactive Oxygen Species (ROS). The free radicals also play an important role in combustion, atmospheric chemistry, biochemistry and biotechnology including human physiology. Consumption of food containing phytochemical with potential antioxidant properties can reduce the risk of human disease. Chain breaking antioxidants are highly reactive with free radicals and form stable compounds that do not contribute to the oxidation chain reaction. The purpose of this study is to evaluate the Medicinal and functional values of natural antioxidants in different vegetable oils.168 Sprague Dawley male rats were divided into three groups. The first group contains 72 rats were divided into 12 groups of 6 rats per group. The rats were fed ad libitum with commercial rat's pellet containing different concentrations of red palm olein (RPO) for 2, 4 and 8 weeks. The second group contains 60 Sprague Dawley male rats which were randomly divided into 10 groups of 6 rats per group and were treated with 15% of RPO, palm olein (PO), corn oil (CO), coconut oil (COC) and control groups for 4 and 8 weeks. The third group contains 36 Sprague Dawley male rats which were randomly divided into six groups of 6 rats per group (3 normal groups and 3 stressed groups) and were treated with 15% of RPO and PO for 4 weeks. The HDL-C increased in RPO and PO of normal group, but it was within normal range under stress condition.

Thomas Edison E. dela Cruz

Phillipines

University of Santo Tomas

Biochar-Fungi-Bacteria (BFB) soil amendment for food security and sustainable agriculture

Biochar, a product of a thermal degradation of organic materials, has a potential as soil enhancer. Available evidence suggests that soil biota play an important role in biochar effects on plant growth and health, but the mechanism involved in this biochar-mediated plant growth is at present not fully understood. Soil fungi are also known for their effective biocontrol of soil-borne pathogens and in the induction of systemic defense in plants while root-associated (rhizosphere) bacteria promote growth of plants through their assistance in nutrient acquisition and secretion of growth-promoting hormones. Now, bring these three beneficial entities together: Biochar + Soil Fungi + Rhizosphere Bacteria = Enhanced Plant Growth. Our project therefore looks at biochar combined with microorganisms (B-F-B) as soil amendment to promote plant growth and increase product yield for food security and sustainable agriculture.

Meron Zeleke Eresso

Ethiopia

Addis Ababa University

Sisters on the move: Ethiopia's gendered labour migration milieu

This paper presents intricacies of gender and migration drawing on the growing phenomenon of Ethiopian female siblings' outmigration. Siblings' migration displays how the migration process is highly impacted by dominant gendered socio-cultural norms as much as it is affected by the demand structures in destination countries. Gendered socialization patterns, gendered norms and gendered roles highly affect the migration trends in defining who migrates, why and how, in the context of patriarchal society. Overarching gender norms influence women's access to education, employment and their autonomous decisions of migration. Furthermore, the paper presents how a migration project and sponsorship of ones' own younger sister by a female migrant is used as a "resistance" mechanism to flee different forms of gender-based violence young girls and women face at their places of origin. Co-migration of sisters and female siblings' sponsorship reinforces the gendered labour migration, enhancing intergenerational female labour migration pattern.

Alex Godoy Faúndez

Chile

Universidad del Desarollo

Why sustainability science in the south?

My research explores the governance of complex and evolving human-ecosystem systems to deliver simple and practical solutions to current sustainability problems like water scarcity and food, waste management, energy and environmental pollution. My main goal is to develop frameworks of analysis for understanding the causes and effects of current events to contribute to national sustainable development through better understanding and integration of local systems - characterized by its natural resources, climate, infrastructure needs engineering, social and political - for the service of decision making techniques to the public policy level, linking science, technology, society and education. Though the use of qualitative and quantitative methods are needed, I attempt to understand if and how a variety of governing programs (such as regulations and planning processes) plan for or adapt to changing social and ecological circumstances. My current work examines the governance of environmental challenges associated with changes in the use and management of ecosystem services.

