The 11th Kobe University Brussels European Centre Symposium

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

20 October 2021

Green Horizons, Sustainable Futures: EU and Japan Research for Climate-Prepared, Resilient Societies

Preface

I am pleased to present this report on the 11th Kobe University Brussels European Centre (KUBEC) Symposium "Green Horizons, Sustainable Futures: EU and Japan Research for Climate-Prepared, Resilient Societies", which was held in a hybrid format, in Brussels and online, on 20 October 2021. KUBEC had held an annual symposium in Brussels for 10 years in a row since its establishment in 2010. Through the events, we had expanded our academic network in Europe and raised the profile of Kobe University and other Japanese universities. However, in 2020, the COVID-19 pandemic hit international academic exchange hard and we had to make a tough decision to postpone the symposium. This 11th symposium was the first major event that KUBEC had been able to hold since the pandemic began, and was also the first to be offered in hybrid format. It was not only an opportunity for fostering our deeper connections with European institutions but also reconfirmed the importance of international academic exchange.

This year marked the fifth time that the symposium was jointly organised with Vrije Universiteit Brussel (VUB), where KUBEC is located. In July 2015 KUBEC relocated to the international office buildings of VUB in order to fulfil its role as a base for international collaboration in education and research between Japan, Belgium, and Europe at large. This symposium is part of our initiative to strengthen collaboration with European partner universities and to further foster joint research between Japan and Europe. This year, the event was also made possible thanks to collaborative assistance from the University of Kent, and we welcomed participants from Japanese and European organisations, both onsite and online, including the Delegation of Japan to the European Union and the European Commission in order to bring in the perspectives of policymakers on the partnership between Japan and Europe.

The theme of the 11th symposium, "Green Horizons, Sustainable Futures: EU and Japan Research for Climate-Prepared, Resilient Societies", focused on the climate issues, one of today's most significant and serious challenges on a global scale. The latest research results were introduced by both Japanese and European researchers in 'Economics' covering a global green economy, 'Natural Sciences' for breakthrough technologies for climate solutions, and 'Social Sciences and Humanities' addressing a resilient and climate-prepared societies. We hope this exchange of knowledge will lead to future collaboration using advanced theories and technology, and we will continue to promote stronger academic and research collaborations between Japan and Europe even in the corona and post-corona eras.

Masato Fujisawa

President
Kobe University

The 11th Kobe University Brussels European Centre Symposium

Green Horizons, Sustainable Futures: EU and Japan Research for Climate-Prepared, Resilient Societies

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Wednesday 20 October 2021
Vrije Universiteit Brussel

Opening — 9:15-10:00

Moderator — **Ken-ichi Yoshida,** Kobe University (Japan)
Opening Addresses — **Prof. Masato Fujisawa,** President, Kobe University (Japan)
Prof. Caroline Pauwels, Rector, Vrije Universiteit Brussel (Belgium)
H.E. Yasushi Masaki, Ambassador of Japan to the European Union (Japan)
Ms. Signe Ratso, Deputy Director General, DG RTD, European Commission (EU)

Keynote speech — 10:00-10:30

Speaker — **Prof. Paulo Ferrão,** Centre for Innovation, Technology and Policy Research, Instituto Superior Técnico, University of Lisbon (Portugal)

Parallel Session 1: 'TOWARDS A GLOBAL GREEN ECONOMY' — 10:30-13:30

Theme 1: The Climate Conundrum: WTO Rules or UN Climate Commitments? — 10:30-11:50
Theme 2: The Perfect Storm: Building Economic Resilience in Overlapping Crises — 12:10-13:30

Parallel Session 2: 'BREAKTHROUGH TECHNOLOGIES FOR CLIMATE SOLUTIONS' — 10:30-13:30

Theme 1: Advances in Climate Science — 10:30-11:25
Theme 2: Key Technologies for a Carbon-neutral Environment — 11:45-13:30

Parallel Session 3: 'ENABLING RESILIENT, CLIMATE-PREPARED SOCIETIES' — 10:30-13:30

Theme 1: Social Impact of Climate Change — 10:30-11:50
Theme 2: Local Adaptation to Global Warming — 12:10-13:30

Policy Keynote — 14:30-14:45

Speaker — **Ms. Elina Bardram,** Director ff, Directorate General for Climate Action, European Commission (EU)

Interactive Workshop and Brokerage Event A — 14:45-16:15

(ECONOMICS) 'VALUING CLIMATE CHANGE AND SUSTAINABILITY'

Interactive Workshop and Brokerage Event B — 14:45-16:15

(NATURAL SCIENCES & TECHNOLOGY)

Interactive Workshop and Brokerage Event C — 14:45-16:15

(SOCIAL SCIENCES & HUMANITIES)

EURAXESS Japan Presentation — 16:15-16:25

Presenter — **Judit Erika Magyar,** EURAXESS Japan (Japan)

Closing — 16:25-16:40

Closing Remarks — **Tamotsu Nakamura,** Executive Vice-President, Kobe University (Japan)
Jeremy Carette, Dean for Europe, University of Kent (UK)
Hugo Thienpont, Vice-Rector, Vrije Universiteit Brussel (Belgium)

Opening Addresses

Prof. Masato Fujisawa

President, Kobe University (Japan)

Distinguished guests, ladies and gentlemen, I would like to extend my heartfelt welcome to the 11th Kobe University Brussels European Centre Symposium, entitled 'Green Horizons, Sustainable Futures: EU and Japan Research for Climate-Prepared, Resilient Societies'.

This symposium had been held for 10 years in a row ever since the establishment of our Brussels Office (KUBEC) in 2010. However, we had to postpone the event last year due to the coronavirus pandemic. Even today, the situation in Japan is still unpredictable and unfortunately we have to participate online from Kobe as the Japanese government has imposed strict travel restrictions. I would like to congratulate our friends in Europe as I have heard that things are pretty much back to normal there. I hope that we will be able to travel from Japan next year. In addition to having a fifth opportunity to jointly organise this event with Vrije Universiteit Brussel (VUB), the University of Kent was also involved this time. I am delighted to see that our network is steadily expanding in spite of these difficult times for international collaboration.

It is a great pleasure and honour to deliver this opening address in the presence of many distinguished guests and familiar friends. Please allow me to express my sincere gratitude, in particular to our honourable guests,

1. His Excellency Ambassador **Yasushi Masaki** (Mission of Japan to the European Union)
   and
2. Ms. **Signe RATSO** (Deputy Director-General, Directorate General for Research and Innovation, European Commission).

