

The 12th Kobe University Brussels European Centre Symposium

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

18 October 2022

Blue Economy, Green Horizons: EU-Japan Research for Healthy, Sustainable Seas and Oceans



Preface

I am pleased to present this report on the 12th Kobe University Brussels European Centre (KUBEC) Symposium “Blue Economy, Green Horizons: EU-Japan Research for Healthy, Sustainable Seas and Oceans”, which was held in Brussels on 18 October 2022. KUBEC has been holding an annual symposium in Brussels since its establishment in 2010. Through these events, we have expanded our academic network in Europe and raised the profile of Kobe University and other Japanese universities. Last year’s 11th symposium was the first major event that KUBEC held in a hybrid format, and it reconfirmed the importance of international academic exchange. This 12th symposium was a return to an in-person event for the first time in 3 years, bringing home the importance of face-to-face conversation in building valuable connections between people.

This year marked the sixth occasion that the symposium was jointly organised with Vrije Universiteit Brussel (VUB), where KUBEC is located. In July 2015, KUBEC relocated to VUB’s international offices in order to better fulfil its role as a base for international collaboration in education and research between Japan, Belgium, and Europe as a whole. Last year and this year’s symposiums were made possible thanks to assistance from the University of Kent as well.

The symposium is a key part of our initiative to strengthen collaboration with European partner universities and to foster further joint research between Japan and Europe. We welcomed participants from Japanese and European organisations (including the Delegation of the European Union to Japan and the European Commission), in order to gain policymakers’ perspectives on the partnership between Japan and Europe.

The theme of the 12th symposium, “Blue Economy, Green Horizons: EU-Japan Research for Healthy, Sustainable Seas and Oceans”, focused on the ocean, and the importance of considering how humankind can sustainably coexist with this vital part of our planet. The latest research results were introduced by both Japanese and European researchers in ‘Economics’, which covered global trade flows, environmental issues and governance of the seas; ‘Natural Sciences’, which looked at new technologies for new horizons, and ‘Social Sciences and Humanities’, which addressed how to build awareness and engage communities. We hope this extensive knowledge exchange will lead to future collaborations relating to advanced theories and technologies, and we will continue to promote stronger Japan-EU academic and research collaborations in the post-pandemic world.

FUJISAWA Masato

President
Kobe University



The 12th Kobe University Brussels European Centre Symposium

Blue Economy, Green Horizons: EU-Japan Research for Healthy, Sustainable Seas and Oceans

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Tuesday 18 October 2022
Vrije Universiteit Brussel

Opening Addresses

Ken-ichi Yoshida, Kobe University (Japan) – Moderator
Prof. Masato Fujisawa, President, Kobe University (Japan)
Prof. Jan Danckaert, Rector, Vrije Universiteit Brussel (Belgium)
H.E. Yasushi Masaki, Ambassador of Japan to the European Union (Japan)
Ms. Signe Ratso, Director-General (Acting), DG RTD, European Commission (EU)

Keynote speech

Mr. Michael Pitiot, Writer and filmmaker (France)

Parallel Session 1: 'BLUE ECONOMY': GLOBAL TRADE FLOWS, ENVIRONMENTAL ISSUES, AND GOVERNANCE OF THE SEAS

Theme 1: Sustainable Blue Economy: New Resources,
Innovative Solutions for Global Economic Recovery
Theme 2: Shaping International Ocean Governance for the Future

Parallel Session 2: OCEANS OF THE FUTURE: ADVANCES IN MARINE AND MARITIME SCIENCES: TECHNOLOGIES FOR NEW HORIZONS

Theme 1: Harnessing the Power of Oceans: Fostering Innovation for Energy Sustainability
Theme 2: Addressing Marine Pollution, Restoring Marine Ecosystems

Parallel Session 3: SEAS, SCIENCE AND SOCIETIES: BUILDING AWARENESS, ENGAGING COMMUNITIES.

Theme 1: Science and Society: A Holistic Approach for Healthy Oceans
Theme 2: Oceans Bridges: Building Ocean Awareness and Literacy, Engaging Communities

EURAXESS Japan Presentation

Interactive Workshop and Brokerage Event A

(Economics) Sustainable Green Economy – 'Lawfare' and Governance of the Seas

Interactive Workshop and Brokerage Event B

(Natural Sciences & Technology) Towards Green Energy and Green Hydrogen

Interactive Workshop and Brokerage Event C

(Social Sciences & Humanities) Ocean Awareness: the Role of Communities and The Media

Closing Policy Keynote

Mr. Pascal Lamy, Chairman of the Board, Mission *Restoring our Ocean and Waters by 2030* (EU)

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, welcome to the 12th Kobe University Brussels European Centre Symposium, entitled 'Blue Economy, Green Horizons: EU-Japan Research for Healthy, Sustainable Seas and Oceans'.

This Symposium has been held since the establishment of our Brussels Office in 2010 and has become a tradition of Kobe University. It has contributed towards enhancing our presence in Europe, promoting international joint research, and discovering new partner institutions. We were forced to cancel it in 2020, then last year all Japanese speakers had to participate online as the Japanese government still imposed strict travel restrictions. However, this year we could finally send a delegation from Kobe again. Face to face communication is very important for building networks between researchers. I am delighted that we can hold an in-person event in Brussels again, combined with the new hybrid style for some online speakers.

Unfortunately, I cannot attend in person this year due to unavoidable commitments. However, I am confident that this year's symposium will be a great success. As in previous years, this event was jointly organized with the Vrije Universiteit Brussel (VUB). In addition, we have also received support from the University of Kent. I am grateful to these two universities for working closely with us.

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

- His Excellency Ambassador **Yasushi Masaki**, Mission of Japan to the European Union and
- Ms. **Signe RATSO**, Director-General, DG Research and Innovation, European Commission.

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

- Professor **Jan DANCKAERT**, Rector, VUB,
 - Professor **Karin VANDERKERKEN**, Vice - Rector, Internationalisation, VUB,
- and the International Relations and Mobility Office of the VUB, for their warm support in organising today's symposium together.

Speaking of the VUB, I was saddened to hear that the former rector Professor Pauwels passed away in August. She was a good friend of Kobe University for a long time and dedicated herself to the VUB's development. Although we did not get the opportunity to talk directly, the congratulatory video message she sent on the occasion of our 120th anniversary is a good memory that we share.

On behalf of Kobe University, I want to pray for her soul to rest in peace and express our condolences to the people of the VUB.

I hope that our cooperation will be further strengthened during rector Dankaert's new administration at the VUB. I believe that substantial collaboration such as a joint educational programme can work as a key to establish an even stronger partnership.

It is Kobe University's 120th anniversary this year. Our 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'. I am determined to devote myself as President to reforming all aspects of the university, education, research, administration, and our contribution to society so that Kobe University becomes one of the world's leading universities. I sincerely appreciate your kind guidance, continued support, and encouragement.