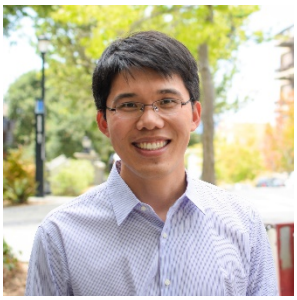
Alison Flynn

Canada

University of Ottawa

Reshaping postsecondary science education to equip learners to address complex 21st century challenges

Science education has historically relied on static, fact-based transmission (e.g., lectures), despite the need for citizens equipped to reason through vast amounts of information and address complex, global issues. Educators have opportunities to reshape teaching, curricula, and learning environments and help learners develop the critical thinking, reasoning, and learning skills needed in their careers and as engaged citizens. The Flynn research team's areas align with these opportunities by: (1) Investigating learning in chemistry/science, particularly around the development of expertise, meaning-making, and scientific argumentation. (2) Investigating the impacts for learners and educators when research from psychology (i.e., self-regulated learning, metacognition, growth mindset, goal-setting) is integrated in postsecondary courses through a tailored learning module. This project's goals include helping to support greater student ownership, agency, and lifelong learning skills in courses that typically focus on disciplinary content. (3) Improving access to educational opportunities by creating online learning tools that are open access, interactive, learner/user controlled, and (currently) available in French and English.



Wei Gao

United States

California Institute of Technology

Wearable sweat sensors

The rising research interest in personalized and precision medicine promises to revolutionize traditional medical practices. This presents a tremendous opportunity for developing wearable devices toward predictive analytics and treatment. In this talk, I will introduce fully-integrated flexible biosensors for multiplexed in-situ perspiration analysis, which can selectively and accurately measure a wide spectrum of sweat analytes (e.g., metabolites, electrolytes, heavy metals, drugs, and other small molecules). This platform allows us to gain real-time insight into the sweat secretion and gland physiology. I will also demonstrate an integrated wearable sweat extraction and sensing system which can be programmed to induce sweat on demand with various secretion profiles. To demonstrate the clinical value of our wearable sweat sensing platform, human subject studies were performed toward fitness monitoring, physiological monitoring, disease diagnosis, and drug monitoring. These wearable and flexible devices open the door to a wide range of personalized monitoring and diagnostic applications.

William Godsoe

New Zealand

Lincoln University

Predicting climate changes effects on biodiversity needs a common language not just big data

As global temperatures continue to rise, we will need to forecast when species will follow changing climates, and when climate change will lead to a loss of biodiversity. Limited information is available and so many forecasts take observations of the climates currently occupied by a species, then use “big data” approaches like machine learning. These forecasts focus on describing the available data with probabilities. As a result, they simplify much of what we know about ecology, and their value is unclear. I will show that there is previously unrecognized common ground between the mechanisms shaping biodiversity and forecasts made possible by big data. Such interdisciplinary insights will make it easier and forecast biodiversity change.

Hong Ching Goh

Malaysia

University of Malaysia

Coastal communities and mangrove conservation

The fisher livelihood has been long associated with the health of mangrove ecosystem but it is not always the case today due to the impacts of urbanization which has led to the change of dependency level. This presentation highlights some of the analysis results from a project linking mangrove fisheries and community based management using nexus approach. The key to mangrove conservation has now relying on the willingness and commitment of multiple and multi-level stakeholders. The multiple roles of mangrove in the rapid urbanized region is revisited and re-investigated.

Tyrone Grandison

United States

Vice President of Data, U.Group

Using Data & Computing for the Greater Good

Vice President of Data, U.Group

As scientists, we have the opportunity to explore and innovate. We also have the responsibility to contribute back to the world around us. Using your skills to improve the well-being of your community should be a critical part of life. I use my skills in computer science and data science to solve problems, to help in policy creation, and to facilitate better science communication and science-based decision making. This talk will outline a single initiative that highlights the possible.

Lisa Herzog

Germany

Technical University of Munich

What's human about human decision-making? Dividing labour between humans and AI

With the arrival of ever more sophisticated forms of artificial intelligence, the question of the division of labour between humans and machines becomes pressing. Which decisions should be taken by algorithms, which ones by humans? This issue leads into deep philosophical waters about what human nature and human intelligence are. In this brief talk, I use three concept from the thought of the political theorists Hannah Arendt to illuminate what is specific about human decision-making: plurality, natality and judgement. These three concepts, I argue, can help us reflect about the line between human and artificial intelligence and the allocation of responsibilities to each of them.