I would also like to take this opportunity to express my deepest gratitude to

3. Professor **Caroline PAUWELS** (Rector, VUB),
4. Professor **Romain MEEUSEN** (Vice-Rector, International Relations, VUB),

and the International Relations and Mobility Office of VUB, for their warm support in organising today's symposium in a hybrid format, which is our first attempt at such an event format.

I started my term as president of Kobe University in April this year. I am determined to devote myself to this role so that Kobe University becomes one of the world's leading universities, however, we needed to set sail in the storms of the coronavirus pandemic. The pandemic has made it difficult for students and researchers to interact internationally, and has significantly disrupted international joint education and research projects. However, while we lost a great deal, I believe that we were able to identify problems, new knowledge and new values that emerged from the various restrictions. As we head towards the 120th anniversary of the foundation of Kobe University in 2022, I hope that we will

be able to take advantage of the various achievements we have made over the years to carry out reforms and create a new normal for education and research activities at Kobe University. Needless to say, even in the corona and post-corona periods, the university will continue to conduct basic scientific research that seeks the truth through intellectual activity and creativity, and applied scientific research that works together with the local community to create innovation, while contributing to society by developing human resources through outstanding education. As a university, we must never forget to fulfill our missions in education and research.

Now, the theme of this symposium is adaptation to climate change. Covid-19 and climate change have many things in common. Both of these issues are related to the survival of humankind and are important issues that the international community must work together to address. They also have a significant impact on people's daily lives and economies. Furthermore, reliable scientific knowledge is essential for providing solutions to these issues.

Besides, this is a very timely topic as the Japan-EU Green Alliance was launched at this year's Japan-EU summit, and the United Nations Climate Change Conference, COP26, will be held in Glasgow in 10 days' time. During the former, they shared the view that Japan and the EU would advance cooperation in various fields, including energy transition, innovation and support for developing countries' transition towards decarbonization and would lead the international community by accelerating climate and environmental measures. At COP26, a number of specific actions will be discussed in order to bring the international community together to tackle a range of climate issues, with a focus on reducing greenhouse gas emissions.

And last but not least, the latest news that the 2021 Nobel Prize in physics was awarded to three researchers from Japan and Europe "for groundbreaking contributions to our understanding of complex physical systems". Dr. Syukuro Manabe and Dr. Klaus Hasselmann were jointly awarded for their achievements in "the physical modelling of Earth's climate, quantifying variability and reliably predicting global warming". That this most prestigious prize was presented for research related to climate change provides further indication that is a critical global topic.

Today's symposium will provide in-depth exchanges on the policies and latest research carried out in the EU and Japan in the interconnected fields of climate economics, technological innovations, social sciences and humanities. Whether you are attending online or in person in Brussels, we have tried to structure the event to be enjoyable for all. It is my sincere wish that today will be a meaningful opportunity for academic dialogue between participants from Europe and Japan.

Thank you very much for joining this event today.

Prof. Caroline Pauwels

Rector, Vrije Universiteit Brussel (Belgium)

Good morning Brussels and good afternoon Kobe. I had the pleasure to visit your beautiful university so I am very happy to meet you virtually even though physical moments are better than these ones.

Esteemed ambassador Yasushi Masaki, esteemed president Masato Fujisawa, esteemed deputy director general Signe Ratso, excellencies *yokoso irasshai mashita* (welcome to the event). Also a very warm welcome to the representatives of the University of Kent that joins these really fruitful exchanges.

Dear experts, professors, ladies and gentlemen, it is my honor to speak to you today and my honest pleasure to be able to do so in person at the already 11th Kobe University Brussels European Centre symposium. I think that I expressed the thoughts of many by saying that we are hopeful to approach the end of this challenging era that lasted already for 18 months and that we are gradually leaving behind as it is demonstrated by the hybrid nature of this event. It is very nice to see all of you here in the room today and also on the screen in Kobe, and I am also looking forward to meeting our Kobe colleagues again during the next hopefully physical edition of this symposium although we need to recognize the advantages of the digital era and welcome them as well.

6 years ago, Vrije Universiteit Brussel was honored that Kobe University chose our campus for the location of its European office. It has allowed us to intensify our relationship creating a deeper and better understanding of our two institutions and to strengthen our networks. We look forward to continuing to do so in the coming years.

"Green horizons sustainable futures: EU and Japan research for climate-prepared, resilient societies", that is the title of today's event and an apt one if we look at today's burning issues, aging, pandemics, the current energy crisis, climate only to name but a few. All these topics require a multi-disciplinary approach and they require an international approach. These are not local issues but global ones that need to be tackled on multiple levels all at once. The climate crisis is or at least should be on top of everyone's mind.

The cop 26 conference you already referred to will be held in Glasgow starting at the end of next week until November 12th with catastrophic flooding across the globe, wildfires raging, hunger due to drought and scorching heat waves. We can only hope that our world leaders will heed the words of the youngsters who took the streets of Brussels only last week calling for actions, not mere words nor slogans. It is our youngsters who urge us to act now and they rightly so urge us to do so immediately. We owe it to our children and their children's children to take care of our planet. The responsibility is shared by all of us, each one of us. We must stop the detrimental spiral that we are in and safeguard our next generation's futures. Today's youth is highly engaged. We see it at our universities, in the streets of our cities. Their passion, their determination, their persistence must embolden us to do so,

to do more, to do what is necessary.

Awards have been presented for climate related research and actions. A tree of scientists indeed won the Nobel Prize 2021 for physics for climate research. And just this past Sunday the first Earthshot Awards were set up by the United Kingdom's Prince William. They are awarded to people and countries who have already acted and did make a difference to encourage them to keep on going and inspire others to step up and do more.

As with the pandemic, we must turn to science and follow advice. Science has been telling us again and again that we are on a wrong path. The IPCC report just verified all the hypotheses science is telling us also with path to take going forward. We need research and innovation to speed up our progress towards change. Therefore, events such as this are important. Government officials from the EU are here alongside experts and researchers to discuss and exchange ideas and to hopefully further engage in joint projects. It is also important to use this occasion to place the EU for substantial and continued funding for global challenges like the global warming. But I am very well aware that you are on the right path to do so. And I am very grateful for that. It is true engagement with others that will ensure change.

