



European Research Council
Conference

Frontier Research: Creating Pathways to Sustainability

Brussels
2 - 3 December 2019



European Research Council
Established by the European Commission

About the European Research Council

The European Research Council (ERC), set up by the European Union in 2007, is the premier European funding organisation for excellent frontier research. Every year, it selects and funds the very best, creative researchers of any nationality and age, to run projects based in Europe. The ERC has three main grant schemes: Starting Grants, Consolidator Grants and Advanced Grants. The Synergy Grant scheme was re-launched in 2018.

To date, the ERC has funded over 9 500 top researchers at various stages of their careers, and over 70 000 postdocs, PhD students and other staff working in their research teams. The ERC also strives to attract top researchers from anywhere in the world to come to Europe. Key global research funding bodies in the United States, China, Japan, Brazil and other countries have concluded agreements to provide their researchers with opportunities to temporarily join the teams of ERC grantees.

The ERC is governed by an independent body, the Scientific Council, led by ERC President Prof. Jean-Pierre Bourguignon. The overall ERC budget from 2014 to 2020 is over €13 billion, as part of the EU Research and Innovation framework programme, Horizon 2020.

Aim

The event will highlight how curiosity-driven research funded by the ERC contributes to achieving the UN Sustainable Development Goals. It will take stock of relevant research supported by the ERC and will provide a networking forum for ERC-funded researchers as well as for policy-makers.

More specifically, it aims to:

- 1) explore the state of the art of research related to sustainability challenges;*
- 2) get a better understanding of current obstacles to achieving the Sustainable Development Goals;*
- 3) highlight potential avenues for change based on new scientific insights.*

Background

The European Research Council Executive Agency (ERCEA) is devoting its annual conference to the highly complex challenge of sustainability. With its focus on scientific excellence and its 'bottom-up approach', where researchers freely choose the topic they propose to study, the ERC is in a prime position to contribute to a broad discussion on sustainability at the frontier of knowledge. The conference will bring together leading, ERC-funded scientists from the Life Sciences, Physics and Engineering as well as the Social Sciences and Humanities. Each will briefly present their project's outcomes and link their work to one of five thematic sessions within the broader sustainability discourse. The intended result will be a wide, non-exhaustive overview of the state of the art of frontier research on sustainability questions, seeking to contribute to ongoing discussions on how to avoid severe global consequences for the environment.

Structure

The conference is organised in seven sessions:

Opening Session

This opening session will introduce some of the latest research on sustainability, its relevance to the EU and in a worldwide context, and will make the link between sustainability challenges and the ERC bottom-up funding approach.

1. Human Behaviour and Sustainability

Human behaviour is affecting every single sustainability challenge. Understanding behaviour and its effects is a first prerequisite to proposing alternative avenues and potential solutions to sustainability problems that the world is facing today. In this session, four ERC grantees will discuss the impact of humans on sustainability issues from different angles. Prof. Szabó of the project LONGWOOD will start with presenting how the vegetation of central Europe has been shaped and influenced by humans since the Neolithic. He will highlight the influence of human woodland management on the dynamics of forests. This project shows how, through the ages, our way of producing goods has affected our environment. As an example of more recent adverse impacts of human behaviour, Prof. Sunyer, leading the project BREATHE, will highlight the extensive use of private vehicles in most European cities, and the detrimental effects on the health of future generations via the resulting air pollution. Specifically, he will present how pollutants from traffic sources are neurotoxic and may impair the healthy development of primary school children. Looking into present and future avenues for improving the effects that human activities and behaviour have on the environment, Prof. Kostakis of the project COSMOLOCALISM will present the sustainability potential of different emerging modes of production. Finally, Prof. Morgera of the project BENELEX will point out how legal frameworks can be used to foster more sustainable practices and can transition society towards a greener economy.

2. Feeding the Future?

Sustainability in food production and consumption requires a holistic, systems-approach; one that addresses the dimensions of food security, malnutrition, obesity, circularity and resource efficiency, and climate change. Our future food systems need to provide nutritious food, which is available, accessible and affordable to all. These systems also need to be adaptive to climate change, and to support healthy, biodiverse ecosystems. Natural resources (water, soil, land and sea) need to be used sustainably within the planetary boundaries and available to future generations. Circularity and resource efficiency are other features of sustainable food systems that minimise food losses and waste. This session will present research that addresses such dimensions of sustainable food systems. First, Prof. Bunnefeld, the Principal Investigator of the project ConFooBio, will address the crucial issue of conflict resolution between food security and biodiversity conservation. Then, on the production side, Prof. Kondorosi of the project SYM-BIOTICS will present the potential of using naturally occurring plant-bacteria symbiosis to improve both yields in agriculture, as well as food safety, via the antimicrobial effects of such symbiosis. As an example of a 'smart agriculture' approach, Prof. Plumeré of the project LiveSEN will show how in-field, real-time sensing of nitrate levels in crops can help reduce the use of fertilisers in agriculture. Finally, Prof. Cani, of the project ENIGMO, will present evidence of the important role that gut microbiota has in regulating metabolism and its impact on the development of obesity and diabetes. This research also offers new leads for therapeutic options for tackling obesity and associated metabolic disorders.

3. Affordable and Clean Energy

Demand for energy is increasing, and substantial investment is needed in innovative clean energy production and storage that can replace fossil fuels. There is a need for developing a broader portfolio of cost-effective renewable energy sources and technologies, including new solutions for energy storage, and innovative techniques for thermal insulation. Furthermore, the transition to a low-carbon, energy-efficient and climate-resilient economy will require a more decentralised, dynamic system with the involvement of all society; where households will participate as managers of decentralised energy networks. In this session, Prof. Giulia Grancini will present her project HY-NANO in which she aims to improve the efficiency of solar energy. Prof. Ballottari of the SOLENALGAE project will then present how microalgal cultures can be used as a source of renewable energy, via improving their photosynthetic solar energy conversion into chemical energy. A further challenge in the clean energy value chain is the distribution of energy. Considering electricity markets, Prof. Fabra, of the project ELECTRIC CHALLENGES, will present an analysis of policy strategies and potential tools for improving electricity markets, for example using dynamic pricing to change household demand patterns. Whereas producing clean and affordable energy is becoming a matter of the utmost importance, saving energy by improving the insulation of commercial and residential buildings appears equally important. Prof. Papakonstantinou, of the project IntelGlazing, will present the development of new technologies to reduce the level of heat-exchange through windows, thereby reducing the energy needed for regulating the temperature of buildings, both recently built and old ones.