Anna Harris

Netherlands

Maastricht University

From critical thinking to critical making in medical schools

The intense effort in designing medical school curricula has the potential to overlook the more mundane and yet incredibly rich practices of everyday design. Everyday design in medical schools is tinkering work involving adaption or making in creative acts of repurpose, skills which can be lost as medical education strives for efficiency, standardisation, transparency and objectivity. In this lightening talk I joyfully celebrate acts of everyday design and the craftsmanship of training healthcare professionals. The presentation draws empirically from an ongoing anthropological and historical study of the role of technologies in training doctors' sensory skills of diagnosis, with fieldwork conducted by a team of anthropologists, science and technology studies scholars and historians in medical schools in Western Europe, Eastern Europe, West Africa and the Asia-Pacific.

In these medical schools we have found, and been inspired by, everyday acts of making. In the presentation I will share stories about, teachers' materials and innovations. I suggest that we should not only be observing more closely the existing practices of creativity and improvisation amongst teachers, but also allow more space for such making in medical schools. Attending to everyday design is not only a creative and enlightening practice, but a necessary one, in order to train adaptive, creative healthcare professionals of the future.

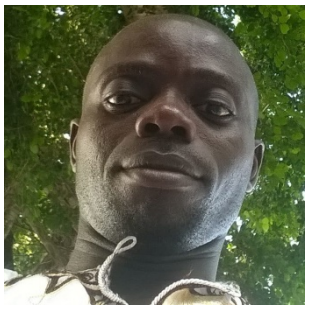
Benjamin Hennig

Iceland

University of Iceland

Re-Enlightening Views of the World

In human geography and other social sciences cartograms are increasingly used as an alternative approach to visualising quantitative data. This talk gives insights into the underlying geospatial methods and demonstrates how also environmental sciences can benefit from these mapping techniques for creating powerful visualisations of complex geographical data. While the results are very unusual depictions, these techniques have the power to provide novel perspectives of our planet and re-engage the audience with the underlying phenomena and processes in an entirely new way. This can be highly relevant in communicating science to the public as much as for our own understanding of the data that we are working with. Powerful visualisations are a valuable tool of re-connecting science to truth and reason in a global world.



Malan Ketcha Armand Kablan

Côte d'Ivoire

Université Félix Houphouët-Boigny

Analysis of anthropic factors of a flood by overflowing of a drainage system along an evacuation channel in Cocody-Riviera, Abidjan, Côte d'Ivoire, and its related sanitary risk associated

Floods by the overflowing of the drainage system are increasingly evident along the M'Badon Canal in Cocody-Riviera. The objective of this study was to assess health risk factors and the anthropogenic factors influencing flood by overflowing of the drainage system along the M'Badon canal. It is part of a proposal to propose measures to mitigate the effects of the phenomenon. The methodological approach required socio-environmental and land surveys (geographic survey, household survey, field observation) and descriptive statistical analysis. The results revealed that many environmental factors are contributing to flooding along the M'Badon Canal.

These factors mainly concern wild garbage dumps, uncontrolled sewage network connections, urban agriculture, and dilapidated network infrastructure. These factors prevent the normal flow of water and provoke the accumulation of water in the canal. Anthropogenic health risk factors identified along the canal include uncontrolled sewage network connections, wild garbage dumps, stagnating water, and open defecation. These factors are at the origin of the proliferation of various disease vectors (flies, rats, cockroaches, soil-transmitted helminths, mosquitoes). Apart from the anthropogenic factors identified, residents behavior favors the occurrence of the flood by overflowing of the drainage system. The results of this study constitute basic work for public and private institutions in charge of drainage and sanitation in Cocody.

Sandeep Kaur

India

University of Delhi and Leibniz Institute for Catalysis, Rostock

Designing and developing alternative renewable energy resources

University of Delhi, India and Leibniz Institute for Catalysis, Rostock

In the present scenario, worldwide there is an increasing threat to global warming due to injudicious use of fossil fuels and non-renewable energy resources by mankind, which in turn has given rise to their scarcity. Moreover, depletion of fossil fuel resources along with unsustainable, anthropogenic emissions of carbon dioxide (CO2) requires the development of renewable, carbon-neutral fuels to meet the requirements of the present and future generations. Extensive research and progress have been made to employ technologies for solar and wind power, but due to their intermittent availability there is a demand to develop efficient and recoverable methods for storing electrical energy in chemical bonds.