VUB is a partner in the Utopia network, a European university alliance with now nine members across Europe. Through this partnership, again a very welcome initiative of the European commission, we can be a gateway for Kobe University to strengthen the network within Europe and maybe Kobe university can likewise be our gateway to its network in Asia pacific. Collaboration is a key between educational institutions, between governments, countries, private and public sector, and between generations. We must aim higher and push further. Courage and perseverance are needed. Let's start today by working together so we can ultimately bridge the gap towards acting. Enjoy today's conference and debates.

I thank you. *Domo arigatou gozaimasu* (Thank you very much).

H.E. Yasushi Masaki

Ambassador of Japan to the European Union (Japan)

Prof. Masato FUJISAWA, President of Kobe University,
Prof. Caroline PAUWELS, Rector, Vrije Universiteit Brussel,
Ms. Signe RATSO, Deputy Director-General for Research and Innovation, European Commission,
Distinguished Guests,
Ladies and Gentlemen,
Good morning,
I am delighted to have the opportunity to give my remarks at this opening session.
As you know well, this symposium takes place today in a hybrid format after a 2-year break caused by Covid-19 restrictions. I would like to express my sincere appreciation to all those who made the organisation of this symposium possible.

(Global challenges)

We are currently facing many global challenges. Last year, due to the pandemic, many conferences and events including this symposium were cancelled or postponed. Even now, many around the world are still suffering from COVID-19. We also recognise that climate change is now the biggest challenge facing all living things on Earth including mankind. We saw that advances in vaccine technology made a great impact on combating the coronavirus. We must now mobilise all kinds of knowledge and technologies to tackle such global challenges.
Today's timely symposium will pick up on various areas linked to climate research, from natural sciences to human and social sciences. From the viewpoint of the Japan-EU policy relationship, this global topic covers a lot of our issues of interest.

(Carbon neutral society)

Last April, the Leaders' Summit on Climate was held. The then Japanese Prime Minister attended it and declared that Japan aims to reduce its greenhouse gas emissions, setting an ambitious target which is aligned with the long-term goal of net-zero by 2050. Of course, we are all well aware that the EU aims to achieve climate neutrality by 2050 as well through the "European Green Deal". In order to achieve our ambitious goal, Japan and the EU need advances in knowledge, technology and innovation related to tackling climate change.

(Green Alliance)

On 27 May, at the EU – Japan Summit, Japan and the EU announced their intention to form a "Green Alliance" to accelerate the transition of their economies towards becoming climate-neutral, circular and resource-efficient in the coming decades, and to cooperate in supporting developing countries' transition toward a climate neutral society. In this regard, Japan and the EU affirmed their collaboration in research and development as one of their priority areas.

(Nobel Prize in Physics 2021)

As for climate research, I would like to celebrate here with you this year's Nobel Prize in Physics which was given to one Japanese scientist; Dr. MANABE, one German scientist; Dr. HASSELMANN and one Italian scientist; Dr. PARISI. Their research laid the foundation for forecasts about the future of the planet, and are bases to understand complex Earth climate systems. Now we can discuss our policies to address climate change based on their past scientific contributions. For the future, we will need more excellent international research collaboration to deal with global challenges. It is therefore important to build and maintain good and efficient research networks to be well prepared for future unknown challenges.

(Launch of "Horizon Europe" and "6th STI Basic Plan" of Japan)

This year, in Europe, "Horizon Europe", which is a 7-year European research and innovation framework programme has been launched. In Japan, the 5-year "6th Science, Technology and Innovation Basic Plan" has also started. In both of Japan and the EU, science and innovation frameworks have started at approximately the same time. Moreover, this year also marks the 10th anniversary of the entry into force of the Japan-EU Science and Technology Cooperation Agreement.

On such occasions, Japan and the EU should join forces to enhance our research cooperation by creating synergies between both frameworks. There are various options in front of us. It is important for both of us to pursue practical and substantial collaboration to build, maintain, and strengthen the knowledge and technology ties between us.

(New Japan PM Mr. KISHIDA's policy)

At the beginning of this month, Mr. KISHIDA Fumio took office as the 100th Prime-Minister of Japan. In the past, he has worked as Minister of State for Science and Technology Policy, which was his first time serving as a cabinet member. Later, he also served as Minister for Foreign Affairs for 4 and a half years. In 2015, while he was Minister for Foreign Affairs, he established "the Advisory Board for the Promotion of Science and Technology Diplomacy" and appointed the first Science and Technology Advisor to the Minister for Foreign Affairs.

On 8 October, in his first general policy speech as Prime-Minister at the Diet session, he identified science and technology as the first pillar of his growth strategy. Therefore, the KISHIDA Cabinet is expected to focus on science diplomacy and international science, technology and innovation policy. It should also be noted that, in the same speech, he expressed his intention to formulate a clean energy strategy which would tie global warming mitigation to growth, and his willingness to vigorously promote that strategy for the purpose of achieving carbon neutrality by 2050.

(Closing)

Japan and the EU share global challenges such as climate change. We also share an advanced science and technology capability, as well as common values and principles, such as democracy; the rule of law; human rights; and fundamental freedoms. A common understanding of fundamental principles and values is essential for sharing science, technology, and innovation. This is why we believe that Japan and the EU should be excellent partners in research to the benefit of both Japanese and European citizens.

Ladies and gentlemen,

Let me conclude by wishing the 11th Kobe University Brussels European Centre Symposium a conclusive success in contributing to closer research partnerships between Japan and Europe.

Thank you very much for your attention.

Ms. Signe Ratso

Deputy Director General, DG RTD, European Commission (EU)

Dear Rector Pauwels,
Your Excellency Ambassador Masaki,
Dear President Fujisawa,
Ladies and Gentlemen,

It is my great pleasure to join today's symposium particularly as the theme of this symposium, as you can see, is very topical. This illustrates the shared ambitions, the shared challenges that the EU and Japan have. It is not by chance that the first Green Alliance the EU established last May is with Japan. We share a real concern on the consequences that climate change is imposing on our lives, communities and economies. But commitments will remain nothing but nice words if we, collectively, do not act to take these forward. And therefore today, I am throwing back the question at all of us: how can we turn these commitments into reality? I therefore call for the EU-Japan Green Alliance to become the North star of our cooperation in research and innovation. And I would argue, we can do much more in this respect.

