



The 11<sup>th</sup> Kobe University Brussels European Centre Symposium  
***Green Horizons, Sustainable Futures:  
 EU and Japan Research for Climate-Prepared, Resilient Societies***

Organised jointly with Vrije Universiteit Brussel  
 With the support of the University of Kent

Wednesday 20 October 2021  
 Vrije Universiteit Brussel

**SPEAKERS AND MODERATORS' BIOGRAPHIES  
 AND ABSTRACTS**

Opening		9:15-10:00
Moderator	<b>Ken-ichi Yoshida</b> , Kobe University (Japan)	
Opening Addresses	<b>Prof. Masato Fujisawa</b> , President, Kobe University (Japan) <b>Prof. Caroline Pauwels</b> , Rector, Vrije Universiteit Brussel (Belgium) <b>H.E. Yasushi Masaki</b> , Ambassador of Japan to the European Union (Japan) <b>Ms. Signe Ratso</b> , Deputy Director General, DG RTD, European Commission (EU)	
Keynote speech		10:00-10:30
Speaker	<b>Prof. Paulo Ferrão</b> , Centre for Innovation, Technology and Policy Research, Instituto Superior Técnico, University of Lisbon (Portugal)	
Parallel Session 1: <b>'TOWARDS A GLOBAL GREEN ECONOMY'</b>		10:30-13:30
	<i>Theme 1: The Climate Conundrum: WTO Rules or UN Climate Commitments?</i>	10:30-11:50
	<i>Theme 2: The Perfect Storm: Building Economic Resilience in Overlapping Crises</i>	12:10-13:30
Parallel Session 2: <b>'BREAKTHROUGH TECHNOLOGIES FOR CLIMATE SOLUTIONS'</b>		10:30-13:30
	<i>Theme 1: Advances in Climate Science</i>	10:30-11:25
	<i>Theme 2: Key Technologies for a Carbon-neutral Environment</i>	11:45-13:30
Parallel Session 3: <b>'ENABLING RESILIENT, CLIMATE-PREPARED SOCIETIES'</b>		10:00-13:30
	<i>Theme 1: Social Impact of Climate Change</i>	10:30-11:50
	<i>Theme 2: Local Adaptation to Global Warming</i>	12:10-13:30
Policy Keynote		14:30-14:45
Speaker	<b>Ms. Elina Bardram</b> , Director ff, Directorate General for Climate Action, European Commission (EU)	
Interactive Workshop and Brokerage Event A ( <b>ECONOMICS</b> ) <b>'VALUING CLIMATE CHANGE AND SUSTAINABILITY'</b>		14:45-16:15
Interactive Workshop and Brokerage Event B ( <b>NATURAL SCIENCES &amp; TECHNOLOGY</b> )		14:45-16:15
Interactive Workshop and Brokerage Event C ( <b>SOCIAL SCIENCES &amp; HUMANITIES</b> )		14:45-16:15
EURAXESS Japan Presentation		16:15-16:25
Presenter	<b>Judit Erika Magyar</b> , EURAXESS Japan (Japan)	
Closing		16:25-16:40
Closing Remarks	<b>Tamotsu Nakamura</b> , Executive Vice-President, Kobe University (Japan) <b>Jeremy Carette</b> , Dean for Europe, University of Kent (UK) <b>Hugo Thienpont</b> , Vice-Rector, Vrije Universiteit Brussel (Belgium)	
Networking reception and drinks		16:40-17:45

**KEYNOTE SPEECH****Paulo Manuel Cadete Ferrão**

IN+, Center for Innovation, Technology and Policy Research, Instituto Superior Técnico (Portugal)

Paulo Ferrão is a Distinguished Professor of Instituto Superior Técnico - University of Lisbon, and President of IN+, Center for Innovation, Technology and Policy Research. He is a board member of the EUREKA Association, and a former President of the COST Association. He is a member of the European Commission Mission Board on "Climate-Neutral and Smart Cities", and of the Environmental Advisory Committee of Rolls-Royce. He has been the President of the Portuguese Foundation for Science and Technology (FCT). He is author and co-author of nine books and more than hundred peer-reviewed papers published in scientific journals.

***Understanding the metabolism of the economies – towards a green economy***

The metabolism of economies is changing as urbanization and industrialization in developing countries increases at unprecedented levels, putting significant pressure on resource depletion and climate change. This is because human needs and activities rely on material flows, resulting both in resource depletion and pollution. Indeed, between 1970 and 2017, while the population doubled and economic activity grew 4.7 times, extraction of natural resources increased 3.4 times. In this context, understanding the dynamics of the socioeconomic metabolism is relevant for identifying (un)sustainable development pathways in different economies and for examining the evolution of critical economic sectors' resource productivity.

Decoupling economic growth from material use and its environmental impacts is the key for sustainable growth, and yet absolute decoupling has mainly been observed during periods of economic recession. This signals that economic transitions to a less material intensive economy depend on a variety of factors and that there is a need for more detailed analysis on the underlying structural changes. This is analyzed by making use of a novel methodological framework. In addition, the use of science and technology for promoting sustainable urbanization pathways is examined as a strategy to promote citizen engagement and to contribute towards the establishment of carbon neutral cities.

**'TOWARDS A GLOBAL GREEN ECONOMY'****Joint producer****Kenji Takeuchi**, Graduate School of Economics, Kobe University (Japan)**Bashir Bernard Siman**, Brussels Diplomatic Academy, Vrije Universiteit Brussel (Belgium)**Theme 1: The Climate Conundrum: WTO Rules or UN Climate Commitments?****Moderator****Kenji Takeuchi**

Graduate School of Economics, Kobe University (Japan)

**Bernard Siman, O.B.E.**

Brussels Diplomatic Academy, Vrije Universiteit Brussel (Belgium)

Head of Financial Diplomacy and Fintech at the Brussels Diplomatic Academy and teaches graduate students "The International Monetary System and Global Financial Architecture" at the Faculty of Economic and Social Sciences, both at the Vrije Universiteit Brussel (VUB). He is a former Court Member of the Worshipful Company of World Traders in the UK and focuses on trade in services. He was also the UK Special Representative to the UAE for Financial and Professional Services attached to United Kingdom Trade and Investment, Co-Chair of the UK-UAE Shipping and Maritime Task Force and

of the bilateral UK-UAE Financial and Professional Services Working Group. Graduate of KU Leuven, London School of Economics, Oxford Brooks University and Kyoto University (Japan). He focuses on global financial and monetary services issues, trade in services in bilateral and multilateral contexts, and on the conflict between free trade commitments and climate undertakings. He has a deep focus on global geopolitics and also teaches at the Belgian Royal Military Academy. He was honoured with the Order of the British Empire by HM Queen Elizabeth II and was made a Knight of the Order of Leopold by HM King Filip of Belgium.

***Conflict between World Trade and Climate Commitments: Top Policy Priority***

The Covid-19 crisis has accelerated and underlined the urgent need to bridge the gap between world trade rules (under the WTO), on the one hand, and the Climate commitments on the other. This uncertainty is costly for business and will slow growth in world trade.

This is particularly the case as the EU is planning to implement the proposed Carbon Adjustment Border Mechanism (CBAM) by 2023, which will effectively be a form of taxation on imported goods and commodities. Moreover, CBAM may also have implications potentially for "Rules of Origin" issues. There is an urgent need to provide global leadership in the formulation of ideas and proposals to bridge the gap between Climate and WTO commitments, but also between the fast growing economies such as India's on the one hand, and the EU and other mature economies on the other, as well as among the advanced economies themselves.