Now, the theme of this symposium is the Ocean. The ocean is very important for Europe, as shown by the fact that it is one of the 5 missions of Horizon Europe. As a port city, Kobe also has strong links to the Ocean and Sea. Since the opening of Japan to the outside world in 1854, it has developed into a bridge between Japan and other countries. At Kobe University, there is the Graduate School of Maritime Sciences, the Faculty of Oceanology, which was reformed just last year, as well as some ocean-related research centres. We are conducting various ocean-related research projects and providing education to future generations of talented experts and global maritime leaders. We are one of only two Japanese national universities that educates and trains seafarers. In addition, our new training ship, the Kaijin maru, was built this year. Therefore, Kobe University can be a strong Ocean-related partner for Europe.

Today's symposium will provide in-depth exchanges on the policies and latest research carried out in Europe and Japan in the interconnected fields of ocean economics, technological innovations, social sciences and humanities. I hope that today will provide a meaningful opportunity for academic dialogue between participants from Europe and Japan.

Thank you very much for participating in this event.



Prof. Jan Danckaert

Rector, Vrije Universiteit Brussel (Belgium)

Your Excellency,
Dear colleagues,
Ladies and gentlemen,

It is my honour to welcome you today to the Vrije Universiteit Brussel's main campus, and at the 12th Kobe University Brussels European Centre Symposium.

"Blue Economy, Green Horizons: EU-Japan Research for Healthy, Sustainable Seas and Oceans", is the title of our event. And an apt one looking at today's burning issues: climate change, preserving nature, protecting our planet, but also economic recovery, the energy crisis. These are topics which require a multidisciplinary approach, and an international one. They are global issues that require to be handled on multiple levels, by a wide range of actors. It requires working together, and learning from one another.

Our oceans and seas give us life. We rely on them for food, livelihoods, combating the adverse effects of climate change, leisure, for transportation, for power generation, for our economies, for travel. Alongside our forests, they are the lungs of our planet, given that up to 80% of our world's oxygen comes from the ocean.

When we talk about our oceans and seas, we are not just talking about climate change. We all know how our oceans influence our climate and weather, but they directly and indirectly affect how we live and work. We'll see this today when we discuss global trade flows, and the interchange between economics and governance, the impact of new technologies and science, and how we need to build more awareness and engage our global and local communities.

As we saw with the pandemic, we need research and innovation to speed up our progress along a path towards change for the preservation and sustainable management of our oceans and seas. This is why events such as this one are important. We have officials from governments, from the EU here, alongside researchers from various academic institutions, representatives from industry and a wide variety of stakeholders to exchange ideas, and hopefully engage further in joint projects.

We're excited to have an extremely diverse group of people here today. We're very honoured to have **Pascal Lamy** with us. He is Chairman of the Board *Mission Starfish 2030-Restore our Ocean and Waters*, and of course he is former WTO Director-General and former EU Trade Commissioner.

We also have award-winning film-maker, author and director, **Michael Pitiot** with us. He's known for his international documentaries such as *Tara Océans*, *Planète Océan*, and *Méditerranée, Notre Terre*. He just won the Ocean Awareness Award at the International Film Festival in Prague 2022.

It is through engagement with others that we will ensure change. Because collaboration is key. Not just between educational institutions, but between governments, between countries, between generations.

Let's start today by working together. Let's harness the energy in the room, and ride the wave of optimism of what the future holds.

Enjoy today's conference and the debates.

Thank you.



H.E. Yasushi Masaki

Ambassador of Japan to the European Union (Japan)



Prof. Masato FUJISAWA, President of Kobe University,
Prof. Jan Danckaert, Rector of Vrije Universiteit Brussel,
Ms. Signe RATSO, Director-General, DG for Research and Innovation,
Distinguished Speakers and Guests, Ladies and Gentlemen, Good morning,

I am extremely delighted to have been invited here to speak once again this year.
I would like to express my sincere appreciation to all those who have been involved in the organisation of this symposium.

Before delivering my opening remarks, I would first like to say our position about the war in Ukraine. More than a half year has passed since Russia's aggression against Ukraine began. Japan as well as international partners including the EU and the G7 countries cannot condone unilateral changes to the status quo by force by Russia. Its most recent missile attacks against civilian infrastructure and cities across Ukraine has led to the death of innocent civilians. We condemn these attacks in the strongest possible terms and recall that indiscriminate attacks on innocent civilian populations constitute a war crime. Peace must be restored to Ukraine as soon as possible. Japan is therefore united with the EU and all our partners. Japan stands with the people of Ukraine.

Today, I would like to take this opportunity to express my views on three points: 1) the relationship between Japan and seas and oceans which is the main topic of today's symposium; 2) Japan-EU cooperation for healthy and sustainable seas and oceans; 3) importance of the academic exchange between Japan and the EU, and appreciation for Kobe University's activities in Europe.

First and foremost, it is important to consider the surroundings around each country. Japan is a maritime nation surrounded by seas and oceans and consisting of nearly 7,000 islands. Although Japan's land area is slightly smaller than that of Sweden and Norway, its total territory including territorial waters and exclusive economic zones is approximately 4.47 million square kilometres, making it the sixth largest in the world. Since ancient times, the surrounding seas and oceans have had an important influence on the lives of the Japanese in so many ways. In fact, as an example everyone knows in the past and even today, seafood, including sushi and sashimi, is deeply rooted in Japanese cuisine. In addition, currently, 99% of Japan's trade volume is via sea.

Against this backdrop, the Japanese government places great importance on building sustainable ocean governance. As part of the detailed ocean policy of Japan, we are working on ensuring a range of important initiatives and policies. Among them are the promotion of marine industries, the maintenance and protection of the marine environment, the improvement of scientific knowledge, promotion of Arctic policy, international cooperation and human resource development as well as ensuring comprehensive maritime security.

Unfortunately, the maritime security situation has become increasingly severe in recent years, including in the waters surrounding Japan. I would like to emphasize that a “Free and Open Indo-Pacific” is a vision that Japan has proposed for the purpose of promoting and maintaining peace and stability in the international community, and that many international partners, including the EU, understand its importance and share its goals.

Secondly, both Japan and the EU recognise that the stability of the seas and oceans is extremely important as part of securing the global commons, and in light of the current international situation, we have deepened our cooperation in recent years. Last September, the EU released the joint communication on its strategy for cooperation in the Indo-Pacific. Japan strongly welcomes the fact that the EU shares fundamental values such as freedom, democracy, and the rule of law, and that it has expressed its willingness to strengthen its engagements in the Indo-Pacific.

We look forward to Japan and the EU advancing concrete cooperation across broad areas including in the field of maritime research.