The IPCC report was already mentioned. According to that, by 2030 we need to cut human- induced CO2 emissions by about 45% as well as reach net zero around 2050, if we want to keep the 1.5°C target "alive". Decarbonisation at such speed would be unprecedented in the history of human enterprise, and it is only one side of the coin. This is because even, if we halt all greenhouse gas emissions today, it would still not prevent the climate change impacts already locked in because of past emissions. Recent developments have brutally demonstrated that the climate crisis is no longer a distant and uncertain danger. It has become a daunting reality for all of humankind, here and now. Record droughts, wildfires and floods continue to wreak havoc on communities and destroy livelihoods worldwide. Barely a day passes by without tragic news in the media about increasingly severe extreme weather events – from unprecedented floods in Europe this summer, all say Belgium suffered from that heavily, to the many disastrous typhoons experienced by Japan in the past years. The IPCC warns that the impacts, severity and frequency will worsen and increase with additional warming. The consequences are severe, as the risks extend well beyond physical damages. In fact, climate change is frequently described as a threat multiplier: it exacerbates existing problems and creates new ones.

Faced with this devastating present and future, what should we, the EU and Japan do?

This is where the EU-Japan Green Alliance comes in. Ambassador Masaki already mentioned that we share the same ambition, becoming climate neutral societies by 2050. But we cannot do that without the contribution of research and innovation. Research and development are one of the key priorities for action, and we have the means to take our cooperation to another level. Let the Green Alliance be our guiding star in this. Unfortunately, I don't have a silver bullet on how to achieve this, but I would

like to share with you just three thoughts.

First, we need to get breakthrough technologies into high gear. Research and innovation have a central role to accelerate the necessary transitions, as well as deploying, demonstrating and de-risking solutions. For example, the EU deployed 1 billion EUR for the world's first Green Deal call for research and innovation. There was an overwhelming response from the research community, worth over 8 billion EUR in both the public and the private sectors. 72 proposals were selected for funding, and I would like to take this opportunity to encourage Japanese researchers to participate actively in similar calls in the future.

My second thought, is that beyond technologies, we need to prepare our societies to face the unavoidable – and accelerating - consequences of climate change. Europe is acutely aware of the importance of building this climate resilience, resilient societies as mentioned also in the title. This illustrates the new EU Strategy on Adaptation to Climate Change. It was adopted in February, and sets out how the European Union can become climate resilient by 2050. And research and innovation will play a critical role. For example, the Mission on Adaptation to Climate Change will be a key implementation vector of societal resilience. This mission aims to turn climate adaption into an opportunity to make Europe more resilient, fairer and better prepared to deal with climate disruptions, such as extreme weather, wildfires and infectious diseases. Certainly, we are looking forward to building also international partnerships in order to do so better. You will hear more about another mission later that is the city's mission with objective to have at least 100 climate neutral cities in Europe by 2030.

The third and final thought I want to share with you today, is the how: is the instrument we are using currently for our cooperate sufficient? We will continue partnering with countries such as Japan that have a vibrant research and innovation system. And at the same time, they share fundamental research and innovation values, as also mentioned by Ambassador Masaki, such as academic freedom, gender equality, diversity, research ethics, open science and evidence-based policy-making. We have been collaborating in projects addressing climate issues already under Horizon 2020, such as, for example, on advanced biofuels and alternative renewable fuels.

I would also like to mention a very successful example of cooperation in technologies aimed at developing societal resilience. As part of the Horizon 2020 "Technologies for first responders" call, the CURSOR project worked on a life-detecting robot for rescue purposes. And this project is a true "success story". Three Japanese researchers of the CURSOR consortium recently received the Best Research Technology Award of the Robotics Society of Japan for their innovative robots which can climb over and under obstacles to find victims in disaster zones. This remarkable accomplishment was announced at the Annual Conference of the Robotics Society of Japan last month. There have been references made to the latest Nobel Prize on physics. Just also to mention European researchers like this and also before, Nobel Prize winners have also benefited from the European Research Council which is also a part of our programme.

However, given the size of the challenges provoked by climate change, will this suffice? I think more of the same will not do it. This is the time to give ourselves the means to implement the research and innovation strand of this EU-Japan Green alliance.

Horizon Europe, the EU Framework Programme for research and innovation, will be a key platform for collaboration to contribute to these efforts: at least 35% of its budget is dedicated to climate-related research and innovation. This is why the Letter of Intent signed by Commissioner Mariya Gabriel and Minister Takemoto is important as it flags strategic areas to focus our cooperation on, such as the Mission focusing on Climate-neutral and smart cities. And to use fully this potential, I think "association to Horizon Europe" would be the most useful instrument. This special status under Horizon Europe grants many advantages to our key international partners. It is a multiplier of efficiency in research and innovation cooperation.For Japanese researchers, it means your project, if successful, would obtain automatic funding from the Horizon Europe programme. It also means that no additional administrative or financial arrangements are needed for participation. It also grants access to a unique network of researchers and innovators in our 25 member states, as well as all other associated countries. We started a conversation with our Japanese partners on the way association works. This enables us to explain how international cooperation is central to Horizon Europe. This also enables us to understand how Japan sees its partnership with the EU, and the role research and innovation plays in it.

Ladies and Gentlemen, 10 days now separate us from the start of COP26 in Glasgow. Research and innovation will be critical for building climate-resilient societies and for preparing for what science tells us is unavoidable. The transition to a climate-neutral and resilient society is both a challenging task and an opportunity to build a better and safer future for all. A major investment in research and innovation to enable the huge transitions at stake and to bring about the necessary knowledge and solutions is needed. At the same time, the EU is acutely aware that we cannot tackle these challenges alone. In fact, no country, no region, can. Our cooperation with Japan is therefore essential. Yet, it is not for the COP to look at how the research and innovation actions of the EU-Japan Green Alliance are implemented. This is for us and now.

Thank you.

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.

Parallel Session 1 10:30-13:30

TOWARDS A GLOBAL GREEN ECONOMY

Theme1: The Climate Conundrum: WTO Rules or UN Climate Commitments?