Uncertainty for businesses is increasing the costs associated with market access for goods. Enabling businesses to simultaneously comply with both trade and climate commitments is a key operational, economic as well as policy/legal requirement that will become more pressing post-Covid to support the return to growth in world trade. In the absence of a resolution by COP on the climate-related metrics affecting world trade, and WTO action on these measures, it is likely that the new rules will be decided by judges in order to fill in the gap. That will not necessarily result in the best outcome from a policy perspective.

The UK can play a globally leading role to resolve this uncertainty that has remained “undealt with” (basically because the WTO leaves it to COP and COP leaves it to WTO), and that is acquiring growing, material and significant importance in world trade. There is a clear opportunity for the UK to provide leadership in two key and strategic areas of British policy that have global reach: free trade and climate commitments, through action at the WTO and COP 2021.



**Kenji Takeuchi** Moderator

Graduate School of Economics, Kobe University (Japan)

Kenji Takeuchi is a professor of economics. His research focuses on environmental and resource economics. Kenji received his Ph.D. in economics from Kyoto University in 1997 and joined Kobe University in 2001.

### ***Resilience of the World Trade to Climate Disasters***

This study examines the impact of natural disasters on international trade. Using cross-country panel data, we investigated the extent to which the occurrence of natural disasters affects monthly exports. Our study includes data on bilateral trade in order to estimate the impact of disasters on exporting and importing countries. The results of the empirical analysis indicate that natural disasters have a negative and statistically significant impact. We found that a natural disaster occurring in a given month has an immediate and persistent impact on exports, with cumulative losses of 9.6% for exporting countries and 5.5% for importing countries. Moreover, this study utilized adaptation measures to analyze the heterogeneous effects of natural disasters. These findings suggest that a country's vulnerability has a negative effect on trade flows, whereas adaptation readiness has a positive effect. The results provide evidence of vulnerability and adaptation associated with disaster shocks that may affect the economy through the trade channel.



**Kevin Verbelen**

AGORIA and Brussels Diplomatic Academy (Belgium)

Kevin Verbelen is Company Lawyer & Expert International Trade at AGORIA, the association of technology companies in Belgium. He is Chair of the Trade Group in DIGITALEUROPE and Steering Committee Member of Belgium's Customs Forum. He is Lecturer & Head of the International Organizations Pillar at the Brussels Diplomatic Academy. Kevin holds a Master Degree of Law from the Vrije Universiteit Brussel, a LL.M International Trade and Business Law from the University of

Arizona, and was awarded for his excellence in International Environmental Law. He worked at the Belgian Representation to the WTO in Geneva and to UNEP in Nairobi.

### ***Carbon Border Adjustment Measure: a Business Perspective***

The European Union recently published its “Fit for 55” package. The package contains a collection of legislative proposals aiming at reducing the EU's CO<sub>2</sub>-emissions by 55% by 2030. One of the proposals is the Carbon Border Adjustment Measure (CBAM). The aim of the proposal is to “mirror”, to a certain extent, the existing Emissions Trading System (ETS) that is applicable to companies dealing in or with certain products with a high carbon content. As the ETS is only applying to companies operating in the EU and as the ETS has to be revised in light of Europe's climate ambitions, the risk of companies leaving the EU to countries

with less strict climate policies (i.e. carbon leakage) has to be contained. Current carbon leakage measures are deemed too expensive or inefficient in the analysis of the EU and its Member States. Hence, the introduction of CBAM. However, the effects of a CBAM could be the opposite of what the EU envisages. If the CBAM would be drafted carelessly and without a profound understanding of economic realities, it may increase carbon leakage. In addition, the risk of discriminating non-EU products could very well lead to a violation of WTO-rules.



## ***Theme 2: The Perfect Storm: Building Economic Resilience in Overlapping Crises***

### **Moderator**

#### **Bashir Bernard Siman**

Brussels Diplomatic Academy, Vrije Universiteit Brussel (Belgium)



#### **Johan Eyckmans**

KU Leuven – Faculty of Economics and Business – Center for Economics and Corporate Sustainability CEDON (Belgium)

Johan Eyckmans studied economics at the University of Antwerp and at KU Leuven in Belgium. He was research fellow of the Fund for Scientific Research Flanders and in 1997 he obtained a Ph.D. at KU Leuven on the incentives of nations to form international environmental agreements. Johan Eyckmans is currently working as professor in environmental economics at KU Leuven. His research interests include the economics of climate change, applications of game theory to the formation of international environmental agreements, economics of waste and materials, circular economy, cost benefit analysis, general equilibrium and integrated assessment modeling, and evaluation of environmental policies.

### ***Distributional Effects of Different Climate Change Damage Channels and Mitigation Policies***

This paper studies drivers of distributional impacts of climate change-related damages and mitigation policies between regions and over time using a numerical integrated assessment model. The first group of drivers relates to change-related damages. In addition to damages that are proportional to GDP, we also consider the nonlinear impacts of climate change on productivity growth and capital depreciation. The second type of drivers relate to global cooperation on climate policy. The third type of drivers relate to policies to alleviate possible adverse impacts on inequality across countries by means of transfers. We find that countries are affected very differently by climate change under different assumptions regarding damage channels. Poorer countries are often warmer and therefore suffer more from adverse climate change impacts on TFP growth leading to higher global inequality. But climate change may also reduce inequality by destroying the capital stock of rich regions that tend to have higher capital values at stake. We show that when cooperation without transfers is maximized for global welfare, rich regions may be required to exert excessive abatement efforts in order to reduce inequality. A transfer scheme, based on a global system of grandfathering tradable carbon permits is proposed to alleviate the impacts of inequality and free riding incentives.



### **Sebastian Oberthür**

Vrije Universiteit Brussel (Belgium)

Sebastian Oberthür is Professor of Environment and Sustainable Development at the Brussels School of Governance at the Vrije Universiteit Brussel (VUB) and Professor of Environmental Policy and Law at the University of Eastern Finland (since 2020). Trained as a political scientist with a strong background in international law, he focuses on issues related to international and European environmental and climate governance. Before joining the VUB in 2005, Sebastian Oberthür served as a part-time assistant professor for international relations at the Otto-Friedrich-University Bamberg from 2001-2005. He has also held part-time teaching positions at Technical University Berlin, the Université Libre de Bruxelles and the College of Europe (Natolin Campus).

### ***The Covid-19 Crisis: A Critical Juncture for EU Climate Policy Development?***

The EU has demonstrated increasing commitment to combating climate change. In December 2019, the European Commission published the European Green Deal (EGD) – an evolving, overarching strategy that aims to achieve climate neutrality by 2050. Just as the plans were underway to implement the EGD, the Covid-19 crisis hit. We ask whether the Covid-19 crisis represents a likely critical juncture for EU climate policy, and why. Experience from previous economic crises suggests that climate policy may be set aside. In 2021, the EU's crisis response seems to somewhat advance EU climate policy, at least on paper (with remaining uncertainties about actual implementation). Given the potential for transformational change already embedded in the EGD, we suggest that additional positive effects of the Covid-19 crisis may not add up to a critical juncture. We reflect on the role of Commission entrepreneurship and the politicisation of climate change and climate policy to explain this outcome.