In this regard, molecular hydrogen is being considered as one of the versatile and alternate sources of energy. Molecular hydrogen is also called the “Green energy source” since only water is produced by its combustion. Naturally, the hydrogenase (H2ase) enzymes are unique in catalyzing the reversible reduction of protons to molecular hydrogen. Another attractive approach is the electrochemical conversion of CO2 to energy-dense carbon compounds, that can be used as fuels and chemical feedstocks. Therefore, our research group is currently working towards the design and development of efficient, cheap and robust molecular catalysts using earth-abundant metals that can be utilized for the reduction of carbon dioxide and production of hydrogen.

Stefan Kohler

Germany

Heidelberg Institute of Global Health, Heidelberg University

Precision Medicine in Global Health

More and more tools and technologies from genomics to big data can be used to help deliver the right health intervention, at the right time, to the right person or population. Step by step, better targeted care for individuals as well as populations may therefore be attainable in many areas of health. A focus of current applications of precision medicine as well as most development of new precision medicine approaches have been, and continue to be, in the field of cancer medicine. Few successful applications of personalized drug therapy have been discovered in areas other than the pharmacotherapy of cancers. I will discuss how precision health principles apply to various areas of healthcare, ranging from personalized drug treatment to precision global health interventions on the population level.

Sergey Kostyrko

Russia

Saint-Petersburg State University

Self-organization of stressed surfaces in nanoscale materials

The development of low-defect nanomaterials is one of the priority areas of modern electronics. By combining materials and structural elements at the nanoscale, it is possible to create devices with unique optical, electrical and magnetic properties. However, many experimental studies have shown that grooves and crack-like valleys can already be formed on free surfaces and interphases of such materials at the stage of fabrication and subsequent thermal or chemical processing. Later, in the process of exploitation, these defects evolve, inevitably leading to deterioration of material properties and decreasing the quality of devices created on their basis. One of the most important directions for research in the framework of the presented problem is the development of theoretical approaches that allow to predict the nucleation of surface defects taking into account thermodynamics of surfaces and interfaces. Thus, the main goal of the current project is to formulate and solve the coupled problems of solid mechanics and thermodynamics related to the formation of a crack-like relief due to diffusion processes activated by the stress field.

Robert Lepenies

Germany

Helmholtz Center for Environmental Research

The Politics of SDG Indicators

In what is undoubtedly the most ambitious political attempt at transformation ever declared, the UN 2030 Agenda for Sustainable Development aimed at nothing less than “Transforming our World”. Progress towards this goal is to be measured with 17 goals, 169 targets and ultimately, 230 indicators. It is these indicators that are currently under intense scrutiny, as statistical agencies attempt to translate a lofty political consensus into technically appropriate means to measure it. These developments coincide with a near-constant interest in indicators in a range of fields such as development studies, critical policy studies, Science and Technology Studies. In my presentation I will compare different specific sustainability indicators (e.g. on multidimensional poverty, water quality; and biodiversity) and show the importance of understanding “indicator constituencies” – that is, the networks of actors and institutions that promote and consolidate a given indicator. To understand the success of sustainability indicators – and possibly to assess their contribution to bringing about transformative change – attention to indicator constituencies, in both research and practical policy, is vital.

Boon Han Lim

Malaysia

Universiti Tunku Abdul Rahman

A Breakthrough for a Water-Cooled Solar Photovoltaic System Operating in the Tropical Region

The performance of a solar photovoltaic (PV) system is reduced with the increase of the temperature of the solar panels. In the tropics, the power loss can achieve close to 20% during a hot and sunny day. Till now, there is no promising solution to tackle the problem.

Though water-cooling a PV system can be easily thought of, the solar industry does not consider it as a feasible solution, simply because of the additional energy consumption of a water pump and the cost of the consumed water. Nevertheless, my team and I have investigated the water-cooling method in detailed and found a cost-effective way to cool the front surface of solar panels with water. In the method, an optimal flow rate of the cooling water is carefully obtained. Then, a switching mechanism is applied to control the operating time of a water pump to minimise electricity consumption. In addition, the threshold temperature to initiate the cooling mechanism was also optimised.