4. Tackling Climate Change

Global warming is causing long-lasting changes to our climate system, which threatens serious, irreversible consequences. Urgent and ambitious collective action is needed to meet the Paris Agreement goals to limit the increase in global mean temperature to two degrees Celsius above pre-industrial levels, aiming at 1.5°C. To meet the Paris climate goals, not only strong political will is needed, but also a better scientific understanding of the interaction between climate and the biosphere, and innovation and investment that enables a transition towards a low carbon economy. The first three researchers in this session will present recent insights on the interaction between the biosphere and climate. Prof. Magurran of the BIOTIME project will describe the temporal dynamics of the abundance of individual species, and their capacity to withstand change and to recover from change over time. Based on the findings of the project, Prof. Magurran has developed an innovative open access database that can form a crucial resource to help policy makers and conservation managers address threats to biodiversity caused by climate change. Prof. Wingate of the SOLCA project will describe her research to assess the global quantitative carbon storage potential of terrestrial ecosystems, and its sensitivity to climate change, using carbonic anhydrase activity in soils as an indicator. Prof. Kuparinen's project COMPLEX FISH studies the complex eco-evolutionary dynamics of aquatic ecosystems faced with human-induced and environmental stress. Finally, Prof. Ameli of the LINKS project will describe possible transformations to the finance system, with a view to deliver the scale and quality of investment needed to achieve a low-carbon economy and to limit global temperature increase to two degrees Celsius.

5. Sustainable Cities and Communities

By 2050, two-thirds of all humanity —6.5 billion people— will be urban, with many people living in mega-cities. Sustainable development cannot be achieved without significantly transforming the way we build and manage our urban spaces. Making cities sustainable means, among others, creating inclusive urban economies, fostering more sustainable modes of transport, access to clean water and green public spaces, and more participatory urban planning and management. In this session, Prof van Ham of the DEPRIVEDHOODS project will first look into the relationship between socio-economic inequality, poverty and neighbourhoods. The spatial concentration of poverty within cities is of great concern, but there is no consensus that living in deprived neighbourhoods negatively affects individual lives. DEPRIVEDHOODS will advance understanding of the ways in which individual outcomes interact with the neighbourhood, which will enable more effective policy measures. A 'sharing economy' is one of the concepts put forward to make our economy more sustainable and inclusive. Prof. Mont, in her URBAN SHARING project, investigates how urban sharing of assets is facilitated by dedicated organisations. She will present concepts of sustainability assessment frameworks to evaluate economic, environmental and social impacts of urban sharing organisations, which can help cities operationalise their sustainability ambitions. She will also outline conceptualisations of institutionalisation pathways of urban sharing. Turning to sustainability in transport, Prof. Papageorgiou will present insights from the TRAMAN21 project. His research designs models of traffic flow and control, which can contribute to a substantial reduction of traffic congestion, and the associated economic costs and environmental pollution. In both urban and rural environments, the massive growth in human activity has also led to a huge increment in the release of pollutants in our aqueous ecosystems, causing risks to public health, the environment and recreation. Prof. Sanchez will present a multifunctional system, based on nanotechnology, that is capable of cleaning industrial wastewaters and polluted aquatic ecosystems from chemical and biological pollutants in a more target-specific and cost-effective way. This system was developed via the Proof of Concept project MICROCLEANERS that built on his earlier ERC project LAB IN A TUBE.

Connections & Conclusions

This final session will briefly summarise first impressions and allow the audience to share their overall impressions. The conference will end with concluding remarks by ERC President Prof. Jean-Pierre Bourguignon.

2 December 2019, 12.15 – 18.00

Opening Session: Are We Creating Pathways to Sustainability?

Moderator: **Waldemar Kütt**, Acting Director, ERCEA

Rapporteurs: **Lino Paula** and **Frank Kuhn**, Scientific Officers, ERCEA

11.30	Registration and coffee
12.15	Waldemar Kütt , Acting Director, ERCEA Welcome Address
12.20	Jean-Pierre Bourguignon , President, European Research Council (ERC) Introduction to the Conference
12.25	Jean-Eric Paquet , Director-General, DG Research and Innovation "Sustainability as a compass for R&I policy"
12.35	Motoko Kotani , Executive Director, RIKEN, Japan "Striving for sustainability by extending the frontiers of knowledge"
12.50	Patrick Caron , President, High Level Panel of Experts (HLPE) for Food Security and Nutrition - Researcher, The Center for International Cooperation in Agricultural Research for Development (CIRAD), France "SDG related contradictions invite us to interface differently with decision makers!"
13.05	Johan Rockström , Director of the Potsdam Institute for Climate Impact Research, Germany "Planetary stewardship in the anthropocene"
13.25	Q&A
13.40	Coffee break

Session 1: Human Behaviour and Sustainability

Moderator: **Angela Liberatore**, Head of Social Sciences and Humanities Unit, ERCEA

Rapporteurs: **Lino Paula** and **Frank Kuhn**, Scientific Officers, ERCEA

14.10	Péter Szabó "People and forests in historical perspective"
14.30	Jordi Sunyer "Brain development and air pollution ultrafine particles in school children"
14.50	Vasilis Kostakis "New technologies won't reduce scarcity, but here's something that might"
15.10	Elisa Morgera "Benefit-sharing for an equitable transition to the green economy - the role of law"
15.30	Q&A
15.50	Coffee break

Session 2: Feeding the Future?

Moderator: **Philippe Cupers**, Head of Life Sciences Unit, ERCEA

Rapporteurs: **Klelia Salpea** and **Silvia Nicolau-Solano**, Scientific Officers, ERCEA

16.20	Nils Bunnefeld "Resolving conflicts between food security and biodiversity conservation under uncertainty"
16.40	Eva Kondorosi "Dual exploitation of natural plant strategies in agriculture and public health: enhancing nitrogen-fixation and surmounting microbial infections"
17.00	Nicolas Plumeré "In-field live sensing of nitrate in crops for real-time fertilization adjustment"
17.20	Patrice Daniel Cani "Targeting the gut microbiota to improve cardiometabolic disorders : the case of <i>Akkermansia muciniphila</i> as next generation beneficial microbe"
17.40	Q&A
18.00	End of day one sessions

3 December 2019, 9.00 – 16.00

Session 3: Affordable and Clean Energy

Moderator: **Martin Penny**, Head of Physical Sciences and Engineering Unit, ERCEA

Rapporteurs: **Christine Courillon** and **Vanessa Fivet**, Scientific Officers, ERCEA

09.00	Giulia Grancini "Hybrid perovskite semiconductors: a game changer in new generation photovoltaics"
09.20	Matteo Ballottari "Improving photosynthetic solar energy conversion in microalgal cultures for the production of biofuels and high value products"
09.40	Natalia Fabra "The energy transition: challenges and opportunities"
10.00	Ioannis Papakonstantinou "Intelligent functional glazing with self-cleaning properties to improve the energy efficiency of the built environment"
10.20	Q&A
10.40	Coffee break