Theme2: The Perfect Storm: Building Economic Resilience in Overlapping Crises

Interactive Workshop and Brokerage Event A 14:45-16:15

(ECONOMICS)

Session 1: Towards a Green Economy

Parallel Session 1 of the Kobe-VUB Symposium focused on the economic aspects of a sustainable future. Economists, political scientists, legal scholars, public sector experts, and business people participated in the session, discussing the topic from various angles. Part 1 of the session was held on the theme of "The Climate Conundrum: WTO Rules or UN Climate Commitments?" Firstly, Bernard Siman, O.B.E. (Vrije Universiteit Brussel and Egmont Institute) gave a speech on global opportunities for bridging the gap between climate and WTO commitments. He pointed out that COVID-19 and climate change are the biggest challenges facing the global economy. This was followed by a presentation from Prof. Kenji Takeuchi (Kobe University) who explained his recent work on the impact of climate disasters on global trade. His results suggest that natural disasters have a negative and persistent impact, although this can be mitigated by enhancing adaptation readiness. Next, Mr. Kevin Verbelen (AGORIA and Brussels Diplomatic Academy) talked about the Carbon Border Adjustment Measure (CBAM) from a business perspective.

The theme for Part 2 of Session 1 was "The Perfect Storm: Building Economic Resilience in Overlapping Crises." Prof. Johan Eyckmans (KU Leuven) introduced his recent exploration into the distributional effects of climate change damage channels and mitigation policies, using an integrated assessment model. Prof. Sebastian Obertür (Vrije Universiteit Brussel) then provided an interesting take on the COVID-19 crisis. According to his research, this crisis might be a critical juncture for EU Climate policy development. Prof. Hiroaki Sakamoto (Kobe University) also gave a nice summary of the concept of carbon pricing and introduced his recent attempt to consider the nonlinearity of the integrated assessment model.

In the afternoon, a workshop was held on "Valuing Climate Change and Sustainability". Four speakers presented their recent works on sustainable consumption and investment. Prof. Adelina Gschwandtner (University of Kent) used the hedonic pricing method to estimate consumers' willingness to pay for organic chicken and found that there is a substantial price premium for sustainable food. Prof. Gunnar Gutsche (University of Kassel) examined individual preferences for sustainable investments across Europe by using a framed field experiment. Next, Prof. Kayo Murakami (Kobe University) investigated the heterogeneity of weighting to mitigate global environmental damages among G20 countries. Finally, Prof. Miwa Nakai (Fukui Prefectural University) reported the results of her recent study based on surveys conducted in Japan and Germany, which looked into the effect that information about environmental benefits has on people's preferences for dynamic electricity tariffs. The session gave all presenters a valuable opportunity to inspire each other and develop their research networks.

Parallel Session 1

Theme 1: The Climate Conundrum: WTO Rules or UN Climate Commitments?

Kenji Takeuchi
Graduate School of Economics, Kobe University (Japan)

Moderator

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 WTOC and COP 2021.

Kenji Takeuchi

Moderator

Graduate School of Economics, Kobe University (Japan)

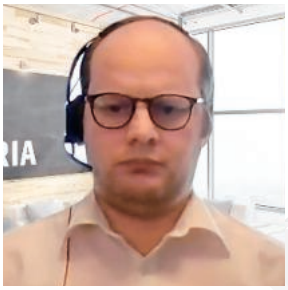
Kenji Takeuchi is a professor of economics. His research focuses on environmental and resource economics. Kenji received his Ph.D. in economics from Kyoto University in 1997 and joined Kobe University in 2001.

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% forexporting 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 CO2-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 polices (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

Bernard Siman, O.B.E
Brussels Diplomatic Academy, Vrije Universiteit Brussel (Belgium)

Moderator

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.

Interactive Workshop and Brokerage Event A

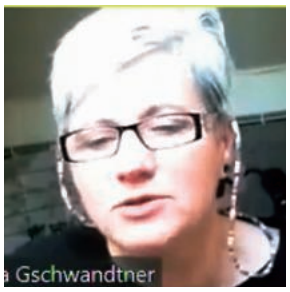
ECONOMICS 'VALUING CLIMATE CHANGE AND SUSTAINABILITY'

Kenji Takeuchi
Graduate School of Economics, Kobe University (Japan)

Moderator

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.

Parallel Session 2 10:30-13:30

BREAKTHROUGH TECHNOLOGIES FOR CLIMATE SOLUTIONS

Theme1: Advances in Climate Science
Theme2: Key Technologies for a Carbon-neutral Environment

Interactive Workshop and Brokerage Event B 14:45-16:15

(NATURAL SCIENCES & TECHNOLOGY)

Session 2: Breakthrough technologies for climate solutions

It is becoming clear from various observations and simulations that the greenhouse effect caused by the increased concentration of carbon dioxide in the atmosphere is leading to global warming and significant climate change. The many natural disasters and changes in the living environment caused by this climate change are not just a problem in meteorology, but also in engineering fields related to human life, such as architecture and civil engineering. These are also issues for material science engineering, as it is necessary to develop new energy sources and energy storage technologies to replace the CO_2 emitting fossil fuels that cause global warming. One of the most significant discoveries in this field is that of "hidden patterns in the climate", which was awarded the 2021 Nobel Prize in Physics "for groundbreaking contributions to our understanding of complex physical systems". This means that a fundamental physics proposal on climate change has predicted the challenges that will arise in the humanities and social sciences. Solving these challenges is proving to be crucial for maintaining a livable environment for humanity.
At present, these issues are being thoroughly studied in each field, with participating universities and institutions conducting active research in this area.
Session 2 consisted of three subjects relating to breakthrough technologies for climate solutions.

Advances in Climate Science

The lectures were given by many speakers from varied backgrounds in industry, government, and academia, including those from Kobe University, Vrije Universiteit Brussel, and its partner universities (Kent University, Kiel University, ParisTech), RIKEN, AIST, and Toyota Motor Europe.
Professor Yoshiyuki Kajikawa of RIKEN and Kobe University presented "Challenge to the New Generation Computational Climate Science Research" and explained the history of climate models. He 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. Dr Giridharan Renganathan of Kent University introduced his research on "Urban climate– Field experiment and modelling studies on urban heat island to urban Albedo". This paper discusses the problem in expanding urban climate concepts (represented by the heat island effect) to the impact of the climate on an entire city, using Albedo as a model. He reported the results of his empirical study, arguing that monitoring and validation under actual physical conditions can be difficult due to resource, time, and physical constraints, and that scaled-up experimental models are important in such situations. Professor Miriam Pfeiffer of Kiel University presented "Climate Past and Present: Corals as Monitors of Past and Current Tropical Climate Variability". Here she introduced the German Research Foundation's SPP2299 research theme: "Tropical climate variability and coral reefs," which aims to improve predictions relating to tropical climate and coral reef ecosystems by combining proxy data, advanced statistical methods, and Earth system modeling.