Finally, a low-cost water recycling method and rainwater harnessing method without occupying extra surface area are employed to optimize the water consumption of the system. With various kinds of optimization and new methods, it is possible to achieve more than 5% of the leverised cost of electricity (LCOE), which is a great breakthrough for the solar PV industry. We hope this breakthrough can contribute a significant step to encourage the use of solar energy to battle climate change.

Daniel Limonta

Cuba

University of Alberta

Fighting against dengue and zika viruses

I am a tropical medicine physician-scientist from Cuba doing research about two important viruses (dengue and zika) transmitted by mosquitos. Dengue virus infection can lead to a life-threatening disease named dengue hemorrhagic fever. For more than 10 years in Brazil and Cuba (mainly in Cuba), I was studying how dengue virus damages different cells from infected patients. I published how a specific form of cell death, named apoptosis, can contribute to the severity of dengue hemorrhagic fever. My research results contributed to define if the reduction of apoptosis may be useful for the treatment of this viral disease. More recently, in a virology laboratory in Canada I started to study zika virus. In 2016, this virus caused a great global concern after the zika virus infection during pregnancy was associated with microcephaly (small newborn heads) in Brazil. I have published how the zika virus infects and damages human fetal brain cells. These findings can contribute to the development of new therapeutic strategies to tackle this viral infection.

Vanessa MacDonnell

Canada

University of Ottawa

The Government's Functions under a Constitutional Bill of Rights

I am interested in how governments function under constitutional bills of rights. My research is focused on how rights obligations influence government operations in the day-to-day: how they shape government processes, the decisions governments make, the policies they adopt, and the laws they propose. My work also examines the role of government lawyers in states with a strong commitment to constitutional rights. In my view, legal scholars pay too much attention to what courts have to say about constitutional rights and not enough attention to how rights shape government decision-making. My research aims to shift the focus.

Fatemeh Mohammadipanah

Iran

University of Tehran

Innovative modalities in drug discovery from bacterial resources

New drugs are required by medicine as many of current structures have insufficient function or toxic effect. Additionally, the emergence of new or chronic disease or resistance development to the current drugs emphasizes this need. On the Other side, the improved understanding of biological systems by the advance of genomic analysis, providing variety of novel molecular targets that their modulation may enable new drug for a range of metabolic or neurological and other hardly curable disease.
However, the field of natural product discovery has undergone a tremendous recession by the rediscovery of known compounds and replacing the bacterial source by combinatorial synthesis was not successful as it was assumed before.

High-throughput screening, induction of silent biosynthetic pathways, tailoring biosynthetic pathways, rational drug design, investigation of symbiont, metabolomics and genome mining analysis are among the major new approaches that are supposed to be able to facilitated the process of drug discovery from bacteria. Although, each has shown high performance metrics, they have not been able to led to a notable advance in the rat.

Felix Moronta

Italy

International Centre for Genetic Engineering and Biotechnology

Ensuring the safe use of biotechnology products in developing countries

Agriculture needs to ensure and increase world agricultural production to serve extended demands with limited environmental resources, fragile biodiversity, and extreme future weather events. To solve this big challenge, a combination of good agricultural practice, innovation in plant breeding and proper agricultural policies are needed. However, the great technological advances in modern agricultural biotechnology, such as the genetic edition of crops or synthetic biology, are far ahead of legal regulations. Without adequate legal frameworks, technological adaptations to improve agriculture cannot be harnessed.

This is where the ICGEB Biosafety Group, to which I belong, comes in. We build bridges between agricultural biotechnologies and policymakers. We foresee technical training and capacity building to national and regional biotechnology regulatory agencies, mainly in developing countries. I assist countries in their capacity to identify and regulate products derived from modern biotechnology. This is achieved through a comprehensive approach involving the provision of technical assistance, training, and advisory services to effect biosafety capacity enhancement.

Now, by joining the GYA, my voice would be amplified and would reach to the global agricultural policy-makers for positively influencing the needed future sustainable agriculture policy adaptations.

Vanny Narita

Indonesia

International University Liaison Indonesia

Microbes in my research: recombinant protein production, antibiotic resistance genes, and microbial diversity

I have been working on the development of recombinant proteins in microbes. Some of recombinant proteins developed are Hepatitis B and dengue recombinant proteins. Hepatitis B is a major global health problem, and approximately 780 000 persons die each year from hepatitis B infection. The vaccine is 95% effective in preventing infection and the development of chronic disease and liver cancer due to hepatitis B. Dengue is a mosquito-borne viral disease that has rapidly spread around the world in recent years. The global burden of dengue is high with a recent estimate of 390 million dengue infections per year. Within Indonesian national consortium consisting of business (WHO-acknowledged pharmaceutical company, PT Biofarma), research institutes, and academia, two recombinant protein patents were obtained.