Session 4: Tackling Climate Change

Moderator: **Alejandro Martín Hobdey**, Head of Call and Project Follow-up Coordination Unit, ERCEA

Rapporteurs: **Sara Serrano-Perez** and **Davide Innocenti**, Scientific Officers, ERCEA

11.10	Anne Magurran "Biological diversity in a changing world"
11.30	Lisa Wingate "Carbonic anhydrase: where the CO ₂ , COS and H ₂ O cycles meet"
11.50	Anna Kuparinen "Complex eco-evolutionary dynamics of aquatic ecosystems faced with human-induced and environmental stress"
12.10	Nadia Ameli "Kick-starting global climate investments: uncovering hidden links in climate finance and exploring dynamic evolution of investment networks for policy design"
12.30	Q&A
12.50	Lunch

Session 5: Sustainable cities and communities

Moderator: **Michel Vanbiervliet**, Head of Ethics Review and Expert Management Unit, ERCEA

Rapporteurs: **Davide Innocenti** and **Silvia Siggia**, Scientific Officers, ERCEA

13.50	Maarten van Ham "Socio-spatial inequality and the life course. Breaking the vicious circle of poverty and segregation"
14.10	Oksana Mont "Urban sharing: concepts, methods and initial findings"
14.30	Markos Papageorgiou "Sustainability, Transportation and Automated Vehicles"
14.50	Samuel Sanchez "Tiny self-powered submarines: Nanorobots for clean water"
15.10	Q&A
15:30	End of session

Connections & Conclusions

Moderator: **Jose Labastida**, Head of the Scientific Management Department, ERCEA

15:30	Jose Labastida – conference résumé
15:40	General discussion
15.50	Jean-Pierre Bourguignon , President, European Research Council (ERC) Closing remarks
16.00	End of conference

Moderators



Opening Session

Waldemar Kütt

Acting Director, ERCEA

Waldemar Kütt is the acting director of the European Research Council Executive Agency since August 2019. He previously headed the unit on "Bioeconomy and Food Systems" in the "Healthy Planet" Directorate of DG Research and Innovation in the European Commission, as well as the units on "Bio-based Products and Processing" and "Bioeconomy Strategy" in the "Bioeconomy Directorate" of the same DG from 2014-2019. During the latter, he was in charge of the 2018 Commission Communication updating the 2012 Bioeconomy Strategy and Action Plan. From 2008 to 2014 he held various positions as senior expert, Deputy and Head of Cabinet in the Cabinets of Research Commissioners Potočník and Geoghegan-Quinn. His main responsibilities included the €80 billion Framework Programme for Research and Innovation, Horizon 2020. He joined the Research Directorate General of the European Commission in 1997 and has since coordinated activities and policies related to innovation, SME, IPR, finance, technology transfer and bioregions. He holds a PhD degree *summa cum laude* in Physics from the Technical University Aachen, Germany, and has worked several years as a postdoc on ultrafast carrier transport and coherent phonons in semiconductors, publishing several papers in the field.



Session 1

Angela Liberatore

Head of Social Sciences and Humanities Unit, ERCEA

Angela Liberatore is the Head of Unit on Social Sciences and Humanities at the European Research Council Executive Agency. Prior to this, she worked in DG RTD of the European Commission in the international cooperation programme with focus on the European Neighbourhood –including the Middle East, and, earlier on, in the Social Sciences and Humanities programme on citizenship, governance, conflict resolution, and in the Environment programme with focus on climate change. She participated in the negotiation of the Kyoto Protocol and contributed to the preparation of the European Commission's White Paper on European Governance. Publications include 'Climate Change, Security and Peace: The Role of the EU'; 'Balancing security and democracy. Biometric politics in the European Union'; 'Democratising Expertise, Expertising Democracy'; 'The Management of Uncertainty: Learning from Chernobyl'. Angela holds a PhD in Political and Social Sciences (European University Institute) and a degree in Philosophy (University of Bologna).



Session 2

Philippe Cupers

Head of Life Sciences Unit, ERCEA

Philippe Cupers is, since the 1st of May 2019, the Head of the Life Sciences Unit at the European Research Council Executive Agency. His responsibilities focus on the coordination of the scientific evaluation of proposals and of the monitoring and follow-up of funded ERC projects in the domain of Life Sciences. Philippe Cupers joined the Directorate-General for Research and Innovation of the European Commission in 2001, where he worked as a scientific officer and then Head of Sector for brain research. He also worked as a scientific officer for setting up the Innovative Medicines Initiative (IMI), Deputy Head of Unit for 'Health Strategy' focusing on the development, promotion and monitoring of European health research and innovation strategy and policies (e.g. personalised medicine), as well as Deputy Head of Unit for 'Innovative tools, technologies and concepts in health research'. Philippe Cupers has a PhD in cell biology and biochemistry from the University of Louvain (de Duve Institute). Before joining the Commission, he worked at the Harvard University Medical School, at the Flemish Institute for Biotechnology (University of Leuven) and at GlaxoSmithKline Biologicals.

Moderators



Session 3

Martin Penny

Head of Physical Sciences and Engineering Unit, ERCEA

Martin Penny is the Head of Unit for Physical Sciences and Engineering in the European Research Council Executive Agency, having joined the Agency in July 2014 from DG Research and Innovation, in the European Commission, where he worked as the political assistant to the Director-General, Robert-Jan Smits. He was previously a policy officer in the international cooperation Directorate in DG Research and Innovation, and, also worked on the development of the specific programmes for FP7 and on the policy and technical aspects of the annual work programmes. Before joining the European Commission, he worked for eight years for the UK Research Councils in Swindon and Brussels, including four years as the Director of the Research Councils' European Office (UKRO) and three years working for the Engineering and Physical Sciences Research Council. Martin has an academic background in organic chemistry and in science and society issues and held postdoctoral research positions at universities in the UK, US and Belgium.



Session 4

Alejandro Martín Hobdey

Head of Call and Project Follow-up Coordination Unit, ERCEA

Alejandro Martín Hobdey studied physics at the University of Manchester and obtained a PhD in nuclear physics at the University of Rochester, USA. Following postdoctoral work at MIT on laser cooling and trapping of atoms, he was awarded a position as Research Scientist in 1988 at the Instituto de Óptica in Madrid, and then went on to work on medical physics as a Research Fellow at Harvard Medical School. He has worked in several research programmes within the Directorate General for Research and Innovation since joining the European Commission in 1994, including the New and Emerging Science and Technology (NEST) Initiative of the 6th Framework Programme. He has participated in setting up the European Research Council since its inception, having been the Head of Unit for the Starting Grants until October 2012. He is currently the Head of Unit for Call and Project Follow-up Coordination within the Scientific Department.