### **Hiroaki Sakamoto**

Graduate School of Economics, Kobe University (Japan)

Hiroaki Sakamoto is an associate professor of economics at Kobe University, a research network fellow at CESifo, and a research fellow at Graduate School of Economics, Kyoto University. He is also an adjunct researcher at the Institute for Advanced Social Sciences and the Research Institute for Environmental Economics and Management, Waseda University.

### ***Pricing the unpriced: An interdisciplinary effort to make the market work for climate***

By briefly reviewing recent developments in the literature of climate change economics, I will talk about how and why economics can be useful for tackling the issue of climate change. In particular, I will highlight the importance of carbon pricing, which effectively puts a price tag on each carbon emission in the market. Pricing carbon naturally requires interdisciplinary efforts where the cost and the benefit of carbon emission can be compared in a single unified framework. I will demonstrate how one can combine economic and scientific models to facilitate policy making on carbon pricing.



**Joint producer****Kenji Takeuchi**

Graduate School of Economics, Kobe University (Japan)

**Bashir Bernard Siman**

Brussels Diplomatic Academy, Vrije Universiteit Brussel (Belgium)

**Moderator****Kenji Takeuchi**

Graduate School of Economics, Kobe University (Japan)

**Adelina Gschwandtner**

University of Kent (UK)

Adelina Gschwandtner was born in Bucharest, Romania. After obtaining a first degree in Economics at the Bucharest University of Economic Studies, she moved to the University of Vienna, where she was awarded her PhD in 2002. She subsequently worked at the University of Vienna until 2011, before moving to the Vienna University of Economics and Business (WU). She joined the University of Kent in September 2012. After pursuing research in empirical Industrial Economics for more than a decade, Adelina has started to conduct research in the areas of Agricultural Economics, Environmental Valuation (more specifically on Organic Food) and the Economics of Happiness.

***Estimation of a Hedonic Price Equation for Chicken Meat in the UK: Does the Organic Attribute matter?***

Chicken meat consumption has increased substantially in the last decades due to farming and processing intensification and due to perceived health and environmental benefits for consumers. Organic chicken additionally, is perceived to have better taste, lead to higher animal welfare and additional benefits for the environment. Thus understanding consumers' preferences for organic chicken is central for policy-making and market strategies that can shape this market in the future. This paper uses a comprehensive data set of scanned shoppings from UK consumers, to show that they are willing to pay an average premium of 135% for the organic attribute in the case of chicken. In addition, this paper contributes to the literature of environmental valuation, demonstrating that household characteristics can be used as instruments into a GMM approach to a hedonic price model, to address the endogeneity and efficiency issues usually ignored in this literature.



### **Gunnar Gutsche**

University of Kassel (Germany)

Dr. Gunnar Gutsche is a lecturer and post-doctoral researcher at the Unit Empirical Economic Research at the University of Kassel. His research addresses different aspects of sustainable finance with a specific focus on sustainable investment behavior at the individual or household level. Furthermore, he has been working on citizen participation in the transition process to a low-carbon economy. He obtained a doctoral degree in 2017 (University of Kassel) and holds a diploma in economics (2011, Georg-August Universität Göttingen). He is also member of the Sustainable Finance Research Platform.

### ***Are preferences for sustainable investments universal? A large scale experiment in five European countries***

To understand the extent to which individual preferences towards sustainable investments vary across countries, this study analyzes data from an incentivized framed field experiment considering ESG (environmental, social, and governance) and climate-related investment decisions in five European countries from May to July 2021. The experiment is part of a survey of households' financial decision-makers in France, Germany, the Netherlands, Poland, and Spain, with about 1,000 respondents per country. Our experimental design enables us to calculate the amount of additional fees respondents are willing to pay in order to invest in exchange traded index funds based on the MSCI World ESG Screened Index and the MSCI World Climate Change Index. This allows us to compare not only preferences for sustainable investments across different countries, but also in terms of the thematic focus of sustainable funds. We also analyze to what extent the relevance of pecuniary motives, social signaling, and social preferences for sustainable investment decisions varies across countries. Thus, this study is the first to compare preferences for sustainable investments at the individual level across different countries, while providing identical information and choices to individuals.



### **Kayo Murakami**

Center for Social Systems Innovation, Kobe University (Japan)

Ph.D. in Economics from Kyoto University in 2011. Currently she is working at Kobe University as a project associate professor in the Center for Social Systems Innovation. Her research interests are: consumer decision-making, valuation of non-market goods, and environmental benefit transfer; applications of choice modeling with a focus on environmental and agricultural issues such as energy policy, food labelling, and lifecycle impact assessment.

### ***What determines the values of environmental benefits? Evidence from a worldwide survey***

One of the key obstacles to establishing international cooperation on environmental issues is the fact that environmental benefits are valued differently depending on the country. But where does this disparity come from? In this study, we analysed large-scale survey data collected across G20 countries to try to find an answer to this question. Combining lifecycle impact assessment and economic valuation techniques, we found that people's perceptions of environmental benefits are in fact diverse, but are highly correlated with a few social indicators such as life expectancy, the Gini index, and subjective well-being. Our findings suggest that improving these social indicators in otherwise ill-equipped countries will facilitate convergence of people's perceptions and will thereby establish a common ground for tackling global environmental issues.





### **Miwa Nakai**

Fukui Prefectural University (Japan)

Dr. Miwa Nakai is Associate Professor at Fukui Prefectural University, Japan. Prior to her current position, she worked at Waseda University and University of Tokyo, Japan. She received her B.A. in Commerce from Griffith University, Australia, and her M.A. and Ph.D. in Economics from Graduate School of Economics at Kobe University, Japan. Her research interests include environmental economics, socially responsible investments, behavioural economics, and development economics. She was a visiting scholar at University of Kassel, Germany in 2019.

### ***The effect of environmental information on preferences for dynamic electricity tariffs: A case of Germany-Japan comparison***

This paper empirically analyzes the effect of environmental information on households' preferences for dynamic electricity tariffs, based on a choice experiment conducted in Germany and Japan. Our particular experimental design allows disentangling two central characteristics of dynamic electricity tariffs. These are the intra- and interday frequency of price adjustments. Overall, we find that households object to frequently changing price patterns. This tendency is remarkably stronger among German households, which indicates that Japanese residents are more willing to accept flexible tariffs. Our preliminary results furthermore suggest that respondents do not mind several price adjustments during a day (i.e. 4 and 12 times a day), with the exception of hourly price changes for German households. As information treatment, we investigate whether highlighting the environmental benefits associated to dynamic electricity tariffs increases households' preferences for more frequent price adjustments. First results suggest that additional environmental information significantly decreases households' aversion against daily price adjustments among the Japanese respondents. With respect to the German sample, the environmental treatment causes the households' aversion against hourly changing within-day prices to diminish.

**Joint producer**

**Minoru Mizuhata**, Graduate School of Engineering, Kobe University (Japan)

**Yoshiyuki Kajikawa**, Kobe University and RIKEN (Japan)

**Maitane Berecibar**, Vrije Universiteit Brussel (Belgium)

***Theme 1: Advances in Climate Science*****Moderator**

**Minoru Mizuhata**

Graduate School of Engineering, Kobe University (Japan)

**Yoshiyuki Kajikawa**

Research Center for Urban Safety and Security, Kobe University (Japan)

Dr. Yoshiyuki Kajikawa is a Project Professor of Research Center for Urban Safety and Security at Kobe University (since 2016) and Senior Researcher of RIKEN Center for Computational Science (since 2014). He received his Ph.D. in science (Atmospheric Science) from Nagoya University Japan and built his career through Postdoctoral fellowships in the International Pacific Research Center (IPRC) at University of Hawaii, and the Hydrospheric Atmospheric Research Center (HyARC) at Nagoya University. He is a specialist in climate system study, especially on tropical climates and Asian monsoons.