I am also working on antibiotic resistance in human impacted environment. Working together as a team consisting of University of Helsinki, Finland, University of Michigan, USA, University of Ehime, Japan, Universitas Gadjah Mada, and PT AmonRa Strategic Communication. We are looking for antibiotic resistance genes and microbial diversity in Indonesian river. Antibiotic resistance is a major threat for humans, with a recent high profile report estimates that, by 2050, 10 million people will die every year due to antibiotic resistance. The study of antibiotic resistance genes in our environment is critical to avoid further emergence and spread of antibiotic resistance.

Marian Asantewah Nkansah

Ghana

Kwame Nkrumah University of Science and Technology (KNUST)

Heavy Metals in Unusual Places

Studies on environmental heavy metals over the years has focused on the obvious sources associated with vehicular emissions, with emissions from metal-work operations located in residential areas (particularly in most developing countries) and with other industrial activities. Recent studies have been expanded to cover the presence of metals in unusual places like lipstick, classroom dust and tea. These are showcased in this presentation. Health risk assessment for some of the metals indicated isolated cases of potential carcinogenic effects on people exposed to those metals.

Dipak Vitthal Pinjari

India

University of Mumbai

Role of Energy Intensified Techniques for Industrial and Rural Engineering: A Cavitational Approach

Industrial Engineering Application:

We have developed the protocols for synthesizing various nanomaterials at the laboratory as well as at pilot scale using cavitation technique. Using sonic energy, his work resulted into an increase in the yield by 10-15% with processing times reduced to minutes from hours resulting into substantially saving (more than 90%) of energy (for most the processes developed) compared to the conventional mode of synthesis. We have developed the area of cavitational milling for natural cellulose which has increased its value addition by 20 times.

Rural Engineering Application:

A significant part of the world's population (>29%) inhabits rural areas. In a developing country like India, cheap and easy access to safe drinking water is a necessity. The Ministry of Water Resources of India has been installing hand-pumps in the villages for people to access borewell water. But lately, the quality of drinking water in rural areas does not comply with standards for human consumption owing to increasing bacterial load. According to WHO and UNICEF, 900 million people do not have access to a safe supply of drinking water. And over 1.5 million children of less than 5 years age die each year due to diarrhea only and it is the second most common cause of child deaths worldwide.

Therefore, we come up with a technology in which the modification in the pumping system itself can serve as an efficient mechanical tool for disinfection of bore well water.

Abel Polese

Estonia

Tallinn University

The SCOPUS Diaries and the (il)logics of Academic Survival: A Short Guide to Design Your Own Strategy and Survive Bibliometrics, Conferences, and Unreal Expectations in Academia
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Now that academics are required to be teachers, managers, media catalyzers, analysts, fundraisers, and social media animals: How do you strike a good balance between what is expected from you and what you want to do? Do you need to excel in all possible academic fields to be a successful academic? Is there a recipe to find a good life-career balance? What conferences to attend? How to find the money to go there? Is it worth it to act as a peer reviewer? What publishers are best to target? Is publishing a chapter in an edited book worth the work?

In the past four years I have been collecting stories and strategies on how to deal with the challenges of an academic life. This book is the result of this effort and is intended to help scholars to design and think strategically about their own career. Beginning with “How to get published in good journals,” it explores a number of questions that most academics encounter at various stages of their careers.

https://cup.columbia.edu/book/the-scopus-diaries-and-the-illogics-of-academic-survival/9783838211992

Anina Rich

Australia

Macquarie University

Yellow tomatoes and red bananas: Exploring the interaction between what we see and what we know

To interact successfully with the world around us we have to integrate incoming visual information with prior knowledge at remarkable speed. But how do internal concepts and expectations shape our perception? 'Seeing' is based on much more than just what is present in the environment, it requires interpretation based on integration with our knowledge and our current goals . I will present work from human neuroimaging demonstrating that our internal representations of objects carry information not present in the stimulus, such as the typical colour of an object, and that our methods can derive the content of these representations. These findings give insight into the way our brains integrate what we know with incoming information to achieve perception of the world around us.