Session 5

Michel Vanbiervliet

Head of Ethics Review and Expert Management Unit, ERCEA

Michel Vanbiervliet is the Head of Unit for Ethics and Expert Management at the European Research Council Executive Agency (ERCEA). Before joining the ERCEA in 2009, he worked as a Commission official in DG ENTR and DG DEVCO, as team leader for the development of IT systems. Prior to joining the Commission, he worked as a process engineer for Volvo Cars and Volvo Trucks, and as IT project manager for a UK-based company in logistics. He graduated in Electrical Engineering at Ghent University (Belgium) and completed his last year of studies at the University of Manchester (UK).



Conclusions

Jose Labastida

Head of the Scientific Management Department, ERCEA

Jose Labastida's role involves mainly the supervision of the evaluation of the scientific proposals submitted to the ERC as well as the scientific monitoring of the funded ones. Before joining the ERCEA, he was Secretary General for Science and Technology Policy and Director General for Research at the Ministry of Science and Innovation of Spain, and Vice-President for Research at CSIC. Formerly, he was a researcher and professor of theoretical physics occupying positions at the Institute for Advanced Study in Princeton, CERN, CSIC and the University of Santiago de Compostela. He holds a PhD in Physics from Stony Brook University.

Opening session: Are We Creating Pathways to Sustainability?



Jean-Pierre Bourguignon

President, European Research Council

Prior to his mandate as president of the European Research Council, Jean-Pierre Bourguignon was the director of the Institut des Hautes Études Scientifiques from 1994 until 2013. This international research institute located near Paris stands as the European counterpart of the Institute for Advanced Study in Princeton. A mathematician by training, he spent his whole career as a fellow of the Centre National de la Recherche Scientifique and held a professor position at École Polytechnique from 1986 to 2012. From 1990 to 1992, he was president of the Société Mathématique de France, and president of the European Mathematical Society from 1995 to 1998. He is a former board member of the EuroScience organisation (2002-2006), and has served on EuroScience Open Forum (ESOF) committees since 2004. Jean-Pierre Bourguignon received the Prix Paul Langevin in 1987 and the Prix du Rayonnement Français in Mathematical Sciences and Physics from the Académie des Sciences de Paris in 1997. He is a foreign member of the Royal Spanish Academy of Sciences. In 2005, he was elected honorary member of the London Mathematical Society and has been the secretary of the mathematics section of the Academia Europaea. In 2008, he was made Doctor Honoris Causa of Keio University, Japan, and, in 2011, Doctor Honoris Causa of Nankai University, China. In 2017, he was elected honorary member of the German Association of Mathematicians and foreign member of the Portuguese Academy of Sciences. In 2019, he was made honorary member of the Polish Mathematical Society.



Jean-Eric Paquet

Director-General, Direction General for Research and Innovation

Jean-Eric Paquet has been working as the Director-General for Research and Innovation (DG RTD) since April 2018. He started working with the European Commission in 1993. From 2002 until 2004, he was the Deputy Head of Cabinet of former Commissioner for Research, Philippe Busquin. Then he worked as a Head of Unit within the DG Mobility and Transport before becoming the Director. In 2013, he joined the DG for Neighbourhood and Enlargement Negotiations. Before starting his current position, Jean-Eric Paquet served as Deputy Secretary General of the Juncker Commission.



Motoko Kotani

Executive Director, RIKEN, Japan

Motoko Kotani is working at the Mathematical Institute of Tohoku University in Japan. Her research field is geometry. She also applies the geometry, which she develops, to materials science as the director of the Advanced Institute for Materials Research at Tohoku University.

She serves RIKEN as Executive Director in charge of both international relationship and of diversity. She is an executive member at the Cabinet office of the Council for Science, Technology and Innovation in Japan.



Patrick Caron

Center for International Cooperation in Agricultural Research for Development, France, Geographer

High Level Expert Group of the UN Committee on World Food Security, Chairman

Patrick Caron is a veterinary doctor, with a PhD in development geography. He is a specialist of farming systems and territorial dynamics, with a special focus on livestock farming. He was appointed Vice President for International Affairs of the University of Montpellier in January 2019. In May 2019, he was appointed Chair of Agropolis International. He joined CIRAD in 1988 where he has been Director-General for Research and Strategy from 2010 to 2016, after having served as scientific director for the "Territories, Environment and People" Department of CIRAD (2001-2004) and as "Environments and Societies" Department director from 2007 to 2010. His works relate to the analysis of the role of agriculture and livestock in rural transformations, particularly in Brazil, Southern Africa and the Near East. Patrick Caron chairs the Scientific Council of AgroParisTech and is a member of the French National Council for Development and International Solidarity. In 2015, he chaired the organising committee of the Global Science Conference on Climate Smart Agriculture (Montpellier, France), in 2016 the international conference Agrichains and Sustainable Development and, in 2017, the International Conference on Living Territories. He is co-chairing the Conference on Global Food Security to be held in Montpellier, France, in June 2020. Patrick Caron was nominated as the chair of the High Level Panel of Experts of the Committee on World Food Security in November 2015.



Johan Rockström

Potsdam Institute for Climate Impact Research, Director

University of Potsdam, Germany, Professor in Earth System Science

Johan Rockström is an internationally recognised scientist on global sustainability issues. He led the development of the Planetary Boundaries Framework for human development in the current era of rapid global change. He is a leading scientist on global water resources, with more than 25 years experience in applied water research in tropical regions, and more than 150 research publications in fields ranging from applied land and water management to global sustainability. In addition to his research endeavours, which have been widely used to guide policy, Johan Rockström is active as a consultant for several governments and business networks. He also acts as an advisor for sustainable development issues at international meetings including the World Economic Forum, the United Nations Sustainable Development Solutions Network and the United Nations Framework Convention on Climate Change Conferences. Johan Rockström chairs the advisory board for the EAT Foundation and the Earth League and has been appointed as chair of the newly formed Earth Commission.

Session 1: Human Behaviour and Sustainability



Peter Szabó

Institute of Botany of the Czech Academy of Science, Czech Republic, Researcher
Principal Investigator, Starting Grant 2011 "Long-term woodland dynamics in Central Europe: from estimations to a realistic model"

Péter Szabó is an environmental historian and historical ecologist. He holds MA degrees in history, English, and medieval studies and completed his PhD in medieval studies at the Central European University in Budapest, Hungary. His research interests lie in the long-term interactions between human societies and wooded environments, with a special focus on what historical knowledge can contribute to today's nature conservation. His publications cover issues ranging from prehistoric forest dynamics through medieval woodland management to the use of large databases in environmental history. In 2012–2016, he led an interdisciplinary team of historians, archaeologists, vegetation ecologists, palaeoecologists and GIS specialists in the LONGWOOD ERC project. Because his work relies heavily on crossing the "great divide" between the humanities and the natural sciences, he also published extensively on the conceptual aspects of connecting history and ecology. Between 2017 and 2019, he served as the president of the European Society for Environmental History.