Key Technologies for a Carbon-neutral Environment

Professor Takashi Kita of Kobe University gave a presentation on "Industry-government-academia collaborations for SDGs" and introduced the activities of Kobe University's SDGs Promotion Office. He argued that establishing open interaction enables SDG-related idea sharing and smooth implementation of outcomes.
Professor Michel Cassir of ParisTech and Professor Minoru Mizuhata of Kobe University gave presentations on CO_2 capture and valorisation using molten carbonate-based electrolytes with either moderate amounts of hydroxide or lithium orthosilicate as additives. Dr Noriko Shisa of Toyota Motor Europe (TME) spoke about "Sustainable Mobility - Towards Carbon Neutrality". She introduced the TME's future plans and developments. She explained that TME is particularly focused on SDG No.13 – Climate Action. Toyota supports the Paris Agreement, and will continue its endeavors towards achieving carbon neutrality by 2050. Professor Maitane Berecibar of Vrije Universiteit Brussel presented "The Batteries of the Future". The market for batteries, which play an important role as energy storage devices, is rapidly expanding and this is particularly the case for lithium-ion batteries. This presentation provided an overview of the issues related to battery development, especially energy density and lifetime, as well as research issues related to their integration with peripheral devices.

R&D on Energy Storage and Power Electronics

This session was followed by an introduction to carbon neutral technology-related research projects. Professor Hiroshi Suzuki of Kobe University presented "Silica Hard-Shell Microcapsules Containing Phase Change Material", which have been developed so that they can be applied to latent heat transportation systems. Professor Kentaro Kuratani of AIST presented topical R&D issues concerning battery technologies, in particular the active materials for next-generation batteries. Finally, Professor Marco Liserre presented "New technologies and materials as driver of tomorrow's power electronics". He gave an overview of current and emerging technologies at the component level. It covered magnetics, active components, integration & packaging technologies, and electric energy storage systems, showing how materials under development are expected to boost current state-of-the art electronics.

Parallel Session 2

Theme 1: Advances in Climate Science

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

Moderator

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)

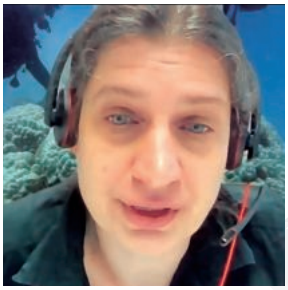
D. Giridharan Renganathan is a senior lecturer and Director of Centre for Architecture and Sustainable Environment at the University of Kent. His research focus is on Urban Morphology and Climatology (environmental design), with specific interest in Urban Heat Island effect and indoor overheating. He 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 20th 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

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

Moderator

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-Plank 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_2 Capture and Valorisation in Molten Carbonate-based electrolytes

CO2 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 CO2 and, furthermore, to reduce it into valuable fuels such as CO, CH4 and C. This presentation gives a general overview of the high temperature applications of such electroclytes, 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 CO2 molecules. Precisely determining the solubility of CO2 in various molten carbonate eutectics is crucial for the development of electrolysis and carbon capture systems and for the mechanistic understanding of CO2 behavior in such media. Reliable CO2 solubility values were obtained by a manometric set-up in carbonate eutectic mixtures, obtaining in the best case a solubility of 10-1 mol.atm.L-1 at 650°C. Another notable trend is that CO2 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+H2 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-Plank 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_2 Separation and Absorption: Research Breakthroughs

Reducing the concentration of CO2 in the atmosphere and curbing global warming is a common challenge for all mankind. It is necessary not only to reduce CO2 emissions, which are the main cause of global warming, but also to construct a system that captures CO2, generates energy from it, and circulates it. For CO2 recovery in places with high CO2 concentration, such as large-scale factories, it is necessary to increase the efficiency of high-temperature-operating CO2 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 (Li4SiO4) is a ceramic CO2 absorbent with a large absorptive capacity (36.7 wt.%) and heat resistance properties. Li4SiO4 has applications as a separator in molten carbonate fuel cells, and as a direct CO2 absorbent for large-scale emission sources such as thermal power stations. The absorption and desorption reaction equilibrium temperature of Li4SiO4 is around 993 K. This study investigates the CO2 absorption behavior of Li4SiO4 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 CO2 absorption processes: chemisorption on the Li4SiO4 surface at temperatures below 773 K; and bulk diffusion at temperatures above 773 K. Isothermal analysis indicated that ball milling and the addition of K2CO3 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 onEuropean 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 is 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.

Interactive Workshop and Brokerage Event B

NATURAL SCIENCES & TECHNOLOGY

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

Session leader

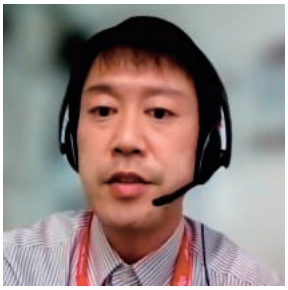
Hiroshi Suzuki

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 Mittelmann 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.

Parallel Session 3 10:30-13:30

ENABLING RESILIENT, CLIMATE-PREPARED SOCIETIES

Theme1: Social Impact of Climate Change
Theme2: Local Adaptation to Global Warming

Interactive Workshop and Brokerage Event C 14:45-16:15

(SOCIAL SCIENCES & HUMANITIES)

Session 3: Enabling resilient, climate-prepared societies

Session 3 of this symposium, entitled 'Enabling resilient, climate-prepared societies', brought together researchers mainly from the social sciences and humanities to discuss various perspectives.

The session was divided into two parts, the first of which was devoted to presentations and discussions on the common theme of 'Social impacts of climate change'. Firstly, Mr. Karel Deneckere (VUB) analysed the impact of the Fukushima nuclear accident on public opinion and attitudes in Belgium. Next, Mr. Kazuhiro Ota (Kobe University) introduced a case study on the impact of climate change on poverty and migration in the Philippines, and discussed the importance and limitations of SDGs. At the end of the first half, Mr. Ginga Tamura (NHK) raised the issue of the media's role in tackling climate change, particularly in the context of the EU and Japan. Finally, Michel Claessens (European Commission and ULB) discussed the efforts and response of scientists to the global crisis of climate change. Thus, the first half of the session gave various stakeholders (such as citizens, scientists and members of the media) the opportunity to actively exchange opinions and discuss how to confront climate change.