Finally, I would like to once again express my appreciation to Kobe University for their efforts in organising this interdisciplinary symposium on a topic of such great interest and importance to both Japanese and European stakeholders. Kobe University established its Brussels Centre in 2010 to strengthen education and research cooperation between Japan and Europe. I would like to congratulate the Kobe University Brussels Centre on the 12th symposium. I would also like to express my sincere gratitude to President Professor Fujisawa for his leadership as well as the endeavours of the Director Professor Yoshida, and I am confident that Kobe University's activities in Brussels will continue to serve as a cornerstone for Japan-EU cooperation in the future.

I would like to close my remarks by expressing my hope that today's symposium on “EU-Japan Research for Healthy, Sustainable Seas and Oceans” will further advance academic, scientific exchanges between Japan and Europe.

Thank you very much for your kind attention.



Ms. Signe Ratso

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

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

It is a great pleasure for me to be with you today at this Symposium organised by Kobe University and the Vrije Universiteit van Brussels (VUB) on such important topics as ocean research and the Blue Economy. Both Kobe University and the VUB are well placed to address these topics because, besides fulfilling an excellent academic role, research is also high on their agendas. And we need to increase the joint research and innovation efforts if we want to address all the challenges we face in our common fight for cleaner oceans and against climate change.

Last year I already highlighted the crucial role that research and innovation policies play in driving the societal transformations needed to achieve a green, fair, sustainable transition. The Blue Economy agenda, which will be a substantial part of the discussions today, is a fundamental contributor to foster and accelerate this transformative process. This is well reflected in the recent efforts made by the European Commission to “put the blue into the green”.

With our Framework Programme Horizon Europe, we want to foster scientific collaboration through actions and missions to restore our seas and oceans. It is precisely this word, “mission”, which sets the background for our cooperation with Japan to flourish in this area and beyond.

The mission-based approach is deeply embedded in our respective “blue” strategies. The European Union’s Mission “Restore our Ocean and Waters by 2030”, coupled with the actions under Horizon Europe’s Cluster 6, and several components of Japan’s R&I programmes, present many possibilities for synergies and mutual reinforcement.

I therefore see this “blue” strand of research actions as a good candidate for increased cooperation between the EU and Japan, two countries sharing the same valued based approach to research.

Fortunately, we are not starting from scratch. The European Union and Japan have already a shared understanding that healthy and sustainable seas and oceans are an essential prerequisite for meeting our ambitious objectives of climate neutrality and green transition.

The G7 Science Ministers’ communiqué of June 2022 unequivocally emphasised the importance of the so-called “Ocean-Climate-Biodiversity nexus” and acknowledged the key role of a healthy ocean to an equitable, resilient and sustainable planet. We count on Japan to continue the work under its Presidency in 2023.

The European Union and Japan also expressed a clear support to the cross-sectoral G7 Ocean Deal and to the G7 Future of the Seas and Oceans Initiative, as well as to other initiatives under the United Nations framework.

One important field for strengthened cooperation could be the collection and processing of reliable, high-quality and harmonised ocean data for a sustainable transformation of the blue economy. In this field, the European Marine Observation and Data Network (EMODnet), which brings together more than 120 organisations, makes the EU a model of best practice in sharing marine data and ocean observations.

I would also like to mention here our European Digital Twin of the Ocean initiative, the main enabler of the Digital Ocean Knowledge System under our Mission “Restore our Ocean and Waters by 2030”. On 3 October, Ms Mariya Gabriel, Commissioner for Research and Innovation, visited the research facilities of the Institute of Industrial Science of the University of Tokyo and suggested to link this Center for Integrated Underwater Observation Technology with the EU Mission ‘Restore our Ocean and Waters by 2030’. We should follow-up on that and work together on reducing plastic litter at sea and on making the blue economy climate-neutral and circular.

But there is room for more cooperation, and this was clearly established by Commissioner’s Gabriel who also attended the Science and Technology in Science Forum in Kyoto, and underlined the importance of international cooperation and global partnerships to address the global challenges.

This is why our research programme Horizon Europe is open to the world. In line with the Global Approach strategy we privilege cooperation with partners who respect fundamental values and key research and innovation principles.

With some like-minded partners having a strong scientific capacity, we also want to go further and offer association to Horizon Europe.

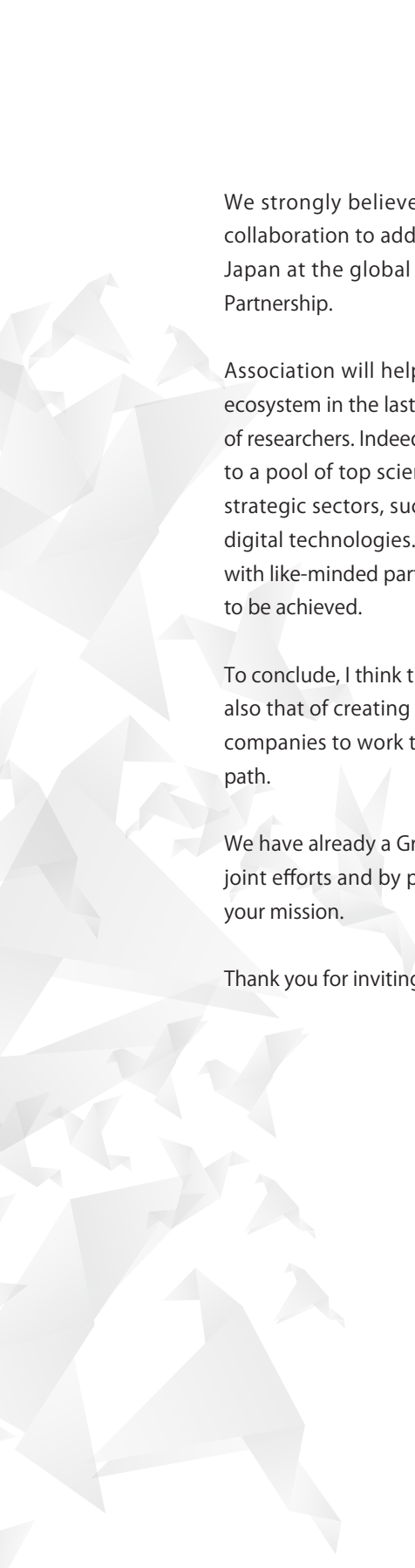
And this brings me to my last point, one I am very much attached to in my role of Chief Negotiator for the European Commission of Horizon Europe Association Agreements with third countries.

At the EU-Japan Summit on May 2022, Japan confirmed its interest in possibly becoming associated to Horizon Europe.

Immediately thereafter we started the exploratory talks and I am pleased with the good progress we made over the last months. I would like to thank the Japanese leadership for giving this process the necessary attention, support and impetus. On our side, we remain committed to moving forward with our fruitful discussions.

Association to Horizon Europe is the closest form of cooperation with non-EU countries such as Japan in the field of science, research and innovation.

It allows scientists and research entities and business sector to have access to participate in nearly all collaborative actions and instruments of the Programme on the same footing as participants from the EU Member States and associated countries, a research family of 43 countries today.