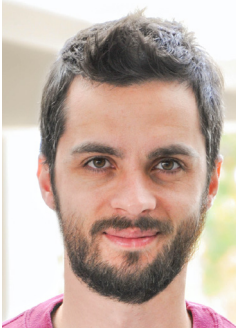


Jordi Sunyer

Pompeu Fabra University, Spain, Professor in Preventive Medicine and Public Health

Principal Investigator, Advanced Grant 2010 "Pre-natal exposure to urban AIR pollution and pre- and post-Natal Brain development", and Advanced Grant 2017 "BRain dEvelopment and Air polluTion ultrafine particles in schOol children"

Jordi Sunyer is the coordinator of the Childhood and Environment Research Programme and the Barcelona Life Study (birth) cohorts in Spain and principal investigator of several international studies at the ISGlobal (World Institute of Health) in Barcelona. He has an extensive experience in the area of respiratory and neurodevelopmental epidemiology and the founding and coordination of birth cohorts in Spain as well harmonisation of birth cohorts in Europe. Specifically, he has over 25 years of experience conducting research aimed at defining the pre-natal and early life exposure contributions to child health. His work has included study design, methods development, ascertainment of study cohorts, and statistical analyses. He has a demonstrated record of successful research in the areas of the effect of POPs, hormonal disruptors and air pollution on asthma, lung function, obesity and neurodevelopment in children, with around 700 scientific articles, cited more than 30,000 times. He also developed a great activity for the translation of these findings into prevention producing reports, guidelines and recommendations for WHO, for the UN-IPCS programme and in government commissions. In 2014, he received the most prestigious award in environmental epidemiology, the John Goldsmith Prize.



Vasilis Kostakis

Tallinn University of Technology (TalTech), Estonia, Professor of Peer-to-Peer Governance

Principal Investigator, Starting Grant 2018 "Design Global, Manufacture Local: Assessing the Practices, Innovation, and Sustainability Potential of an Emerging Mode of Production"

Vasilis Kostakis is Professor of Peer-to-Peer (P2P) Governance within the Ragnar Nurkse Department of Innovation and Governance at TalTech. He is also a faculty associate within the Berkman Klein Center for Internet and Society at Harvard University, and a visiting professor within the Institute of Environmental Science and Technology at Autonomous University of Barcelona. Moreover, he is a fellow at the Royal Society for the Encouragement of Arts, Manufactures and Commerce. Vasilis Kostakis is the founder of the P2P Lab and has been the research coordinator of the P2P Foundation, winner of the 2016 Golden Nica for Digital Communities. In 2018, he was awarded a four-year grant from the European Research Council, to study the convergence of the digital commons with local manufacturing technologies. Along with an interdisciplinary team of scholars, activists, and social entrepreneurs, Vasilis focuses on how to create an economy based on locally sustainable communities that are digitally interconnected. He has written essays for several outlets such as the Harvard Business Review and Aeon. His work has appeared in 15 languages.



Elisa Morgera

University of Strathclyde, United Kingdom, Professor of Global Environmental Law

Principal Investigator, Starting Grant 2013 "Benefit-sharing for an equitable transition to the green economy - the role of law"

Elisa Morgera is the director of the UK-funded One Ocean Hub, a 5-year global inter-disciplinary collaboration on sustainable and inclusive ocean governance spanning marine and social sciences, arts and law in Africa, South Pacific and the Caribbean. She specialises in international, European and comparative environmental law, with a particular focus on the interaction between biodiversity law and human rights (particularly those of indigenous peoples and local communities), equity and sustainability in natural resource development, oceans governance, and corporate accountability. She has also researched the environmental dimensions of the external relations of the European Union (EU).

Session 2: Feeding the Future?



Nils Bunnefeld

University of Stirling, United Kingdom, Professor in Biological and Environmental Sciences

Principal Investigator, Starting Grant 2015 "Resolving conflicts between food security and biodiversity conservation under uncertainty"

Nils Bunnefeld is a professor in biological and environmental sciences at the University of Stirling in the United Kingdom. He has studied biology and animal ecology at the University of Göttingen, Germany and the University of Groningen, the Netherlands, before taking up a PhD at Imperial College London. After two postdocs at the Swedish University of Agricultural Sciences and again at Imperial College London, he started a lectureship at the University of Stirling, Scotland. His main research interests encompass the sustainability and management of social-ecological systems using the combination of empirical data collection and modelling to investigate the interaction between human decision-making and the dynamics of ecosystems. In order to do this, he focusses on developing models and approaches to integrate ecological, social and economic data and theory with the aim to decompose synergies, trade-offs and conflicts between nature conservation and human livelihoods.



Eva Kondorosi

Institute of Plant Biology of the Hungarian Academy of Sciences, Hungary, Professor

Principal Investigator, Advanced Grant 2010 "Dual exploitation of natural plant strategies in agriculture and public health: enhancing nitrogen-fixation and surmounting microbial infections"

Eva Kondorosi was born in Budapest, graduated (in biology) and received her PhD (in genetics) at the L. Eötvös University in Budapest. She was a postdoc at the Max Planck Institute (Köln) and visiting scholar at the Universities of Sussex, Harvard and Cornell. She was a research director at the Institut des Science Végétales (CNRS), then director of the BAYGEN Institute in Hungary. Currently, she directs the Symbiosis and Functional Genomics Unit at the Biological Research Centre in Szeged. Her primary research field is Rhizobium-legume symbiosis with recent focus on plant-controlled differentiation of bacteria. For her original discoveries, she received several prestigious awards, including the Balzan Prize, the Szechenyi Prize and the IS-MPMI prize. She is full member of the Hungarian Academy of Sciences, a foreign associate of the National Academy of Sciences (USA), and a member of the following institutions or bodies: Academia Europaea (also member of its Board of Trustees), the European Molecular Biology Organization, the Board of Directors of the International Society for Molecular Plant-Microbe Interactions (until 2016), the German National Academy of Sciences Leopoldina, the French Academy of Agriculture and the European Academy of Microbiology. She was vice-president of the European Research Council and was a member of the UN Secretary General's Scientific Advisory Board.