The second half of the session, which was held on the general theme of community adaptation to global warming, began with Koen Borghys (VUB) introducing empirical examples of local responses to the SDGs in Brussels. Then Ms. Carina Veeckman (VUB) presented the results of an ongoing research project on forward-thinking citizen science involvement in environmental monitoring and reporting. Next, Mieko Kiyono (Kobe University) presented the results of a Japanese case study on community resilience in response to climate change-related natural disasters. Finally, Marialena Nikolopoulou (University of Kent) discussed the adaptation of cities in the face of global warming and the importance of urban planning. In the second half of the session, presentations were given on both urban and suburban adaptation to global warming, and opinions were exchanged on future adaptation measures.

In the afternoon of the session, the potential of educational programs for a wide range of people and the direction of future collaborative research were explored. First, Mr. Koji Matsuoka (Kobe University) introduced the ESD (Education for Sustainable Development) programme being developed at Kobe University, and discussed the importance of activities for the practical realization of sustainable development, including various environmental and social topics such as climate change. This was followed by a lively exchange of views on the status of relevant educational programmes in Europe and their development. As a continuation of the morning's discussions, the potential for the development of citizen science and its interaction with other related projects was explored. Participants discussed the search for potential collaborators, and future joint research projects.

The interconnectedness of the presentations provided a very useful forum for the exchange of information and confirmed the existence of research projects with potential synergies. It also provided insights into what Japan and the EU can do to address the major global issue of climate change.

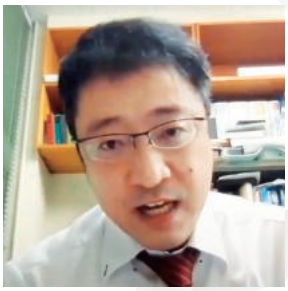
Parallel Session 3

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 counties 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.

Role of Mass-media to tackle climate change and its difference between Europe and Japan

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 Substainable 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 Sklodowska-Curie Industrial Doctorate 'Solutions for Outdoor Climate Adaptation' and Editor of the International Journal 'Building and Environment'.

Thermal comfort as a commodity; what does thermal resilience mean

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.

Interactive Workshop and Brokerage Event C

SOCIAL SCIENCES AND HUMANITIES

Leo Van Audenhove
Vrije Universiteit Brussel (Belgium)

Session leader

Patrick Vittet-Philippe

Session leader

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.

Policy Keynote

Ms. Elina Bardram

Director ff, Directorate General for Climate Action,
European Commission (EU)

It's a great pleasure to be with you and share some thoughts about the relevance and the significance of the EU-Japan Green Alliance in the context of prompting momentum at a global level ahead of COP 26 that will take place in Glasgow in less than 10 days.

I would like to begin by putting the recent intensification in the EU's bilateral relations with Japan into the global context. Urgent action has hardly ever been as necessary as today. The Intergovernmental Panel on Climate Change (IPCC) confirmed in its 6th report that the world is warming rapidly due to human influence and underlined yet again the need for urgent action. Action needs to be scaled up and made more comprehensive. The report set out the need to reduce CO2 emissions to net zero, and scale up action to protect our natural carbon sinks.

Ahead of the COP26, all countries, and in particular all major economies need to demonstrate enhanced ambition of the Paris Agreement commitments. The EU-Japan Green Alliance by 2050 has been already communicated by all the G7 countries and several other economies. The transition is picking up speed but there are very important economies that are yet to make their intentions known, including China and India. We are very much aware in the EU that to reach the Paris goals globally, we cannot act alone. We must motivate all countries to join a global race to carbon neutrality – and join forces with those partners that embarked on similar pathways to climate neutrality by mid-century and enhanced 2030 ambition.

The EU and Japan are ideally positioned to be in the first row of this 'ambition coalition' - which also means reaping first mover advantages and as major economies, EU and Japan have particular responsibility to demonstrate progress on the implementation of our climate objectives under the Paris Agreement. This transition should leave no citizens behind because without the public support governments can only go so far.

The EU has been working closely with Japan for many years, with Strategic Partnership Agreement and Economic Partnership Agreement as key tools framing our cooperation, but our recent Green Alliance opens a full spectrum of areas where closer cooperation between the EU and Japan will be beneficial, both to reinforce our partnership but also to set the tone for the rest of the world and share our experiences in terms of policies, economics and technologies with those that have less capacity to embark on this transition. Both the EU and Japan are stepping up their domestic efforts on climate and green transition across the board, developing and implementing policies to achieve their 2050 target, and enhance the 2030 ambition. We continue to look at policies even outside of the United Nations Framework Convention on Climate Change (UNFCCC) because it makes economic sense. - Dealing with CO2 emissions is cheaper than dealing with the negative consequences of climate

change. Climate change is not only the business of environmentalists but also budget makers, urban planners, agriculture and forestry. There is no sector of the economy that cannot be involved in overall efforts.

The EU Green Deal is our EU roadmap towards climate neutrality by 2050 and the EUs new growth strategy. The European Climate Law adopted in June enshrines into law the goal set out in the European Green Deal – for Europe's economy and society to become climate neutral by 2050. The European Climate Law also sets the new net greenhouse gas emissions reduction target of at least -55% by 2030, compared to 1990 levels. With the EU Climate Law and the package of legislative proposals presented in July 2021 'Fit for 55 package', the EU is taking decisive and bold action towards climate neutrality by 2050.

The Green Alliances between the EU and Japan is still in its infancy so we need to see how we operationalize that. It is important that we have the necessary platforms to bring policy makers, civil society and businesses together to accelerate the cooperation. We also expect that the major policy updates on both sides needed to align previous sectoral policies with the more ambitious 2030 target will be forthcoming in a very frequent sequence. The EU and Japan are making serious efforts to combat climate change and are also contributors to climate finance that delivers on the global solidarity and the goals that have been committed to in the context of the UNFCCC agreement.

As such, we have a strong interest for the EU and Japan to join forces in the context of our external efforts and action on climate change, including through joint projects and initiatives that would help accelerate transition in third countries. One of the areas we definitely want to look at is the cooperation with other Asian and African countries as well as the pacific.

We are looking forward to the COP26 and moving ahead with the finalization of the outstanding negotiation items such as article 6 on carbon markets, enhanced transparency framework and enhancing or kicking off the discussions on the post-2025 goal. But it is clear that the COP26, as any other COP, is not going to deliver alone. It is not the international climate conference that delivers the safety zone but the action that takes place in the countries, - action driven by the governments assuming responsibility and assuring their citizen that someone has control and responsibility of where we will find ourselves in 10, 20 and 30 years time when I hope we will be living in a net zero global economy that's safer for all of us.