Moritz Riede

United Kingdom

University of Oxford

Flexible Solar Cells?

Relying on the only known working fusion reactor in our solar system (to date), solar energy has made significant strides in recent years, being now, together with wind, the cheapest source of new electricity in all major economies, apart from Japan (Bloomberg NEF, LCOE 2018).
The current dominating technology, crystalline silicon solar cells, are seen more and more being used on roof tops as well as large scale power plants. While their cost continues to drop, they typically come in rigid and heavy modules (~ 1.7x1m^2, ~20kg) and greyish/black in colour, limiting their applications and eventual floor cost.

Thus, intensive research is carried out in labs around the world, including ours, on new materials for solar cells. The goal is to enable solar cells that can be made on flexible light weight substrates using inexpensive large area fabrication technologies and can offer additional advantages like semi-transparency. The materials our research is focussing on are co-called organic semiconductors. These carbon-based compounds are already used commercially in organic light emitting diodes (OLEDs) in the displays of many mobile phones; we are using them for the reverse process: instead of taking electricity (from a battery) and converting it into light in an OLED display, we look at the absorption of sun-light and its conversion into electricity. If successful, organic solar cells can become a ubiquitous technology allowing us to harness the power of the sun everywhere we go.

Filippo Rossi

Italy

Politecnico di Milano

Formulated hydrogels and nanoparticles for spinal cord repair

Spinal cord injury (SCI) represents the most frequent disabling injury among the diseases of the spine. An estimated 2.5 million people worldwide live with SCI, and more than 180,000 new injuries/year. The persisting SCI has a great impact on the quality life of the affected persons and represents also a heavy burden for the society in terms of loss of income and healthcare costs. The biggest difficulty in the treatment of this disease, reason why no efficacious treatments are available, consists in its dynamic nature. In particular after a primary lesion (car accident, gunshot…) a cascade of events takes place until the scar formation and the impossibility to reconnect the two junctions. It is necessary to design a vehicle able to perform multiple release of anti-inflammatory drugs (neuroprotection) to reduce inflammation and then try to rebuild the damaged tissue (neuroregeneration). In this perspective the use of formulated hydrogels and nanoparticles able to gelify and release in situ can represent a promising approach in order to perform multiple release following the timescale of the pathology.

Michael Saliba

Switzerland

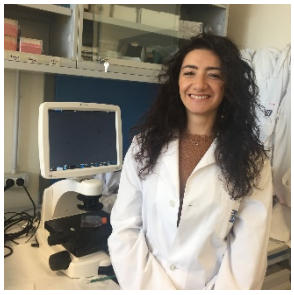
University of Fribourg

Novel perovskite materials for a sustainable energy future

One hour of globally-received sunlight could power the planet for one year. And yet only 1% of all global electricity is from solar panels. My research aims to make solar power a significant part of a clean and sustainable energy future.

In recent years, a novel material group, so-called perovskites, have taken semiconductor research by storm. Not only do these materials convert sunlight efficiently and cheaply into electricity, they also have the potential to dramatically improve already established silicon solar cells.

Thus, perovskite materials could become a disruptive technology leading to a sustainable energy solution for the generations to come.



Velia Siciliano

Italy

Istituto Italiano di Tecnologia-IIT

Synthetic Biology: an opportunity to tackle unmet medical needs

Synthetic biology, is a field of bioengineering that aims at reprogramming cells to confer new properties and functions or to study mechanisms underlying biological pathways. Mammalian synthetic networks build on the conjugation of efforts to design “smart interfaces” that are activated when specific endogenous or exogenous inputs are sensed. The ability to trigger a desired output only when selective criteria are met is highly desirable for the development of advanced, personalized therapies and may overcome side effect issues of state-of-the-art medical approaches. I will give a glimpse of how “smart interfaces” are designed and built, with an outlook to biomedical perspective.