Nicolas Plumeré

Ruhr-University, Germany, Professor

Principal Investigator, Starting Grant 2016 "Protection of Redox Catalysts for Cathodic Processes in Redox Matrices" and Proof-of-Concept Grant 2017 "In-Field Live Sensing of Nitrate in Crops for Real-Time Fertilization Adjustment"

Nicolas Plumeré graduated at the University of Glasgow with a honours degree in Chemistry in 2004 with a first class distinction. He obtained his PhD with *summa cum laude* in 2009 at the University of Tübingen, Germany. After a short fellowship as researcher at the company NECi, in the USA, Nicolas Plumeré became a group leader at the Center for Electrochemical Sciences, Faculty for Chemistry and Biochemistry, Ruhr-Universität Bochum in 2010. He was promoted to a tenured professorship in analytical chemistry in 2017, and currently serves as one of the PIs of the Excellence Cluster RESOLV from the German Research Foundation that started in 2019. He is strongly invested in his scientific community notably by acting on the council of the Bioelectrochemical Society and as an advisory board member of Chemical Science, the flagship journal of the Royal Society of Chemistry. He was awarded the 2019 Luigi Galvani Prize (a biannual award for scientists under the age of 45 with excellent track-records in the field of bioelectrochemistry). In 2018, he co-founded the company Silverbear specialised in point-of-use sensing for smart agriculture. The Plumeré lab has specialised in interfacing biocatalytic systems and electrodes for application in energy conversion and energy conversion schemes. The group's expertise comprises organic chemistry for synthesis of redox interfaces, electrochemistry for quantification of electron transfer pathways, mathematical modeling for predicting photocurrent and electrochemical microarrays for biomolecule screening. Notable achievements include electrochemical sensing for applications in precision agriculture and electrocatalytic processes for biophotovoltaics and biofuel cells.



Patrice Daniel Cani

Université Catholique de Louvain (UCLouvain), Belgium, Professor & FNRS Researcher

Principal Investigator, Starting Grant 2013 "Gut microbiota, innate immunity and endocannabinoid system interactions link metabolic inflammation with the hallmarks of obesity and type 2 diabetes" and Proof-of-Concept Grant 2017 "Study of the therapeutic potential of an Akkermansia muciniphila-based products in subjects with an increased cardio-metabolic risk."

Patrice D. Cani is leading a team at the Louvain Drug Research Institute (LDRI) of the University of Louvain and is a researcher from the Belgian Fund for Scientific Research (FRS-FNRS) and WELBIO investigator. After a BSc degree in dietetics he joined the Faculty of Medicine of UCLouvain where he received a MSc in Nutrition, another MSc in Health Sciences, and a PhD in Biomedical Sciences (physiology and metabolism). He received the prize "Baillet Latour Grant for Medical Research" (2015) and the "International Prize of Physiology Lucien Dautrebande" (2016). He has been elevated at the rank of Officer of the Walloon Merit and elected as associate member of the Royal Academy of Medicine of Belgium in 2016. He also received the Bauchau Chair at UNamur (2016) and the Francqui Chair at ULiège (2017). He published in 2007 the discovery of the concept of metabolic endotoxemia, and he recently discovered the beneficial role of the bacteria *Akkermansia muciniphila* on obesity and cardiometabolic risk factors. His main research interests are the investigation of interactions between gut microbes and host in the context of obesity, type 2 diabetes, cardiometabolic disorders and cancer. With more than 250 scientific research articles, reviews and book chapters, he is ranked in the top 1% world-class researchers with exceptional research performance and more than 26000 citations. His motto is : "In Gut We Trust".

Session 3: Affordable and Clean Energy



Giulia Grancini

University of Pavia, Italy, Associate Professor

Principal Investigator, Starting Grant 2018 "HYbrid NANOstructured multi-functional interfaces for stable, efficient and eco-friendly photovoltaic devices"

Giulia Grancini received an MS in Physical Engineering in 2008 and obtained her PhD in Physics *cum laude* in 2012 at the Politecnico of Milan. Her experimental thesis focused on the realisation of a new femtosecond-microscope for mapping the ultrafast phenomena at organic interfaces. During her PhD, she worked for one year at the Physics Department of Oxford University where she pioneered new concepts within polymer/oxide solar cell technology. From 2012-2015, she was a post-doctoral researcher at the Italian Institute of Technology in Milan. In 2015, she joined the group of Prof. Nazeeruddin at Ecole Polytechnique Fédérale de Lausanne (EPFL) awarded with a Co-Funded Marie Skłodowska-Curie Fellowship. From 2016 to 2019, she benefited from a Swiss Ambizione Energy Grant. Giulia Grancini is Principal Investigator of the ERC StG Project "HYNANO" aiming at the development of advanced hybrid perovskites materials and innovative functional interfaces for efficient, stable, and environmentally friendly photovoltaics, one the biggest challenge nowadays in Europe. Within this field, Giulia contributed to reveal the fundamental light-induced dynamical processes underlying the operation of such advanced optoelectronic devices whose understanding is paramount for a smart device optimization. Recently, she received the Swiss Physical Society Award in 2018 for Young Researcher and the IUPAP Young Scientist Prize in Optics. She authored 80 peer-reviewed scientific papers on material design and understanding of the interface physics which govern the operation of organic and hybrid perovskite devices. She is currently member of the Young Academy of Europe.



Matteo Ballottari

University of Verona, Italy, Associate Professor of Plant Physiology

Principal Investigator, Starting Grant 2015 "Improving Photosynthetic Solar Energy Conversion In Microalgal Cultures For The Production Of Biofuels And High Value Products"

Matteo Ballottari is an Associate Professor in Plant Physiology in the Department of Biotechnology at the University of Verona in Italy. He studies photosynthesis mostly in microalgae but also in plants, focusing on how it might be improved through an interdisciplinary approach. In particular, he investigates regulation and dynamics of light energy utilisation in order to increase algal biomass yield and high valuable product accumulation. Prof. Matteo Ballottari graduated in Biotechnology at the University of Verona in 2004. In 2008 he obtained his PhD in Molecular, Industrial and Environmental Biotechnology at the University of Verona, collaborating during his thesis with the University of California in Berkeley (USA). His PhD thesis was focused on the functional characterization of photosynthetic proteins in higher plants and received in 2009 the national award "Franca Rasi" for his PhD work. He is member of the Italian Society of Plant Biology and of the International Society of Photosynthesis Research. Since 2016, Matteo Ballottari was selected as a member of the Young Academy of Europe. Matteo Ballottari is involved in many national and European projects financed by public and private funds about the exploitation of photosynthetic organisms to produce biofuels and high value products.