***Challenge to the New Generation Computational Climate Science Research***

A cloud is the minimum element that makes up organized cloud systems and plays an important role in the formation of our climate system. It has been challenging to simulate clouds on a global scale due to the low horizontal resolution of computer models developed using existing computational resources. Clouds have been expressed through the simplified process of parameterization. Recently, the first-ever sub-kilometer global atmospheric simulation successfully resolved deep convections, paving the way for the next stage of global climate research. We found that the simulated convection core is expressed by multiple grind points in the sub-kilometer experiment, which advance to resolve the convection for the entire Earth. We are currently in a transition phase and working towards the long-term integration of global cloud-resolving simulations. Next generation computational climate science research with the history of climate model will be presented at this workshop.



### **Giridharan Renganathan**

Kent School of Architecture and Planning, University of Kent (UK)

D. Giridharan Renganathan is a senior lecturer and Director of Centre for Architecture and Sustainable Environment at the University of Kent. His research focus is on Urban Morphology and Climatology (environmental design), with specific interest in Urban Heat Island effect and indoor overheating. He has secured large research grants from RGC (Hong Kong SAR) and EPSRC (UK), and European Commission. He has over 25 peer reviewed publications and 4 book chapters. He received the prestigious Carter Bronze Medal (2016) awarded by CIBSE for one of his publications.

He has also reviewed research grant proposals for NERC (UK), EPSRC (UK), MRC UK) Israel Science Foundation and Royal Netherlands Academy of Arts and Sciences.

### ***URBAN CLIMATE – Field experiment and modelling studies on urban heat island to urban albedo***

Very often urban climatologists give least importance to urban design variables in their modelling approaches; as a result, urban designers tend to assess the climate parameters subjectively (Ali-Toudert and Mayer, 2006; Giridharan, 2007; Ooka, 2007). Model developers need to understand the importance of urban design in improving urban climate, and develop models incorporating all critical urban design variables at a very fine spatial scale (Emmanuel et al., 2007). Further, considering the complexities and uncontrollable changes in the urban environment, it is important to develop context specific models rather than relying on generic models. However, these models need to represent parameters in terms of the real setting. Further, they need to be validated for the real physical settings. At times, monitoring and validating under real physical settings could be difficult due to resource, time and physical constraints. In these situations, scaled experimental models could be the answer. Therefore, through this presentation I would like to highlight how on-site measurement and scaled experimental models were used to address urban heat island to urban albedo research with special focus on the EPSRC-funded urban albedo project.



### **Miriam Pfeiffer**

Institute of Geosciences, CAU Kiel (Germany)

Professor of Paleontology and Historical Geology at the Institute of Geosciences, CAU Kiel, Germany. Awarded MSc from Frankfurt University, Germany and PhD from Kiel University/GEOMAR in 1999 and 2002, respectively. Post-Doc at the GEOMAR 2003-2006. JSPS postdoctoral fellow at Hokkaido University, Japan in 2006/7. Post-Doc, Habilitation and Heisenberg fellow at RWTH Aachen, before joining CAU Kiel in 2018. Her research focusses on corals as paleoclimatic archives and their use for projecting tropical climate variability. Committee member of priority program SPP2299 'Tropical

climate variability and coral reefs' (<https://www.spp2299.tropicalclimatecorals.de/>) funded by the German Science foundation (2022-2028).

### **Climate Past and Present: Corals as Monitors of Past and Current Tropical Climate Variability**

The rise of tropical sea surface temperatures driven by anthropogenic climate change is the greatest threat to coral reef ecosystems, which will face irreversible damage even if warming is limited to 1.5°C. In addition, warming in the tropics affects the climate extremes such as droughts, floods and hurricanes. However, the instrumental record of tropical climate is limited to the past 150 years, and lacks spatial and temporal homogeneity. Instrumental biases during and after World War II affect sea surface temperature readings and affect 20<sup>th</sup> century warming estimates. Massive corals build skeletons with annual density bands, comparable to tree rings. Geochemical data extracted from coral skeletons allow monthly reconstructions of temperature, hydrology and other environmental parameters at a temporal resolution comparable to instrumental records. Moreover, as corals

grow continuously at rates >1cm per year and live for up to 500 years, while fossil corals are abundant on tropical shores, recent climatic extremes are captured and can be evaluated in the context of natural climate variability over the past millennia. The SPP 2299 'Tropical climate variability and coral reefs' aims to improve projections of tropical climate and coral reef ecosystems, by combining proxy data, advanced statistical methods and earth system modelling.

## **Theme 2:** Key Technologies for a Carbon-neutral Environment

### **Moderator**

**Yoshiyuki Kajikawa**, Research Center for Urban Safety and Security, Kobe University (Japan)



### **Takashi Kita**

Vice President, Kobe University (Japan)

Takashi Kita is a Professor in the Department of Electrical and Electronic Engineering, Graduate School of Engineering, Kobe University, Kobe, Japan. He is also Vice President of Kobe University and Director of the Office for Promoting SDGs. He obtained a Dr of Engineering from Osaka University, Osaka, Japan, in 1991. In 1996, he was a visiting researcher in Professor H.-J. Queisser's Laboratory at the Max-Planck Institute, Stuttgart, Germany. His current interests include the epitaxial growth and material physics of III-V material-based quantum heterostructures, and semiconductor nanostructures for new generation solar cells and novel light sources. He was a

research member of the EU-Japan project "A new generation of concentrator photovoltaic cells, modules and systems", which organized by EC and NEDO (Japan) from 2011 to 2014.

### ***Industry-government-academia collaborations for SDGs***

The Sustainable Development Goals (SDGs) were adopted at the United Nations Sustainable Development Summit in 2015. These SDGs are universal goals that developed countries including Japan should tackle alongside developing countries for the benefit of the international community. There are 17 SDGs comprised of 169 targets that we should aim to achieve by 2030. The goals represent pressing issues and aim to end poverty, save the earth, and enable people to live peaceful and fulfilling lives. Kobe University's SDGs Promotion Office was established in February, 2020 to contribute towards the 17 goals through our research expertise and educational activities. We also initiate industry-government-academia collaborations and develop novel interdisciplinary research areas to foster new value creation. With local communities and industries, we aim at establishing open interaction, enabling SDG-related idea sharing and allowing outcomes to be smoothly implemented. In order to achieve the SDGs, it is essential to harmonize innovative technologies and education with a diverse society. In this spirit, we promote (1) technological, industrial and societal innovation, (2) value creation and its implementation, (3) education for younger generations and virtuous cycles of human resource development, (4) close cooperation with local communities, and (5) strong international collaborations with people, institutions and organizations around the world.



### **Michel Cassir**

Chimie ParisTech, PSL Research University (France)

Emeritus Professor at Chimie-Paris Tech, PSL Research University. Ph.D. in Analytical Chemistry from University of Paris VI in 1977. Habilitation as Research Director in 1992. Education and research awards from French University and Ministry of Research & Education. Professor for 9 years at the National University of Mexico (UNAM). Head of the Lab. Electrochemistry, Chemistry of Interfaces & Modeling for Energy. Responsible for education, research and international programs. Research focused on high temperature fuel cells (MCFC, SOFC/PEFC/hybrid) and electrolysis cells (MCEC, SOEC), batteries, new materials for energy, ultrathin layers, electrochemistry for sensors and medical applications. 360 communications, conferences, or posters at scientific events (98 invited conferences). Authored 280 scientific publications, proceedings & book chapters. Invited Editor of publications including IJHE and JPS, among others. Involved in large-scale scientific collaborations all over the world (including Europe, Japan, South Korea, China, the USA and Latin America).