We strongly believe an association of Japan to Horizon Europe will not only result in a deeper collaboration to address common challenges, but will also contribute to strengthening the role of Japan at the global scene of scientific and technological leadership and strengthen our overall Partnership.

Association will help Japan reversing a slight slowdown registered in the performance of its STI ecosystem in the last years, not least by boosting international scientific co-publications and mobility of researchers. Indeed, through association Japanese research and innovation actors will secure access to a pool of top scientists and researchers from Europe to engage in collaborative research in key strategic sectors, such as climate and environment, clean-tech and renewable energy, health and digital technologies. When the leadership of a country can be strengthened through collaboration with like-minded partners and allies, then we all agree that there is ample room for a win-win solution to be achieved.

To conclude, I think that our role as policy-makers is not only that of enacting the right legislation, but also that of creating a favourable environment for our researchers, research entities and innovative companies to work together on shared missions that could set our societies on a more sustainable path.

We have already a Green Alliance in place. Let's now put some "blue into the green" by fostering our joint efforts and by pooling resources to save and restore our seas and oceans. It is our mission, it is your mission.

Thank you for inviting me and I wish you a successful edition of this important Symposium.

Keynote Speech

Mr. Michael Pitiot

Writer and filmmaker (France)



An award-winning author, screen writer, director and producer, Michael Pitiot shot his first reportages in 1991. Posted as Media Attaché at the French Embassy in Ho Chi Minh City, he spent five years developing radio and television cooperation with Vietnam, before sailing back to France on a Chinese junk, producing an epic documentary *L'Odyssée du Sao Mai* on this oceanic voyage for France Télévisions.

The following year, he led a circumnavigation of Africa with a crew of journalists and 12 leading French writers, including JMC Le Clézio and Jean-Christophe Rufin, exploring the connection between Africa and the rest of the world through the continent's major harbours (*Portes d'Afrique*). He then joined the Tara Expéditions Foundation, producing a collection of documentaries on oceans and climate change. This included the award-winning *Tara, a Voyage Through the Climate Machine*, cofinanced by the European Commission, documenting the true story of a team of scientists on the ice-bound exploration ship *Tara*, drifting for two years across the Arctic Ocean, the first such expedition since the legendary Nansen's *Fram* voyage of 1893-1896.

He then wrote and produced a series of films for France Télévision, documenting the *Tara Océan* mission, an international scientific consortium's round-the-world expedition which carried out a landmark plankton census across the world's seas and oceans (*Tara Océans, voyage aux sources de la vie*).

After meeting the celebrated ecologist and Earth photographer Yann Arthus Bertrand, he coproduced with him *Planète Océan*, a feature-length documentary, celebrating the relations between humankind and the ocean. This film, produced for Universal Studios and France Télévisions, won the best cinematography award at the Monterey Blue Festival in California. This fruitful collaboration gave birth to another 10 ocean, nature and wildlife television films, including *Méditerranée*, *Notre Terre*, many of them available world-wide on Netflix and other platforms. His film *Terra*, the sequel to *Planète Océan*, was also premiered in December 2015 at COP15.

He is the author of several books, including a history of piracy. He is currently working on several scripted projects, celebrating mankind and life.

Michael Pitiot just won the Ocean Awareness Award at the International Film Festival 2022 in Prague.

Building Ocean Awareness, Opening New Horizons: A Key Role for Creative Media

A recent turn in human societies has pushed the scientific world to take public positions on climate change and the critical health of oceans. Most of these crucial issues have long been identified by scientists who have been conducting in-depth research. However, instead of just reporting to their peers, a growing number of these scientists have taken to the microphone or the camera in order to raise awareness with the wider public. In social media, as well in traditional ones, the scientist has become a familiar face in our over-connected world.

However, in the meantime, audiences have reached an unprecedented level of media sophistication, visual literacy and *sens critique*. 'Talking heads' are no longer enough, especially when it comes to hard science. Stories on whales have always been easier to tell than a love affair within the microbiome. Yet, today we need to understand the microbiome more than the whale's life. Keeping the audience focused on science, sometimes demanding science, requires ever more creativity, both in the storytelling and in the art of film-making.

Using extracts from some of my award-winning films, including *Planet Ocean*, the *Tara Oceans* series, and *Journey through the Climate Machine*... I would like to demonstrate how cinematic tools can be of remarkable efficiency in helping disseminate important scientific information – for example on the fascinating world of planktons or on the highly complex interactions between climate and oceans.

Using the appropriate visual technology and creativity the filmmaker can help audiences see the invisible and travel through geological time. Powerful storytelling based on hard science, compelling visual effects, inspiring characters, exciting stories: 'all hands on deck' are now required to raise awareness with increasingly sophisticated and diverse audiences and to get communities engaged in the science and the beauty of our Blue Planet.

Parallel Session 1 10:30-13:30

**'BLUE ECONOMY': GLOBAL TRADE FLOWS,
ENVIRONMENTAL ISSUES, AND GOVERNANCE OF THE SEAS**

*Theme1: Sustainable Blue Economy: New Resources,
Innovative Solutions for Global Economic Recovery*

Theme2: Shaping International Ocean Governance for the Future

Interactive Workshop and Brokerage Event A 14:30-16:00

(ECONOMICS)



Parallel Session 1

Theme 1: Sustainable Blue Economy: New Resources, Innovative Solutions for Global Economic Recovery

Bernard Siman

Financial Diplomacy & FinTech at the Brussels Diplomatic Academy,
the Vrije Universiteit Brussel (Belgium)

Moderator

Masahiko Furuichi (by video)

International Association of Ports and Harbors (IAPH) (Japan)



Secretary-General of International Association of Ports and Harbors (IAPH). He received B.E. (Civil Engineering), M.E. (Civil Engineering) from Hokkaido University, Japan, M.S. (Transportation) from Northwestern University, USA, and Ph.D. from Hokkaido University. He has a broad range of experiences in port planning and development at Ministry of Land, Infrastructure, Transport and Tourism (MLIT), Japan, served as Professor at the Graduate School of Management, Kyoto University, taught "Global logistics and trade" and "Global logistics and maritime transport", and published many research papers in the field of global logistics, maritime transport and seaport strategy.

Environmental Ship Index (ESI) Program initiated by the IAPH

Both air pollutant emission (SO_x, NO_x) and greenhouse gas emission (CO₂) from international shipping are regulated by International Maritime Organization (IMO). However, in fact it takes a longer time to build a consensus on new regulation among the member states in the world. On the other hand, World Ports Climate Declaration was adopted by major ports and major cities at C40 World Ports Climate Conference 2008. In the context of this new stream, Environmental Ship Index (ESI) Program was designed and created in 2011, aiming at incentivizing ship owners, operators and managers to improve environmental performance of their vessels' emission. Incentive provider ports encourage the ESI-registered ships to invest on the better environmental performance faster than the IMO regulation by providing discounted port dues (as incentives) depending on their ESI score. As a result, ESI Program's incentive scheme in conjunction with IMO regulation may generate synergy effect on better air quality in and around the ports and decarbonization of international shipping toward 2050.