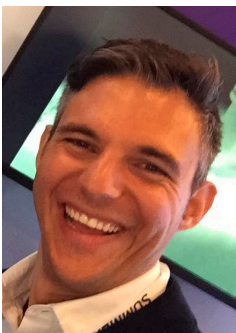


Natalia Fabra

Universidad Carlos III de Madrid, Spain, Professor of Economics

Principal Investigator, Consolidator Grant 2017 "Current Tools and Policy Challenges in Electricity Markets"

Natalia Fabra is a professor of economics and head of the EnergyEcoLab at Universidad Carlos III de Madrid (ES). She is a research fellow at the Centre for Economic Policy Research, associate member of the Toulouse School of Economics and research fellow at the University of Cambridge Energy Policy Research Group. She obtained her PhD in 2001 at the European University Institute (Florence), under the supervision of Prof. Massimo Motta. Natalia Fabra works in the field of industrial organisation, with emphasis in energy and environmental economics and regulation and competition policy. Her research papers are published in leading journals such as the American Economic Review, the Rand Journal of Economics, The Economic Journal, Energy Economics, The Journal of Industrial Economics, and the International Journal of Industrial Organization, among others. She is also associate editor at the Economic Journal and the Journal of Industrial Economics. Natalia Fabra has received two distinguished awards as Best Young Spanish Economist (one awarded by the Banco Sabadell Foundation, and the other by the Madrid regional government). Natalia Fabra has been research visiting fellow at several institutions, including the University of California Energy Institute (Berkeley), Nuffield College (Oxford), the Toulouse School of Economics, Northwestern University (Chicago), and the Energy Policy Research Group (Cambridge).



Ioannis Papakonstantinou

Faculty of Engineering Science at University College London, United Kingdom, Professor of Nanoengineering

Principal Investigator, Starting Grant 2015 "Intelligent functional glazing with self-cleaning properties to improve the energy efficiency of the built environment"

Ioannis Papakonstantinou received his diploma in electrical and computer engineering from the National Technical University of Athens and his PhD in optical interconnects from University College London (UK) in 2008. In 2008-2009, he worked for Sharp Laboratories of Europe, investigating sub-wavelength diffractive films to improve the brightness, uniformity and power consumption of liquid crystal displays. He joined CERN-European Organisation for Nuclear Research in 2009, to work on optical fibre links for the distribution of timing-trigger and control signals in the Large Hadron Collider. He was appointed as a lecturer in the Electronic and Electrical Engineering Department at UCL in 2011, where he founded the Photonic Innovations Lab. He was promoted to senior lecturer in 2015 and to professor of photonics and nanofabrication in 2018. His research focuses on nanophotonics and nanotechnology fabrication methods for energy and biomedical applications. He currently serves on UCL's Board of Energy Directors. Previously, he was a member of the steering committee of CERN's Crystal Clear Collaboration and a member of EPSRC's Early Career Forum in Advanced Manufacturing. He is very keen to translate research from the work bench to the market and has already overseen the work of his PhD through successful commercialisation, moreover he is the co-founder of a successful university spinout.

Session 4: Tackling Climate Change



Anne Magurran

School of Biology at the University of St Andrews, United Kingdom, Professor

Principal Investigator, Advanced Grant 2009 "Biological diversity in an inconstant world: temporal turnover in modified ecosystems" and Proof-of-Concept 2016 "Biodiversity Change: an open access data resource supporting societal responses to the biodiversity crisis"

Anne Magurran's research interests focus on biological diversity – its measurement, evolution, maintenance and conservation. Ever since her PhD on Irish woodlands at the University of Ulster, she has been interested in how to measure biological diversity as shown by her most recent book on the topic "Biological Diversity: Frontiers in Measurement and Assessment". Her ERC grant BioTIME was concerned with how biological diversity is changing over time. It addressed this question in two ways: by compiling the BioTIME database (biotime.st-andrews.ac.uk) of ecological assemblage time series, that is assemblages around the world that have been monitored over a number of years using the same methodology; and through field work to quantify biodiversity change in freshwater ecosystems in the Caribbean island of Trinidad. The BioTIME database, which now contains data from over 600,000 localities across the Earth, is showing that the world's ecosystems are being restructured at rates that exceed the predictions of the best ecological theory we have. These findings are mirrored in the detailed field surveys of tropical rivers. Together they alert researchers to the rapid compositional reorganisation occurring in ecosystems and highlight fundamental and applied challenges for biodiversity scientists. Thanks to her ERC Proof of Concept grant BioChange, the BioTIME database is now open access and free to anyone, anywhere in the world, to use for research, education or conservation.



Lisa Wingate

Institut National de la Recherche Agronomique de Bordeaux, France, Research Director

Principal Investigator, Starting Grant 2013 "Carbonic anhydrase: where the CO₂, COS and H₂O cycles meet"

Lisa Wingate is a researcher at the Institut National de la Recherche Agronomique in Bordeaux, France. Her undergraduate, postgraduate and postdoctoral research has a strong foundation in ecosystem physiology and geosciences. She has worked alongside experimentalists and modellers to develop theoretical understanding of stable isotope fractionation in a range of ecological systems in order to interpret the responses of ecosystem components to climate, holding positions at the University of Edinburgh and the University of Cambridge before joining the Institut National de la Recherche Agronomique. There, her research lies at the interface between geochemistry, physics, biology and ecology, and aims to describe the regulation of atmospheric CO₂ and COS concentrations at scales spanning the enzyme to the globe.



Anna Kuparinen

University of Jyväskylä, Finland, Professor

Principal Investigator, Consolidator Grant 2017 "Complex eco-evolutionary dynamics of aquatic ecosystems faced with human-induced and environmental stress"

Anna Kuparinen is a professor in the Department of Biological and Environmental Science at the University of Jyväskylä in Finland. Her research interests cover fundamental questions within the fields of ecology and evolutionary biology, such as Allee effects, life-history evolution, and eco-evolutionary dynamics, which she investigates using mechanistic simulation models. She mainly focuses on fish, aquatic ecosystems, and their sustainable harvesting.



Nadia Ameli

Bartlett School Environment, Energy & Resources, University College London, United Kingdom, Senior Research Associate

Principal Investigator, Starting Grant 2018 "Kick-starting global climate Investments: uncovering hidden links in climate finance and exploring dynamic evolution of investment networks for policy design"

Nadia Ameli is an experienced researcher on economic, finance and policy aspects of climate change and related energy issues. Her research investigates questions related to financial barriers of low-carbon investments. She completed her PhD in Business Administration at the Polytechnic University of Marche (Ancona, Italy) and University of California (Berkeley, USA) with a focus on energy financing policy. She is a principal researcher fellow with a proleptic academic appointment at the UCL Institute for Sustainable Resources (UCL ISR). She joined UCL ISR in 2016 to lead the finance work of two EU Horizon2020 projects, entitled GREEN-WIN and RIPPLES. Both projects explore the cross-cutting role of finance in overcoming barriers to climate adaptation, mitigation and sustainability action with a particular emphasis on exploring avenues for integrating climate public policies with mainstream finance framework and system. While at UC Berkeley together with Prof. Daniel Kammen, she explored an innovative approach, namely the Property Assessed Clean Energy, to link private funding to public financing mechanisms to facilitate access and affordability of low-carbon projects. Demonstrating the novelty of this scheme, PACE was awarded #1 World Changing Idea of 2009 by Scientific American. She is also bringing research insights into policymaking and practical experience to bear upon academic studies. Within the "Two Degrees Investing Initiative", she has co-organised two workshops on climate finance and has supported the research work at several international public policy organisations, including the OECD, the European Commission and the Global Green Growth Institute.