### ***CO<sub>2</sub> Capture and Valorisation in Molten Carbonate-based electrolytes***

CO<sub>2</sub> emissions, representing 80% of global anthropogenic emissions, currently exceed 40 Gt per year; it is therefore necessary to significantly decrease them in order to control global warming. The key challenge is the storage and/or the conversion of this molecule. The unique physicochemical properties of molten carbonates make them among the most efficient solvents to solubilize CO<sub>2</sub> and, furthermore, to reduce it into valuable fuels such as CO, CH<sub>4</sub> and C. This presentation gives a general overview of the high temperature applications of such electrolytes, in particular the so-called Molten carbonate Fuel Cell (MCFC), already a mature technology, which can be used as a reference device for absorbing and exploiting CO<sub>2</sub> molecules. Precisely determining the solubility of CO<sub>2</sub> in various molten carbonate eutectics is crucial for the development of electrolysis and carbon capture systems and for the mechanistic understanding of CO<sub>2</sub> behavior in such media. Reliable CO<sub>2</sub> solubility values were obtained by a manometric set-up in carbonate eutectic mixtures, obtaining in the best case a solubility of 10<sup>-1</sup> mol.atm.L<sup>-1</sup> at 650°C. Another notable trend is that CO<sub>2</sub> solubility increases alongside temperature in most eutectics. Some results of the co-electrolysis of water and carbon dioxide are given, showing that in standard conditions the main product is a CO+H<sub>2</sub> mixture. The addition of moderate amounts of hydroxides to molten carbonates provokes a beneficial effect on the co-electrolysis. This overview on molten carbonate-based devices, together with a set of recent experimental results will provide evidence of this research field's significance and promising industrial applications.



### **Minoru Mizuhata** Moderator

Graduate School of Engineering, Kobe University (Japan)

Minoru Mizuhata is a Professor in the Department of Chemical Science and Engineering, Graduate School of Engineering, Kobe University, Kobe, Japan. He is also the one of the professors in responsible for the operation of the Interface Science Research Center and the Brussels office. He earned a PhD in Science from Kobe University in 1992. He worked at Osaka National Research Institute from 1992 to 1996 as a researcher of Laboratory Hydrogen Energy and studied the R&D of Polymer Electrolyte Fuel Cells. In 1996, he moved Kobe University and was promoted to associate professor in 2005, and professor in 2011. He was a visiting researcher of Professor F. Faupel's Laboratory of Kiel University and Professor J. Maier's Laboratory of Max-Planck Institute, Stuttgart, Germany in 1997. His current interests include inorganic chemistry and material science for energy conversion. He has written more than 200 papers and 25 patents.

## ***CO<sub>2</sub> Separation and Absorption: Research Breakthroughs***

Reducing the concentration of CO<sub>2</sub> in the atmosphere and curbing global warming is a common challenge for all mankind. It is necessary not only to reduce CO<sub>2</sub> emissions, which are the main cause of global warming, but also to construct a system that captures CO<sub>2</sub>, generates energy from it, and circulates it. For CO<sub>2</sub> recovery in places with high CO<sub>2</sub> concentration, such as large-scale factories, it is necessary to increase the efficiency of high-temperature-operating CO<sub>2</sub> absorbers, and we have improved this reaction rate by modifying the surfaces of conventional materials. Here, I will introduce one of our research topics.

Lithium orthosilicate (Li<sub>4</sub>SiO<sub>4</sub>) is a ceramic CO<sub>2</sub> absorbent with a large absorptive capacity (36.7 wt.%) and heat resistance properties. Li<sub>4</sub>SiO<sub>4</sub> has applications as a separator in molten carbonate fuel cells, and as a direct CO<sub>2</sub> absorbent for large-scale emission sources such as thermal power stations. The absorption and desorption reaction equilibrium temperature of Li<sub>4</sub>SiO<sub>4</sub> is around 993 K. This study investigates the CO<sub>2</sub> absorption behavior of Li<sub>4</sub>SiO<sub>4</sub> at lower temperatures. Samples, the surfaces of which were modified with ball milling under an Ar atmosphere, exhibited increased Brunauer-Emmett-Teller surface areas. Electron spin resonance (ESR) spectroscopy indicated an increase in the content of Si dangling bonds upon ball milling. Thermogravimetric-differential thermal analysis indicated two different CO<sub>2</sub> absorption processes: chemisorption on the Li<sub>4</sub>SiO<sub>4</sub> surface at temperatures below 773 K; and bulk diffusion at temperatures above 773 K. Isothermal analysis indicated that ball milling and the addition of K<sub>2</sub>CO<sub>3</sub> decreased the activation free energy.



**Noriko Shisa**

Toyota Motor Europe (Japan)

Noriko Shisa is Technical Head of Technology Research Planning at the Technical Center of Toyota Motor Europe (TME). She joined Japan's Toyota Motor Corporation (TMC) in 2007. After a successful career as a researcher in the field of materials, she was transferred to the Technology Management Department as Group Manager of the Research Planning Group from 2018. There her main responsibilities were future research planning and academia-industry collaboration in TMC. Since April 2021, she has been assigned to TME, mainly focusing on European research planning based on her experience at TMC.

## ***Sustainable Mobility - Towards Carbon Neutrality***

At Toyota, sustainability has always been at the center of everything we do. The environment in particular is part of our heritage and commitment. Through Kaizen, which means continuous improvement, we have always strived to find better ways to ensure people's well-being and contribute better solutions to society.

We are most closely linked to SDG No.13 – Climate Action. Toyota supports the Paris Agreement, and will continue to do its utmost to take on the challenge of achieving carbon neutrality by 2050. In 2015, at the time of the Paris Agreement, we pioneered a corporate commitment to measurable change through Toyota's Environmental Challenge 2050. With our Environmental Challenge 2050, we are committed to making our entire operations, including manufacturing and services, sustainable.

We are developing our future plans knowing that Europe is leading the way towards carbon neutrality, from a global perspective. Europe is also the most important partner in research and development for achieving carbon neutrality. At the end of this presentation, we will also introduce our R&D activities that are being carried out in Europe.



**Maitane Berecibar**

Vrije Universiteit Brussel (Belgium)

Prof Dr Ir Maitane Berecibar is the Battery team leader in the MOBI research group at VUB. She is now in charge of R&D innovation and strategy in the field of batteries; novel materials, second life, state estimations, recycling, safety, etc. As the team leader she focuses on developing new consortia, managing promising innovative projects and supervising her group. She obtained her PhD in Engineering of Sciences at VUB in August 2017 titled "Development of an Accurate State of Health Estimation Technique for Lithium-Ion Batteries". Since then, she has worked as a senior researcher, grant writer and project manager at the MOBI research centre for H2020 and other projects related to energy management transition. Additionally, Prof Berecibar is a key partner of the Battery2030+ initiative. She is also coordinating the European project Bat4ever and is an official member of the IEC standardization body (TC-69 and TC-21)

***The Batteries of the Future***

Batteries have become an indispensable product for society; they are being used in a variety of products ranging from cellphones to electric vehicles. The most popular battery technologies are the lithium-ion batteries due to their high energy- and power-density as well as their long lifetime compared to other types. Lithium batteries are the dominant type of battery technology used in EVs. Many different types of lithium batteries exist and they have various characteristics. The battery characteristics define their specific energy (i.e., driving range), cycle life, power performance, safety, etc. The next few years will see novel battery chemistries, compositions and production steps. In predictive maintenance and reliability studies, the required stress will further improve the driving range, environmental performance, and cost of vehicles. However, there are still challenges to overcome in applying novel topics such as artificial intelligence, sensor integration and self-repairing properties to developing batteries of the future.