Wouter Dewulf

University of Antwerp (Belgium)

Prof dr. Wouter Dewulf (1970) works at the Department of Transport and Regional economics of the University of Antwerp (Belgium), and is currently performing research on Air Cargo Strategy, Airport Strategy, Urban Logistics, E-commerce and Sustainability. He also is academic director of the advanced Master of Maritime and Air Transport Management at the Antwerp Management School; and is visiting professor at the University of Hasselt (Belgium), Trisakti Institute of Transportation (Jakarta) and Kedge Business School (Marseille). He researched the strategy of air cargo operators and completed a Ph.D. on The Strategy of Air transport carriers, about Carpet Sellers and Cargo Stars'. After two Master's studies in Applied Economics and Business Engineering at the University of Antwerp he started as a management trainee at British Airways in London. In 1997, he joined Sabena Technics to head up the purchasing department and moved two years later to the position of Director of Supply Chain Management. In 2002, he joined Van Gansewinkel, the largest waste management company in the Benelux, as director for West Belgium, where he became the director of Belgium, France and Luxemburg in 2008. Since 2013, Wouter has been affiliated with the University of Antwerp and the Antwerp Management School.

Disruption, Innovation and Regulation: What Can the Maritime Industry Learn from the Aviation Industry - Or is it Vice-Versa?

The presentation starts with an overview of Disruption, Innovation and Regulation in the air transport industry over the past 50 years. The aviation industry is renowned for its innovation, regulation and agility towards disruption. The presenter gives an overview of parallels and contrasts between the aviation and maritime sectors. In addition, it gives some insights on what the maritime industry can learn from the Aviation Industry, and vice-versa, with a special focus on sustainability efforts.

Kevin Verbelen

AGORIA and Brussels Diplomatic Academy (Belgium)



Kevin Verbelen is Senior Expert International Trade and Company Lawyer 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 and participated several times in the World Economic Forum.

Global Supply Lines: Sustainable Governance and Geostrategy

The war in Ukraine, a ship that blocks the Suez Canal, tensions over Taiwan, a pandemic, open strategic autonomy, made in China 2025, from fossil to sustainable fuels ... The world is rapidly changing and so is business. Global Value Chains are under immense pressure and are slowly but surely being unraveled. Some say this is a good evolution. "It will bring jobs back". "This will provide shorter supply chains". "This will be a more sustainable supply chain." But is it really? This presentation will provide an overview of what has happened in the past years regarding global trade and how it is affecting business. It will explore what the consequences are and how this will affect countries, economies, business and people.

Theme 2: Shaping International Ocean Governance for the Future

Mikio Takebayashi

Graduate School of Maritime Sciences, Kobe University (Japan)

Moderator

Eva Pejsova

Japan Chair, Brussels School of Governance (Belgium)



Dr Pejsova leads the Japan Chair at the Centre for Security, Diplomacy and Strategy (CSDS) of the Brussels School of Governance (BSoG) at the Vrije Universiteit Brussel (VUB). Her research focuses on security issues within the broader Indo-Pacific region, notably related to maritime security, sovereignty disputes, regional cooperative mechanism, as well as overall issues of good ocean governance. She holds a PhD in Strategic Studies from the S. Rajaratnam School of International Studies (RSIS) in Singapore and has previously worked as Senior Analyst at the EU Institute for Security Studies (EUISS) and Senior Advisor of the Asia Pacific Research and Advice Network (#APRAN).

Rule-based Governance of the Seas: A Leading Role for the EU and Japan?

The world's oceans are under ever-increasing pressure. Against the backdrop of great power rivalry and geopolitical tensions, the international maritime environment is defined by increasing militarisation. Authoritarian regimes have become more assertive, multiplying coercive actions and grey-zone operations at sea, exacerbating tensions in existing maritime security hotspots and shaking the foundations of a global rules-based order. At the same time, the seas' rich living and non-living resources have become severely depleted, putting the health of the marine ecosystems, but also the stability and economic prosperity of the coastal communities, at risk.

The need for sustainable ocean governance has never been more acute. While UNCLOS and its related conventions indeed provide a sound legal basis for the management of complex maritime security and safety issues, implementation requires leadership and political will. The European Union has taken the leadership of the international ocean governance since 2016 and vows to step up its role as a global 'maritime security provider'. When working towards this goal, joining forces with Japan, one of the most active promoters of a rules-based maritime order, can multiply its chances for success and constitute a promising area for cooperation between the two like-minded partners.



Erik Franckx

Vrije Universiteit Brussel (Belgium)

Nelson Mandela University (South Africa)

Professor, Vrije Universiteit Brussel (V.U.B.), honorary professor, Nelson Mandela University (2020 -), emeritus professor, Université Libre de Bruxelles, and acting President of the Belgian Society of International Law (2017 -).

He is appointed by Belgium as: expert in marine scientific research for use in special arbitration under the 1982 United Nations Convention on the Law of the Sea (1982 Convention) (2004 -); expert in maritime boundary delimitation to the International Hydrographic Organization (2005 -); arbitrator under the 1982 Convention (2014 -) and was member of the Permanent Court of Arbitration (2006 - 2012).

International Law of the Sea: Meeting Today's and Tomorrow's Challenges

The United Nations has been extremely successful in codifying the law of the sea, for it was able to achieve this result not once (in 1958), but twice (in 1982), which is quite exceptional when viewed from a general international law perspective. The second codification effort resulted in the so-called Constitution for the Oceans and proved necessary, inter alia, because of decolonization and technological developments that had taken place in the meantime.

The present contribution looks into the major novelties introduced by the 1982 United Nations Convention on the Law of the Sea when compared to its predecessor. At the occasion of the 40th anniversary of the adoption of this document, it should be stressed that the development of technology and scientific knowledge of the oceans did not stop in 1982. The 1982 Convention has been trying to cope with these novel developments. It is consequently not to be considered as a constitution written in stone, but rather as a flexible document that has already been adapted in a number of ways. So far, the 1982 Convention has stood the test of time and it is expected that it will continue to do so for some time to come.

Bernard Siman

Financial Diplomacy & FinTech at the Brussels Diplomatic Academy,
the Vrije Universiteit Brussel (Belgium)



Bernard Siman is a Head, Financial Diplomacy & FinTech, Brussels Diplomatic Academy, VUB, where he teaches at the graduate flagship programme in Economic Diplomacy. He is also a Senior Associate Fellow at Egmont- The Royal Institute for International Relations in Brussels covering Hybrid Threats and Mediterranean and Maritime Affairs. He is also the Senior Liaison Officer of the European Corporate Security Association (ECSA). He lectures at several programmes and institutions, including the European Security and Defence College of the EU and the Royal Military Academy, Belgium.