Session 5: Sustainable Cities and Communities



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Maarten van Ham

Delft University of Technology, the Netherlands, Professor

Principal Investigator, Consolidator Grant 2013 "Socio-spatial inequality, deprived neighbourhoods, and neighbourhood effects"

Maarten van Ham is Professor of Urban Geography and head of the Urban Studies research group at the Department of Urbanism, Delft University of Technology (NL). He is a population geographer with a background in economic and urban geography. He also is a research fellow at the Institute of Labor Economics in Germany and professor of geography at the University of St Andrews (UK). He investigates people-place relationships at different spatial scales, from neighbourhoods to cities to regions. Through his research he aims to better understand how neighbourhoods, cities and regions develop, and how different spatial configurations and structures emerge (within and between cities), and how these configurations affect socioeconomic outcomes for people across spatial scales. His group has a strong international reputation for research on socio-economic and ethnic segregation, neighbourhood effects, neighbourhood change, urban regeneration, residential mobility & migration, and housing. His research is of an international and interdisciplinary nature with research projects in the UK, the Netherlands, Germany, Sweden, Finland, Lithuania, Estonia, Spain, and China.



Oksana Mont

International Institute for Industrial Environmental Economics in the Lund University, Sweden, Professor in Sustainable Consumption and Production

Principal Investigator, Consolidator Grant 2017 "Urban Sharing: Sustainability and Institutionalisation Pathways"

Oksana Mont is a professor in sustainable consumption governance. She has a PhD in Technology, MSc in Environmental Management and Policy, and MSc in Biology and Chemistry. She conducts inter-disciplinary and international research on sustainable business models, sustainable consumption and lifestyles and sustainable consumption policy. The current topical domain is the sharing economy and circular economy. She leads a research group on Sustainable consumption governance at the International Institute for Industrial Environmental Economics at Lund University and supervises seven PhD students. She has over 15 years of project leadership experience. She is a Principal Investigator of the 5-year programme on urban sharing funded by the European Research Council and a 4-year project on urban reeconomy funded by the Swedish Research Council Formas. She also leads projects on business models in two 4-year programmes funded by MISTRA on "REES – Resource-Efficient and Effective Solutions" and "Mistra Sustainable Consumption – from niche to mainstream". She is an editor of a book on "Research Agenda for Sustainable consumption governance" (2019) and co-editor of a book with Max Koch on "Sustainability and the Political Economy of Welfare (2016) Routledge. She is an author of more than 200 academic publications and official reports.



Markos Papageorgiou

School of Production Engineering and Management, Technical University of Crete, Greece, Professor

Principal Investigator, Advanced Grant 2012 "Traffic Management for the 21st Century" and Advanced Grant 2018 "Lane-free Artificial-Fluid Environment for Vehicular Traffic"

Markos Papageorgiou received the Diplom-Ingenieur and Doktor-Ingenieur (honors) degrees in Electrical Engineering from the Technical University of Munich and was a free associate with Dorsch Consult, Munich (1982-1988), and with Institute National de Recherche sur les Transports et leur Sécurité (INRETS), Paris, France (1986-1997). From 1988 to 1994, he was a professor of automation at the Technical University of Munich. He joined his current institution in 1994. He held several visiting professor positions around the world at: Politecnico di Milano, Ecole Nationale des Ponts et Chaussées, Paris, at MIT, Boston, University of Rome La Sapienza, Italy. He is a distinguished visiting professor at Tsinghua University, Beijing, China, an honorary visiting professor of the University of Belgrade, Serbia and the Dynamic Systems and Simulation Laboratory he has been heading since 1994 and was a visiting scholar at the University of California, Berkeley. Markos Papageorgiou authored/edited seven books and over 500 technical papers. His research interests include automatic control and optimisation theory and applications to traffic and transportation systems, water systems and further areas. He was the editor-in-chief of Transportation Research – Part C (2005-2012). He also served as an associate editor of IEEE Control Systems Society – Conference Editorial Board, of IEEE Transactions on Intelligent Transportation Systems and other journals. His awards are numerous: Life Fellow of IEEE, Fellow of IFAC, a DAAD scholarship, the Eugen-Hartmann Award from the Union of German Engineers, a Fulbright Lecturer/Researcher Award, the IEEE Intelligent Transportation Systems Society Outstanding Research Award and the Outstanding Application Award, the IEEE Control Systems Society Transition to Practice Award, the IEEE Transportation Technologies Award.



Samuel Sanchez

Institute of Bioengineering of Catalonia, Spain, Researcher

Principal Investigator, Starting Grant 2012 "LT-NRBS: Lab-in-a-tube and Nanorobotic biosensors.", Proof of Concept 2015 "Active microcleaners for water remediation" and Proof of Concept 2017 " Lab-in-a-patch for PKU self-assessment"

Samuel Sanchez is an ICREA Research Professor and group leader at the Institute of Bioengineering of Catalonia (ES) since 2015. Since 2019, he also acts as deputy director of the Institute. He got his PhD in Chemistry from the Universitat Autònoma de Barcelona in 2008. In 2009, he worked at NIMS, Japan and from 2010 until 2013, he was group leader at the Institute for Integrative Nanosciences, IFW Dresden, Germany and at the Max Planck Institute for Intelligent Systems from 2013-2018. He received several awards: Guinness World Record® 2010 and 2017 for smallest jet engine; MIT TR35 as "Innovator of the year under 35" Spain 2014; Princess of Girona Scientific Research Award 2015 (Royal House Foundation); "Joven Relevante" Award by the Círculo Ecuestre de Barcelona and the National Research Award for Young Talent from the Catalan Foundation of Research and Innovation. Currently, the main research lines in his group are: nanofabrication of self-powered micro- and nanorobots, from fundamentals to biomedicine and environmental applications; 3D bioprinting for soft robotics and biomedical engineering; fabrication of ultracompact, flexible devices for biosensing and physics of active colloids near surfaces. He published around 130 papers, with close to 9000 citations and consolidated his group as one of the leading ones in catalytic nano-motors.



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Jean-Pierre Bourguignon
ERC President and Chair of its Scientific Council



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