**Joint producer**

**Minoru Mizuhata**, Graduate School of Engineering, Kobe University (Japan)

**Maitane Berecibar**, Vrije Universiteit Brussel (Belgium)

**Session leader**

**Minoru Mizuhata**, Graduate School of Engineering, Kobe University (Japan)

**Hiroshi Suzuki**

Graduate School of Engineering, Kobe University (Japan)

Professor of the Department of Chemical Science and Engineering, Kobe University, Japan. Awarded Dr. Eng. in 1991, from Kyoto University, Japan. After working for Kyoto University as an instructor from 1988 to 1991, he joined Hiroshima University as an associate professor from 1991 to 1998. His research interest is thermal media transportation. He has received awards from the Heat Transfer Society (1990, 2019), the Society of Chemical Engineers (1990), and the Society of Rheology of Japan (2021). As the president of Japanese Society of Latent Heat Engineers, he was leading the

Japanese researchers who are working on thermal storage and latent heat transportation technologies.

***Silica Hard-Shell Microcapsules Containing Phase Change Materials***

Silica hard-shell microcapsules containing phase change materials have been developed so that they can be applied to latent heat transportation systems. Silica microcapsules have advantages in terms of their thermostability, mechanical toughness, resistance to chemicals, and weak adhesiveness to the walls of flow systems compared with polymer-shell microcapsules. In this talk, the thermal characteristics of silica hard-shell microcapsules containing inorganic hydrates will be discussed. From the results, it is found that the super-cooling phenomena of inorganic hydrates disappears in microcapsules. These results demonstrate that these microcapsules have many applications not only to latent heat transportation but also to various kinds of thermal storage systems. The combination dispersants of drag-reducing surfactants and polyvinyl alcohol was also developed to prevent the sedimentation of the silica microcapsules. The microcapsule sedimentation was found to occur very slowly in contrast to Stokes' traditional theorem. The present microcapsules containing phase change materials are promising materials for the realization of a low-carbon society.

**Kentaro Kuratani**

National Institute of Advanced Industrial Science and Technology (AIST)

Graduate School of Engineering, Kobe University (Japan)

Kentaro KURATANI is a Group Leader of the Advanced Electrochemical Device Research Group in the National Institute of Advanced Industrial Science and Technology (AIST), Japan. He is also a Visiting Associate Professor of the Graduate School of Engineering at Kobe University, Japan. He obtained his doctoral degree in engineering from Kobe University in 2005. Subsequently, he joined AIST and started his career. In 2021, he was promoted to group leader. His research focuses on materials science in relation to the active materials of electrochemical devices.

## ***Breakthrough Research in Material Technologies for Batteries***

The demands to curb the emission of greenhouse gases (GHGs) increase every year. Renewable energy, such as solar-power and wind-power, has the potential to reduce GHG emissions and consequently the implementation of renewable energy is being accelerated worldwide. In Europe, for example, almost 30% of electricity was generated via renewable energies as of 2015. The practical usage of electric vehicles is considered to be another possible candidate for reducing GHG emissions. In both cases, electrochemical devices including Lithium-ion batteries (LIBs) play an important role.

In this presentation, I will give an overview of research and development related to electrochemical devices such as LIBs at AIST and introduce the new materials we have developed.



**Marco Liserre**  
Kiel University (Germany)

Marco Liserre received the MSc and PhD degree in Electrical Engineering from the Bari Polytechnic (Italy), respectively in 1998 and 2002. He has been Associate Professor at Bari Polytechnic and Professor in reliable power electronics at Aalborg University (Denmark) from 2012. Since 2013 he has been Full Professor and holds the Chair of Power Electronics at Kiel University (Germany) where he leads a team of 25 researchers with a Power Electronics Laboratory, a Medium Voltage Laboratory and a Laboratory on Batteries and Energy Conversion, in cooperation with colleagues in material science. He has lead in the last 7 years third-party projects for over 13 M€ (of which 5 % direct company assignment). Notably he was awarded an ERC Consolidator Grant (European Excellence Grants) for the project "The Highly Efficient And Reliable smart Transformer (HEART), a new Heart for the Electric Distribution System" in 2013.

He has published 500 technical papers (1/3 of them in international peer-reviewed journals) and a book, which received more than 42000 citations. Marco Liserre is listed in the ISI Thomson report on "The world's most influential scientific minds" from 2014. He is fellow of IEEE and has received various awards, including the IES 2009 Early Career Award, the IES 2011 Anthony J. Hornfeck Service Award, and the 2018 IEEE-IES Mittelman Achievement Award, which is the highest award of the IEEE-IES.

## ***New technologies and materials as driver of tomorrow's power electronics***

Technologies such as silicon and medium-frequency ferrites are reaching their limits and only moderate gains can be expected from them in the future. New materials are therefore being actively investigated to go beyond the current SOA in terms of efficiency, power density, reliability, etc. Although these new technologies open new research and application fields, they can raise new concerns, e.g. in terms of applicability, and be challenging to use; their optimal development therefore calls for pluri-disciplinary research teams, involving both materials scientists and power electronics experts.

This presentation will offer an overview, restricted to the component level, of current and emerging technologies. It will cover magnetics, active components, integration & packaging technologies, and electric energy storage systems, showing how materials under development are expected to boost the current state-of-the art.

**'ENABLING RESILIENT, CLIMATE-PREPARED SOCIETIES'****Joint producer****Masayuki Sato**, Graduate School of Human Development and Environment, Kobe University (Japan)**Leo Van Audenhove**, Vrije Universiteit Brussel (Belgium)**Theme 1: Social Impact of Climate Change****Masayuki Sato****Moderator**

Graduate School of Human Development and Environment, Kobe University (Japan)

Masayuki Sato is a Professor at Graduate School of Human Development and Environment, Kobe University, Japan. He received his Ph.D. in Economics in 2006 from the Graduate School of Economics, Kyoto University. After receiving Ph.D. he has worked for Graduate School of Global Environmental Studies, Kyoto University as assistant professor, Field Science Education and Research Center as associate professor. He moved to Kobe University in 2012. He was a Visiting Scholar at Department of Land Economy, University of Cambridge during 2019-2020. His research interests are on the economic valuation of the environment and ecosystem services related to sustainability issues.

**Karel Deneckere**

Vrije Universiteit Brussel (Belgium)

I am a guest lecturer at Vrije Universiteit Brussel (VUB) and Université Saint Louis (USL), both in Brussels, Belgium. I obtained my PhD degree in the winter of 2020 with my dissertation on the public debate on nuclear power in Belgium. I worked as a teaching assistant and PhD researcher at the VUB from 2013. Prior to that, I was working on a pre-doctoral project on energy issues in Belgium at the University of Antwerp. I have a MA in communication studies (VUB), a Msc. in sustainable development & human ecology (VUB) and a licentiate in History (Ghent University ).