After finishing his undergraduate studies in Belgium, he completed his MPhil at the London School of Economics, Oxford Brooks University and Kyoto University (Japan).

“Lawfare” as a Hybrid Maritime Threat to Global Governance

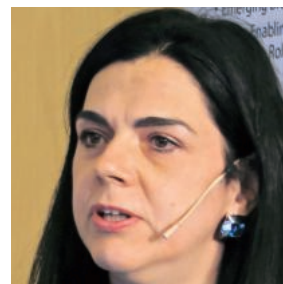
Lawfare is a rising Hybrid threat to the rules-based governance regime of the seas. The aim of Lawfare is to undermine the current interpretations of the United Nations Convention on the Law of the Sea (UNCLOS) gradually and persistently by constantly challenging its application through court challenges, backed up by new biased interpretations, changing the physical nature of maritime features, and naval presence.

Lawfare subverts, over time, sovereignty and economic rights and affects connectivity in a direct and concrete manner, thus affecting, inter alia, global trade flows, minerals and resources rights, access and allied costs, such as insurance and naval capacity building. The South China Sea is a current example. However, attention should also be paid to how Lawfare will affect the Arctic whether in the extraction of resources, sovereign rights or connectivity through the Northeast Passage. Europe is directly affected by developments in the Arctic whether economically or strategically. It is crucial that Europe, both in terms of the EU and also of its Member States, pre-emptes the impact of possible Lawfare operations against its interests as stipulated by the existing international regulations and treaties and counters the impact of Lawfare ahead of time. Japan is equally exposed to the impact of Lawfare in the China Seas whether through sovereign rights, resources or crucially the impact on maritime connectivity.

EURAXESS Japan Presentation

Judit Erika Magyar

EURAXESS-Japan Country Representative



In keeping with the EU 'Global Approach' to international Research and Innovation cooperation, EURAXESS Japan offers all users hands-on opportunities to develop their careers and find collaboration opportunities with European researchers and research organizations. It also acts as a bridge between Japanese and European funding agencies and programmes.

EURAXESS Japan is an information and networking tool supporting researchers working and studying in Japan who wish to connect or stay connected with Europe, using the opportunities offered by Horizon Europe and the EU Member States' research programmes. EURAXESS Japan's target audience is both Japanese and EU researchers at various stages in their careers, PhD students to professors.

EURAXESS Japan is an all-in-one networking platform and information tool for talented researchers who wish to explore and develop careers in Europe. Whether you are looking for insights into EU research policy and funding, Horizon Europe Work Programmes and Calls, practical tips to pursue a scientific career in Europe, or you wish to build contacts and meet with other researchers, EURAXESS Japan is here for you.

Funded by the European Commission, with the support of Japanese and European organisations, EURAXESS Japan focuses on three key activities to promote EU-Japan researcher exchange and mobility:

- to provide regular, tailored and reliable information
- to organise networking and information sessions across Japan, and participate in key researchers' mobility events (science fairs, events organised by Japanese funding agencies, the EU Delegation to Japan, Member States Embassies' S&T Departments among others)
- to build on the strength of a 6500-strong EURAXESS community in Japan to exchange information and experiences, as well as practical tips on jobs and funding.

Since its launch in 2013, EURAXESS Japan has established contact with thousands of researchers and organizations via multiple SNS platforms (Twitter, Facebook, LinkedIn); organised over 100 events attended by over 3,000 participants; been visited by nearly 100,000 users via its portal; published over 40 newsletters; opened a satellite office at Kobe University in addition to the Tokyo headquarters.

In short, whether you want to know more about European Research and Innovation policy, programmes, funding and collaboration opportunities, EURAXESS Japan has a dedicated team, ready to assist you. Please visit our websites:

- <https://euraxess.ec.europa.eu/worldwide/japan>
- <https://www.office.kobe-u.ac.jp/intl-euraxess/index.html>

Interactive Workshop and Brokerage Event A

SUSTAINABLE GREEN ECONOMY – 'LAWFARE' AND GOVERNANCE OF THE SEAS

Mikio Takebayashi

Graduate School of Maritime Sciences, Kobe University (Japan)

Joint Producers and Moderators

Bernard Siman

Financial Diplomacy & FinTech at the Brussels Diplomatic Academy,
the Vrije Universiteit Brussel (Belgium)

Mikio Takebayashi

Graduate School of Maritime Sciences, Kobe University (Japan)



Professor of the Graduate School of Maritime Sciences, Kobe University, Japan. Received a Ph. D. (in Civil Engineering) from Kyoto University, Japan. After working as an associate professor (2000-2010 at Kobe University), he joined the Graduate School of Maritime Sciences as a professor. His research interests are infrastructure planning and management, especially policy and management related to ports and airports. He has published many academic papers in major international journals such as Trans. Res. Part A. He has been a member of various committees hosted by Ministry of Land, Infrastructure, Transport and Tourism of Japan, City of Kobe, etc., holding important roles such as committee chair.

Net Zero and Its Effect on the International Cargo Transport Network

"Net Zero by 2050" is quite an ambitious concept for maintaining the global environment for coming generations. On the other hand, this concept will change our way of life, especially in regard to transport and logistics. The current transport system heavily depends on fossil fuels. The international trade and supply chain relies greatly on ocean transport, and should be changed to reduce GHG emissions. In this presentation, which focuses on intra-Asian and trans-Eurasian markets, we will discuss what kind of future would result from following the direction indicated by the Net Zero concept. First, we will give an overview of the current situation for supply chains based in Asian countries. Second, we will pick out some interesting phenomena backed by the Net Zero concept and consider their future directions, especially changes to the transport network. Finally, we will look at some potential questions that arise when pushing the Net Zero concept further.



Ramin Raeesi

Centre for Logistics and Heuristic Optimisation (CLHO), Kent Business School, University of Kent (UK)

Dr Ramin Raeesi is a Senior Lecturer in Management Science and the Director of the Centre for Logistics and Heuristic Optimisation (CLHO) at Kent Business School (KBS). His main area of research corresponds mainly to optimisation problems that arise in supply chain, logistics and transport networks with a particular focus on decarbonisation. He was/is the principal investigator of several funded projects on decarbonising the road and maritime transport sectors and is actively conducting funded research on hydrogen supply chain design, new fuel and net-zero technologies adoption, maritime transportation, port operations, renewables adoption optimisation, and infrastructure and fuel portability.