To conclude the Green Alliance is an important step forward in our bilateral cooperation and we also hope it to be a model for the EU's engagement with like-minded partners that have assumed equivalent level of ambition and determination and remains committed to making that work not just in the bilateral context but also as an inspiration for the broader global community.

Thank you.

Closing Remarks

Tamotsu Nakamura

Executive Vice-President, Kobe University (Japan)

Distinguished guests, distinguished scholars, colleagues, ladies and gentlemen;

It was a great pleasure for me to join you at this symposium today.
On behalf of Kobe University, I would like to express my sincere gratitude for your support and participation in this event. It was the first time that we have held this symposium in a hybrid format. I really appreciate every single effort done by the staff there in Brussels and here in Kobe. Although there may have been some technical problems, I believe everyone was able to fully participate in and enjoy this event. In addition, I would particularly like to thank online participants for staying until the end, considering how late it is in Japan.

I am quite sure that the excellent presentations and active discussions that took place in each session and workshop. I strongly hope that they will serve as a stepping stone to future exchanges and collaborations. Today's symposium has been an opportunity to hear about various fascinating research projects and I believe that this has inspired many of you. However, funding is very important for developing joint research. Tomorrow's follow-up workshop is designed to complement today's symposium by introducing framework programmes that European and Japanese researchers can utilize. Our office of Research and Management will host the event with VUB as well as other Japanese universities. I very much hope that you will also take part in tomorrow's event.

Kobe University's long-term vision is to further advance and develop as a "global hub for the multidisciplinary co-creation of research and education that cultivates profound knowledge and outstanding innovators". Since April, we have been cultivating a diverse and inclusive environment under President Fujisawa and the new administration. Promoting international partnerships with other organisations is indispensable in order for us to realise this great vision. We are determined to strengthen our collaborative relationships with the VUB and other European partners who have kindly supported our activities and increased our presence in Europe. I am very grateful for your continued warm support and I'm looking forward to working with you more closely.

I'd like to thank you all once again for participating in today's symposium. Hopefully it will be possible to see all of you in person next year.

Thank you very much.

Jeremy Carette

Dean for Europe, University of Kent (UK)

Honorable guests, distinguished delegates, colleagues,
My name is professor Jeremy Carrette. I'm the dean for Europe at the university of Kent. The university has been delighted to support the 11th annual joint symposium organized by our close partners, Kobe University and the VUB. I'd like to thank all of those who have made this event possible today.

Climate change can only be tackled in a cross-disciplinary way. Collaboration is at the heart of our challenge to address these issues and our strength against the magnitude of the challenge is working together. Today we've heard from experts from across the humanities, social science, and hard sciences drivers of action through their commitment to research. Symposiums such as today's event are vital in presenting solutions and promoting a cross-pollination of ideas and demonstrating that there is hope in the action we take together. Universities have a crucial role in forming and driving up the partnerships and making research have the impact in the world through its engagements with business, industry, governments and ensuring that higher education offers its insights into the solutions.

Kent recognizes how important our European and global connections are. Witnessed by our presence in Brussels, we have our Brussels School of International Studies which has been here for over 20 years, part of our international commitment and part of our development of the relationships for research and teaching. At a regional level, Kent leads on the climate and emergency strand of the inter-regional internationalization initiative, the 3i University Network comprising of four universities in the transmanche, English channel, and north sea area newly created to intensify collaboration opportunities and utilize the combined strengths of research academic and professional training administration and infrastructure to find solutions to common problems and challenges in this region.

Reflecting on our links with Kobe and VUB, we have been privileged to work with these institutions for many years through our exchange and research collaborations as neighbours in Brussels. With our shared values, a belief in the strength of working together for the common good the power of education and the extricable connection between research and the hope for the future. We are proud to be your partner. On behalf of the university of Kent, I would like to thank Kobe Brussels center and the VUB for inviting us to be part of this event. The connections made here today will make a difference in the future. Success in tackling climate change and the common challenges that face the world to today are only achieved by working together. And I look forward to future collaborations in addressing climate change and making our planet a safer place.

Thank you.

Hugo Thienpont

Vice-Rector, Vrije Universiteit Brussel (Belgium)

Mr. Ambassado
Excellencies
Dear colleagues
Ladies and gentlemen

It's an honor for me as Vice Rector of innovation and industry relations of the Vrije Universiteit Brussel to close this 11th Kobe University Brussels European Center symposium. I am indeed the last speaker who is standing between you and the networking reception and the long-awaited sake testing.

My colleagues, the Executive Vice President professor Tamotsu Nakamura from Kobe university and the Dean for Europe of university Kent professor Jeremy Carrette have already given a clear summary of what the symposium on green horizons and sustainable futures has brought forward, namely that it is absolutely necessary and urgent to jointly create a global green economy to develop breakthrough technologies for climate solutions and to enable resilient climate prepared societies. The key message which is also my key message for today is that we need to do this together and in an interdisciplinary, multidisciplinary and cross-disciplinary manner. We need to join forces internationally to overcome the earth threatening issues that have been and are continuously being created on a daily basis still now. So it is only by teaming up and by nurturing and facilitating collaborations between our best researchers, scientists, engineers, and decision makers that we will be able to turn the tide to regain a green horizon for mother earth and to create a sustainable future for the generations to come.

And on behalf of the Vrije Universiteit Brussel I would like to thank the organizers of this symposium and in particular our Kobe and Kent colleagues for their great and professional work as well as the joint producers for setting up this great programme. A big word of thanks also goes to all the keynote speakers of today who gave inspiring and motivating talks to all the panel moderators and panel members for their lively discussions and for the new insights they gave us and, of course, to all of the attendees of this symposium who stayed with us until this very late hour certainly from the point of view of our Japanese colleagues.

I am convinced that this symposium will inspire all of us to keep going and to relentlessly pursue a greener and a sustainable future. The joint efforts of Japan and Europe can most certainly provide a major contribution to this beautiful objective and let us, therefore, continue to join forces to exchange researchers, share ideas, share results, and jointly develop novel technologies for the better world to come.

The best and the fastest way to turn my wishes into reality is to start making plans in the upcoming network reception and seal your intentions with a fantastic drink. I, therefore, invite you now to the

networking reception and the sake tasting. I sincerely hope that we can all meet in 2022 during a live meeting again.

Arigatou gozaimasu. Thank you all.

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