***Nuclear power's trembling foundations: A case study of the Belgian public debate in the aftermath of the Fukushima nuclear accident***

Contrary to some other countries, the large-scale nuclear accident at Fukushima (2011) did not really pose an immediate existential threat to nuclear power in Belgium. Seemingly, the large-scale accident did not provoke more than a passing uproar in the public debate. The industry conveniently repeated their well-rehearsed message that Belgian climate commitments make nuclear power unavoidable (e.g. Bickerstaff, Lorenzoni, Pidgeon, Poortinga, & Simmons, 2008; Doyle, 2011), leaving many of its critics stunned. This paper characterizes the Belgian public debate on nuclear power as an ongoing discursive struggle for hegemony. Generally, it seeks to reconstruct the discourses on nuclear power that circulated in the Belgian public debate. More specifically, it looks at how 'the environment' is articulated within these discourses. For this purpose, it uses discourse-theoretical analysis (DTA) (Carpentier & De Cleen, 2007), which combines Laclau and Mouffe's (1985) discourse theory with methodological guidelines from critical discourse analysis (Wodak & Meyer, 2009) and qualitative content analysis (Charmaz, 2006). My analysis reveals that the discursive struggle took place on two levels of abstraction. On a more explicit level, the nuclear cause seemed to emerge from the controversy unharmed. On a more implicit level, however, the analysis reveals a whole different picture. Here,

it shows that the accident contributed to a shift in how the public understands human's relationship with the non-human world. While the 'modernist' ontology gradually erodes, an alternative ecological ontology is emerging.



**Kazuhiro Ota**

Graduate School of Human Development and Environment, Kobe University (Japan)

Professor at the Graduate School of Human Development and Environment, Kobe University, Japan. PhD from Hitotsubashi University, Japan. He works on Development Studies and Area Studies of the Philippines. His research interests are poverty issues and community development. He is the author of 'Migration and the Nation-State: The Contradictions of Globalization' in K. Sakai & N. Lanna eds. Migration Governance in Asia: Multi-level Analysis, Routledge (forthcoming).

***Climate Change's Impact on Poverty and Migration***

The impacts of climate change vary between countries and social groups. In Asia, there are several countries that are greatly affected by natural disasters caused by climate change, such as India, China and the Philippines. In many cases, the poor are severely impacted. The problems triggered by disasters, however, usually stem from the structural social contradictions. This paper discusses how climate change impacts poverty and the poor, focusing on the Philippines. It criticizes rapid economic development strategies that result in social and environmental consequences. In addition, it looks at the Sustainable Development Goals (SDGs) from a critical viewpoint. It may be impossible to overcome the current issues even if all the SDGs are achieved.



**Ginga Tamura**

NHK (Japan Broadcasting Corporation) (Japan)

As a correspondent at NHK, Japanese public television, Ginga Tamura has been covering international politics, especially international negotiations on climate change and environmental issues, as part of the International News Division. He reported on COP24 in Poland in 2018 and COP25 in Spain in 2019. He has frequently covered and reported on various topics such as "climate justice", "climate tech" and "role of youths in climate change".

He was awarded an MA from Tokyo University of Foreign Studies in 2013 after completing his bachelor degree at Kobe University in 2011, which included a 1-year exchange at Université de Paris X.

***Informing Public, Mobilizing Public Opinion: The Role of Mass-Media***

While the social movement "Global School Strike" initiated by Greta Thunberg, a Swedish girl, mobilised thousands of people in European countries in February 2019, only 12 people gathered for the first demonstration of "Fridays for Future Japan" in the same February. The Guardian, a major daily newspaper in the UK, updated their style guide in 2019 to describe climate change as a "climate crisis", however almost all Japanese media outlets still use the expression "global warming", and don't even say "climate change", while posting less articles about the issue.

What are those differences?

In addition to historical and cultural factors, I focus on a global survey about people's views on climate change. These results show that Japanese people are more reluctant to take measures against climate change, compared to the global average, which may explain the differences in people's attitudes, and would be a reason why the mass-media may have to undertake different strategies to raise awareness of this issue in Japan.





### **Michel Claessens**

European Commission and Free University of Brussels (Belgium)

Michel Claessens (Ph.D. ULB, Brussels) is a retired EU official and professor of science communication at the Free University of Brussels. He has published 15 books and about 35 articles and book chapters on European science and technology. He is an active member of international networks on science communication (PCST, ESOF, etc.) and a frequent speaker at international conferences (Chinese Association for Science Communication, AAAS, TEDx, etc.). He is currently developing an international alliance to promote science culture together with 14 teams of experts. His latest book, "The Science

and Politics of Covid-19", has just been published by Springer.

### ***How Should Scientists Tackle Global Crises: The Climate Test-Case***

The IPCC, the Intergovernmental Panel on Climate Change, is the most remarkable initiative that has successfully contributed towards building sustainable links between science and policy. It has been publishing periodic reports and authoritative assessments on the whole issue of global warming since 1988. The international group has established itself as a model for technoscientific governance, in particular by combining scientific and political skills from a policy- and decision-making perspective. Hence, the IPCC has become a suitable model for other international expertise projects, such as the "Intergovernmental Scientific and Policy Platform on Biodiversity and Ecosystem Services" (IPBES), established in 2012 by 94 governments.

Unfortunately, these lessons were not taken into account in the management of the Covid-19 crisis, during which governments promoted national approaches rather than international cooperation. Cooperation between scientists and politicians still needs to be improved. I will discuss the conditions for setting up a suitable international framework which would serve as a "natural" basis for tackling planetary crises. This would be the basis for facilitating long-term interaction between politicians and scientists, a mechanism for co-constructing political action by scientific validation and a basis for international cooperation.



### ***Theme 2: Local Adaptation to Global Warming***



### **Leo Van Audenhove**

**Moderator**

Department of Communication Studies, Vrije Universiteit Brussel (Belgium)

Leo Van Audenhove is a professor and head of the Department of Communication Studies at Vrije Universiteit Brussel. He is a researcher at imec-SMIT – Studies on Media, Innovation and Technology, as well as an extra-ordinary professor at the University of the Western Cape. In 2013, he was instrumental in setting up the Knowledge Centre for Digital and Media Literacy in Flanders, of which he subsequently became the director. It was established by the government as an independent centre to promote digital and media literacy in Flanders. His research focuses on media and data literacy, digital inclusion, and ICT4D.





### **Koen Borghys**

Studies in Media, Innovation and Technology (SMIT), Vrije Universiteit Brussel (VUB) (Belgium)

Koen Borghys is a PhD researcher at Studies in Media, Innovation and Technology (SMIT), Vrije Universiteit Brussel. His PhD focuses on the monitoring of progress by local actors (both public and private) within the Brussels Capital Region towards the UN Sustainable Development Goals (SDGs). The project combines several of his personal interests: cities and municipalities (the local level), data-driven policymaking and sustainability. Before his PhD Koen was already working as a researcher at SMIT, focusing on smart city related projects with local governments. Koen obtained a Master of Laws and a Master of Science in Economics at Ghent University.

### ***Monitoring Sustainable Development Goals: The Role of the Local Level in Brussels***

The 17 Sustainable Development Goals (SDGs) were adopted by the UN in 2015. Together with 169 sub-targets, they are part of the Agenda 2030 and form the international sustainability framework for the coming decade. The aim is to achieve global sustainable development by 2030, thereby equally addressing 5 pillars of sustainable development: people, planet, prosperity, partnership and peace.