The Port of Dover 'Clean Ferries' Project: An Example of University-industry Cooperation

Situated on the Southeast tip of England, Dover is the closest British port to the continent, and thus of particular strategic importance to the cross-channel traffic. It contributes to 33% of all UK – EU trade and handles 2.4m trucks (i.e., 31% of the total HGVs transiting through UK's major seaports) and 30% of all ro-ro ferry arrivals into the UK. To sustainably deliver the unique benefits of Dover's geographic position, estimated to be worth £3 billion to the economy, the "Dover Clean Ferry Power (DCFP)" project brought together a consortium of key business and academic partners to study the techno-economic feasibility of potential electric power solutions for Short Straits ferries. To accelerate the adoption of hybrid or fully electric propulsion vessels in the Short Straits (Dover to Calais and Dunkirk) ferry fleet, the DCFP consortium led by the University of Kent focused on accurately identifying energy demand by current and future ferries operating at the port over different planning horizons and real operating conditions, and potential innovative, realistic, and reliable energy supply pathways within the infrastructural and operational constraints of the port. This presentation discusses several highlights, insights and findings from this university-industry collaborative project.

Ra Mason (by video)

University of East Anglia (UK)



Ra Mason is Sasakawa Associate Professor of International Relations and Japanese Foreign Policy at the University of East Anglia (UEA). He was previously Course Leader of Asia Pacific Studies at the University of Central Lancashire (UCLan), JSPS Fellow at the University of the Ryukyus, and Associate Professor of Public Policy at Tohoku University. Ra is author of Japan's relations with North Korea and the Recalibration of Risk and co-author of Regional Risk and Security in Japan and Risk State (Routledge), in addition to publishing widely on Okinawa, Djibouti and the DPRK, as well as writing for the Asahi Shimbun's Asia Japan Watch (AJW), The Conversation UK (TCUK) and The Asan Forum. This presentation illuminates the changing dynamics of the East China Sea.

Claiming and calming greyzones in the East China Sea: dangers of the drift from lawfare to warfare

In an environment of rising geostrategic tensions across the Indo Pacific, as the confluence of competing interests contested by the world's three largest economies, among others, the East China Sea (is a potential flashpoint with global implications. This paper argues that while at first sight superior conventional military capabilities boasted by the US Japan alliance provide the basis for ongoing American headed regional hegemony, a combination of confirmation bias and immobilism in US foreign policy have led to latent changes in the status quo that risk undermining stability across this troubled body of water. Ultimately, more conceptual awareness and flexibility will need to be demonstrated by successive American administrations, and greater legal and narrative alignment prioritized by all parties, if the ECS is to avoid drifting from a site of lawfare into one of warfare.

Parallel Session 2 10:30-13:30

**OCEANS OF THE FUTURE: ADVANCES IN MARINE AND
MARITIME SCIENCES: NEW TECHNOLOGIES FOR NEW HORIZONS**

*Theme1: Harnessing the Power of Oceans:
Fostering Innovation for Energy Sustainability*

Theme2: Addressing Marine Pollution, Restoring Marine Ecosystems

Interactive Workshop and Brokerage Event B 14:30-16:00

(NATURAL SCIENCES & TECHNOLOGY)



Session 2: Oceans of the future: Advances in marine and maritime sciences: New technologies for new horizons

Session 2 consisted of two Themes relating to new technologies for sustainable seas and oceans, and one Interactive Workshop/Brokerage Event for green energy and hydrogen. The lectures were given by a variety of speakers with diverse backgrounds in academia, including those from Kobe University, Vrije Universiteit Brussel, University of Kent, and their partner universities (Kiel University, University of Florence, Aix-Marseille University), and Ochanomizu University.

Theme 1: Harnessing the Power of Oceans: Fostering Innovation for Energy Sustainability

Martin Visbeck (GEOMAR Helmholtz Centre for Ocean Research Kiel and Kiel University) presented “Digital Twins of the Ocean - Opportunities to future-proof sustainable development” in which he introduced the international programme DITTO (Digital Twins of the Ocean) in the context of the UN Decade of Ocean Science for Sustainable Development. Minoru Takeda (Graduate School of Maritime Sciences, Kobe University) gave a presentation on “Applications of Superconductivity in the Field of Maritime Sciences” and explained a helical-type seawater magnetohydrodynamics (MHD) generation system, a new MHD method of separating oil from contaminated seawater, and fundamental technologies for marine transportation of liquid hydrogen. Makoto Aoki (Radioisotope Research Center, Ochanomizu University) presented the “Study of Electrode Surface Structure for the Improvement of the Seawater Electrolysis Efficiency and Reaction Selectivity” by means of online system. She investigated the surface structure and layer-by-layer composition of Pt-M (M=Co, Ni, etc.) electrodes using a synchrotron radiator. Benedetto Allotta (Interuniversity Center of Integrated Systems for the Marine Environment (ISME), and the University of Florence) presented “Perspectives in Underwater Robotics: Current Activities at ISME” and introduced ISME, a consortium of nine Italian universities that has been carrying out underwater robotics research for more than 20 years.

Theme 2: Addressing Marine Pollution, Restoring Marine Ecosystems

Yue Gao (AMGC, The Vrije Universiteit Brussel) gave a presentation on the “Biogeochemical cycle of inorganic contaminants in the North Sea and Baltic Sea - measurement of trace metal bioavailability”. She explained her research on bioavailability in the marine environment, which is influenced by physio-chemical parameters including salinity, pH, redox potential as well as complexation and precipitation processes. Robert Barker’s (University of Kent) presentation entitled “Safe Harbours: Industry-University Collaborations in Environmental Protection” was unfortunately cancelled. Richard Sempéré (CNRS, Director of Ocean Sciences Institute, Aix-Marseille University) talked about “Plastics and their organic additives in the marine environment: Proposals to limit the risks for the Mediterranean Sea” in which he discussed risks and impact predications regarding the Mediterranean Sea, which has been reported as one of the major plastic contamination hotspots in the world. Simon Barnes (University of Kent) presented “Decarbonising the maritime sector; complex, challenging and costly?” and introduced new and novel technologies that might be adopted by fleets in different regions, and what this could mean for continued operations in ports and on vessels.

Interactive Workshop/Brokerage Event B: Towards Green Energy and Green Hydrogen

After morning session 2, five industry and academia panelists from various regions talked about how renewable resource-based electricity, as well as hydrogen energy, will help the world become carbon neutral by 2050. Dominik Richter (Hydrogen Europe) presented “Towards Green Energy and Green Hydrogen: A European Approach”, giving insight into hydrogen-related regulatory developments, targets and measures on a European level. He also talked about reducing European dependency on Russian gas and how to achieve the ambitious climate goals. Minoru Takeda (Graduate School of Maritime Sciences, Kobe University) gave a presentation on “Marine Transportation of Hydrogen Energy: Challenges and Opportunities - the Kaitaku Project” and predominantly explained the ongoing CO₂-free hydrogen supply chain project between Japan and Australia. This project is using the liquid hydrogen carrier “Suiso Frontier” and a CO₂ capture and storage technology. Ivar Kruusenberg (CEO, PowerUP Energy Technologies/KBFI) presented “Hydrogen as a game changer for the maritime sector” and appealed to the maritime industry to drastically reduce CO₂ emissions with the eventual goal of decarbonisation. As an example, he introduced a liquid hydrogen marine transportation project supported by the Japanese government. Isabel Francois (WaterstofNet vzw, Turnhout) gave an online presentation entitled “Hydrogen Status: Flanders-Belgium”. She gave an overview of the hydrogen pilot projects and developments that have been implemented in the Flanders region, which focus on transporting hydrogen and developing related technologies and expertise. Ander Martinez Alonso (MOBI – The Vrije Universiteit Brussel) gave a presentation on “Hydrogen as an energy vector, a Multi-Energy System Approach” in which he explored how hydrogen can be used as a sustainable energy source in combination with other renewable energy sources and technologies. He highlighted the importance of techno-economic assessments and optimal operation of these systems in order to transition towards a carbon neutral European economy by 2050.