Henri Tonnang

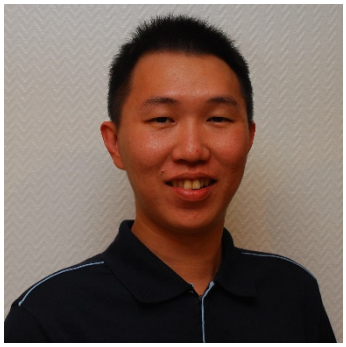
Benin Republic

University of Buea, International Centre for Insect Physiology and Ecology (ICIPE)

Pathway for Scaling Up Agriculture Proven Technologies in Africa

Technologies for African Agricultural Transformation (TAAT) is a technology, financing, and partnership platform for driving the Feed Africa strategy of African development (AfDB) by helping to take proven agricultural innovations, knowledge and good agricultural practices to scale in Africa. TAAT implementation is carried out through commodity value chain compact, which is an entire ecosystem of actors needed to deliver technologies at large scale. In this context "technology" is understood as the practical application of proven scientific knowledge and/or knowledge products for increasing agricultural productivity. A "technology toolkit" is a tailor-made combination of proven, and others accompanying technologies, aiming at attaining a target productivity level through commodity value chain.

This paper presents the pathway adopted by the TAAT's program implementation team to promote and disseminate proven agriculture technologies across agro-ecologies and reach million of farmers in Africa. The process of technology dissemination started by assembling proven technologies into toolkits while taking into account farmers, public and private sectors along the value chain. Well-preformed toolkits will be converted into investment portfolios for wide commercialization towards the transformation of African agriculture.



Chang Da Wan

Malaysia

Universiti Sains Malaysia

University Rankings as a Quality Indicator?

University rankings have become an annual affair driven in higher education. The 'independent' rankers employ sophisticated metrics that include research publication, citation, teaching and learning, as well as reputation, to compare the relative 'performances' and 'quality' of universities. Although critics have commented that university rankings is bias towards research as compared to other functions of a university as well as the robustness of these rankings to show quality, there has not been sufficient attention given to the reputation component. This talk focuses on questioning, arguably, the heaviest weightage used to construct the rankings, and importantly, also a highly questionable component in terms of its reliability and validity. The questions raised, therefore, will be crucial for us to re-think, is university rankings a quality indicator for our universities?

Martijn Wieling

Netherlands

University of Groningen

The beauty of language variation

My research focuses on investigating language variation and change, both quantitatively and experimentally. In my quantitative work, I use computational and statistical techniques to reveal and visualize linguistic patterns present in large data sets. In my experimental work, I use electromagnetic articulography and ultrasound tongue imaging to register the movement of the tongue during speaking. During my presentation, I will discuss and show some of the beautiful patterns we found investigating language variation using these two approaches.

Sabrina Daniela Silva Wurzba

Canada

McGill University

Molecular profiling to understand oral cancer progression

Dr Wurzba is assistant professor and scientist at McGill (Canada) with a long-standing interest in the integration of molecular mechanisms influencing tumor progression and metastatic process in head and neck cancer aiming to identify innovative therapeutic/prognostic targets for incurable diseases. She has working to characterize the clinicopathological impact of the genetic/genomic alterations in advanced tumors, and to explore the underlying fundamental mechanisms that facilitate metastatic spread.

Lahcen El Youssfi

Morocco

Sultan Moulay Slimane University

IWRM (integrated water resource management) and Ethics vs. sustainability

Water resources are limited, delicate, and very unequally distributed over space and time. During the second half of the 20th century, water demand has increased (Vargas-Yáñez et al., 2009). In many countries, the water use is approaching the limit level of available resources. The climatic changes will have more negative impacts on water resources. Agriculture, industry and domestic wastewater are increasing water scarcity and the pollution of water resources, both surface water and groundwater (UN-Water, 2007). The adoption of convenient IWRM (integrated water resource management) strategy is crucial for an efficient use of this resource and for its sustainability for the future generations. One of the crucial and dismissed aspects related to IWRM (integrated water resource management) strategies in is the ethical issue. Thus, even with the adoption of IWRM and developments in water resource policy, regulation, law, management, monitoring, health and research in water resources sector, there are still many challenges.

Those challenges are related to poverty, inequality, social and environmental injustices. In fact, sustainable use and protection of water resources is essential to addressing some of these social challenges. However, how can equity, social and environmental justice, in its broad sense of including human and ecological constituencies, are achieved in the allocation of water and in the management of water resources?