Although written for national governments, the Agenda 2030 for Sustainable Development addresses every actor worldwide - (local) governments, companies, educational institutions, organizations and individual citizens - to achieve these goals together. To monitor progress towards the goals, the UN also formulated one or more 'global' indicators for each of the 169 SDG sub-targets. However, local entities have different priorities and ambitions to national governments and work within a different context. In order to make the implementation of the global goals workable, it is necessary to give a local interpretation of the international framework. Within the PhD Project 'SDG in ACTION' the existing global framework will be adapted to local entities within the Brussels Capital Region and a monitoring tool will be developed to conduct a follow-up on the SDGs.



### **Carina Veeckman**

imec-SMIT, Vrije Universiteit Brussel (Belgium)

Since 2011, Carina Veeckman has been a senior researcher at imec, SMIT-Vrije Universiteit Brussel (VUB) in Belgium (Ms. Communication Sciences). She has an extensive track record as a project manager for European and national funded projects and helps with the proposal preparation and writing. She has a particular interest in co-creation, citizen science, living labs and social innovation platforms. She is part of the 'Data, Governance & Communities' Unit at SMIT and serves as principal investigator on citizen science with two recent science communication handbooks. She is also a board member of Scivil, the Knowledge Centre for Citizen Science in Flanders.

### ***Citizen Science for Environmental Monitoring and Policy: Best Practices***

This presentation is about the application of citizen science to environmental monitoring and reporting, and its opportunities and challenges. Citizen science, or the participation of citizens in scientific research, is not a new concept. However, ICT developments and growing calls from the European Commission for public involvement and transparent policymaking has created new opportunities (e.g., Green Deal; Horizon Europe, pathway 6). The data collected through citizen science initiatives can contribute to the knowledge base for SDG monitoring and implementation, however, the uptake in policy by government administrations is still low. Based on interviews and workshops with the 13 Flemish center cities (Belgium), some key insights about the potential

of citizen science at the local level are illustrated, such as the increase of citizen involvement in prioritized issues. Based on the results, a ten-step roadmap for developing a citizen science policy will also be shared in order to promote the uptake of citizen science by policy makers.



### **Mieko Kiyono**

Graduate School of Human Development and Environment, Kobe University (Japan)

Dr. Mieko Kiyono is Associate Professor at the Graduate School of Human Development and Environment, Kobe University, Japan. She obtained a PhD from Kyoto University, Japan in 2009. After working for Kyoto University as a post doctor, she joined Kobe University in 2013 as an assistant professor at the Center for Regional Partnership in the Graduate School of Agricultural Science, Kobe University until 2015. From 2015 to 2017, she was also involved in policy making as a local government employee of Sasayama City. She currently serves as an advisor on the agricultural and rural environment of Tamba-Sasayama City.

## ***Adaptation to Climate Change: Community Resilience to Natural Disasters in Rural Area, JAPAN***

It is widely acknowledged that global warming significantly affects the features of extreme events (Imada et al., 2020). Imada et al. also found that the probability of seasonal heavy rainfall in the regions where the July 2017 Northern Kyushu Torrential Rains and the July 2018 Torrential Rains occurred has significantly increased with the progression of global warming. Disasters are expected to occur more frequently in the future, and it is necessary to focus on how local communities can function in terms of disaster prevention, mitigation and recovery. This presentation will focus on a community in the Kuma River basin of Kumamoto Prefecture that was affected by the 2020 torrential rains in northern Kyushu. In rural areas of Japan, aging and depopulation have become a serious issue. In addition, the disaster recovery process was carried out differently compared to the normal recovery process, due to people practicing self-restraint regarding social activities in order to prevent coronavirus infection. On the other hand, the field survey revealed that the recovery process was triggered by agriculture, which is similar to the trend after the Kumamoto earthquake in 2016. This presentation will reveal how local communities living along large rivers are enhancing their resilience.



### **Marialena Nikolopoulou**

University of Kent (UK)

Marialena Nikolopoulou is Professor of Sustainable Architecture and Deputy Head of School at the Kent School of Architecture & Planning, University of Kent. She has extensive experience in monitoring of microclimatic conditions and post-occupancy surveys in different operational contexts, and is on the Steering Committee of the CIBSE Guide A on Environmental Design. Her work on outdoor comfort has received awards from diverse bodies (RIBA, International Society of Biometeorology) and best paper prizes, and has influenced understanding of the topic across the world. She is currently the UK lead for the European H2020 Marie Skłodowska-Curie Industrial

Doctorate 'Solutions for Outdoor Climate Adaptation' and Editor of the International Journal 'Building and Environment'.

## ***Outdoor comfort as a commodity; what does thermal resilience mean under climate change?***

The recent COVID-19 pandemic highlighted the need for inclusive, high quality, open space, as essential for supporting liveability

and resilience. The talk will focus on understanding how the abstract concept of thermal comfort, an inherent characteristic of space, is affecting the use of and activities in open urban spaces. It will explore the mechanisms through which our adaptive capacity is enhanced, from conscious actions to a range of parameters in the contextual framework of psychological adaptation, temporality and cultural norms, proceeding to discuss how these can be employed in design. Ultimately, it will highlight the need for adaptive capacity and thermal resilience at the individual level, as well as spatial scale, supporting environmental diversity. In a warming climate and in the wake of a global health pandemic, outdoor comfort becomes an important commodity, where the design of open spaces has the potential to play a critical role not only for climate regulation and energy, but also for health, live ability and social cohesion.

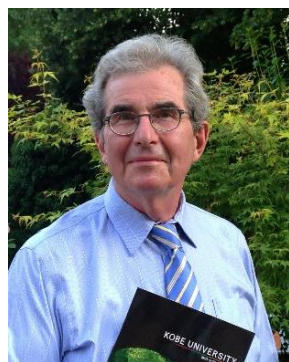


#### **Joint producer**

**Masayuki Sato**, Graduate School of Human Development and Environment, Kobe University (Japan)  
**Leo Van Audenhove**, Vrije Universiteit Brussel (Belgium)

#### **Session leaders**

**Leo Van Audenhove**, Vrije Universiteit Brussel (Belgium)  
**Patrick Vittet-Philippe**, Kobe University Brussels European Centre (Japan)



#### **Patrick Vittet-Philippe**

Kobe University Brussels European Centre (Belgium)

Patrick Vittet-Philippe is a recently retired EC official, with a special interest in international S&T cooperation, science communication and science diplomacy. Before joining the Commission, he taught at Trinity College Dublin and Merton College Oxford and was *attaché de recherche* at the French CNRS. He spent 14 years in the French Diplomatic Service, as press and cultural attaché in Tel Aviv, London and New York. After a period in the European television industry, he joined the EC as expert-adviser in Information Society technologies and the digital economy, representing the institution in key international fora and conferences. He moved in 2001 to DG Research and Innovation as Press and Communication Officer, responsible, in particular, for commissioning TV magazines on EU research (e.g. *Futuris* on Euronews) and public engagement in science. In 2011 he became Head of the Japan and Russia Desks, where he organized the 'EU-Russia Year of Science', and was directly involved in the preparation of the S&T chapters of EU-Russia and EU-Japan Summits. He was appointed as adviser to Kobe University Brussels European Centre in 2017, focusing on the development of joint research projects and academic cooperation between Europe and Japan.