Parallel Session 2

Theme 1: Harnessing the Power of Oceans: Fostering Innovation for Energy Sustainability

Minoru Takeda

Graduate School of Maritime Sciences, Kobe University (Japan)

Moderator

Martin Visbeck

GEOMAR Helmholtz Centre for Ocean Research Kiel and Kiel University (Germany)



Martin Visbeck is head of research unit Physical Oceanography at GEOMAR Helmholtz Centre for Ocean Research Kiel and professor at Kiel University, Germany. His research interests revolve around ocean's role in the climate system, ocean circulation, upwelling systems, integrated global ocean observation, digital-twins of the ocean and the ocean dimension of sustainable development. He led the 'Future Ocean' Network in Kiel to advance integrated marine sciences by bringing together different disciplines to work on marine issues. He serves on a number of national and international advisory committees including member of the Governing Board of the International Science Council (ISC)

Digital Twins of the Ocean - Opportunities to future-proof sustainable development

Digital twins are fine-grained virtualizations of physical objects and systems which have been widely applied in the engineering realm for tasks such as engine optimization and port management. For the Ocean and Earth in particular, digital twinning means to intuitively bundle and provide easy access to marine data, models, and simulations to explore "what if" scenarios. A well-constructed digital twin of the ocean will enable a wider range of users to interact with digital assets to explore current and future scenarios, especially related to human interactions with the ocean. High-value application areas include fisheries and mariculture, marine protected areas, ocean-based tourism, ecological forecasting, nature-based solutions, marine infrastructure development, and the interactions between all of these with an ever-growing collection of data streams.

Recently we initiated an international programme DITTO - The Digital Twins of the Ocean in the context of the UN Decade of Ocean Science for Sustainable Development. DITTO intends to build a Digital Twin of the Ocean Framework that allows users to create a family of application-focussed digital twins that collectively twin the ocean as a whole, with access to a range of ocean data and forecasting and predictive systems. This powerful framework will enable users to visualize and explore ocean

knowledge and empower ocean professionals and models, forecasts, citizen scientists, policymakers, and the general public alike. This session aims to showcase global applications and pilots of digital twins and discuss possible applications for the ocean system (<https://ditto-oceandecade.org/>).



Minoru Takeda

Graduate School of Maritime Sciences, Kobe University (Japan)

Minoru Takeda is a professor in the department of Marine Engineering, Graduate School of Maritime Sciences, Kobe University, Japan. He obtained an MSc and a PhD in Physics from Osaka City University, Japan in 1986 and 1993, respectively. In 1997, he was a visiting researcher in the National High Magnetic Field Laboratory in Florida State University, USA. This year he became the co-director of the Cryogenics and Superconductivity Society of Japan. His research focuses on applications of superconductivity in the field of maritime sciences, and on cryogenics related to production, storage and transportation of liquid hydrogen.

Applications of Superconductivity in the Field of Maritime Sciences

Our research is entitled “Oceans and Hydrogen Energy: Applications of Superconductivity in the Field of Maritime Sciences.” It is being conducted at the Cryogenics and Hydrogen Laboratories located on the Fukae Campus of Kobe University. Our main goal is to establish a carbon neutral society based on renewable and hydrogen energies, using advanced technologies including cryogenic and superconducting devices. First, a helical-type seawater magnetohydrodynamics (MHD) generation system, which generates electricity used to produce hydrogen, is explained as well as a helical-type MHD ship thruster. Second, a new MHD method of separating oil from contaminated seawater using a high-field superconducting magnet, which is based on the difference in the electric conductivity between seawater and oil, is explained with good quantitative agreement between the experimental data and the equation for the separation. Third, fundamental technologies for marine transportation of liquid hydrogen, which has a boiling point of 20 K, are explained, focusing on a superconducting magnesium diboride (MgB₂) liquid level sensor. An overview of the marine transportation of liquid hydrogen (including topics related to the production and storage of liquid hydrogen) in Japan will be given at the interactive workshop and brokerage event B.

Makoto Aoki (by video)

Radioisotope Research Center, Ochanomizu University (Japan)



Makoto Aoki is an assistant professor of the Radioisotope Research Center, Ochanomizu University. She obtained her PhD in Science from Ochanomizu University, Japan in 2016. After working for the Fuel Cell Nanomaterials Center of the University of Yamanashi, she joined Kobe University as an assistant professor from 2017 to 2022. Her research focuses on the construction of an energy conversion system using renewable energy. Her current interest is water electrolysis for the development of a hydrogen production system that uses renewable energy from the ocean.

Study of Electrode Surface Structure for the Improvement of the Seawater Electrolysis Efficiency and Reaction Selectivity

Understanding the electrochemical reactions on the electrode/electrolyte solution interface and the surface structure of the electrode are important for constructing high-performance devices such as batteries, fuel cells, electrolytic cells. In order to clarify the mechanism behind electrochemical reactions and to practically apply them to devices, we designed and developed various electrochemical cells and methods for in-situ measurement. By conducting in-situ measurement using synchrotron radiation and single crystal electrodes, we investigated the surface structure and layer-by-layer composition of Pt-M (M = Co, Ni, etc.) electrodes (which are posited to serve as an electrode catalyst for various devices such as fuel cells) and clarified the factor for the improvement of catalytic activity.

I will also talk about a seawater magnetohydrodynamic (MHD) power generator which has a unique system that transforms the kinetic energy of ocean and tidal currents directly into electric energy.



Benedetto Allotta

Interuniversity Center of Integrated Systems for the Marine Environment (ISME) and University of Florence (Italy)

Full professor of Robotics and Mechanism Design at the Dept. of Industrial Engineering, University of Florence. Chairman of the Scientific Committee of SeaLab (<https://isme.unige.it/research/sealab>), a joint laboratory between ISME <http://www.isme.unige.it/> and the CSSN of the Italian Navy for experimentation on heterogeneous autonomous vehicles. 1992: Ph.D. degree in Robotics magna cum laude from the Scuola Superiore Sant'Anna, Pisa. 1987: Laurea degree (M.S.) in Mechanical Engineering from the University of Pisa. Courses taught in Robotics, and Mechanism Design. Current research interests: robot design, marine and underwater robotics, control of robots, mechatronics, sensor fusion in navigation systems.

Perspectives in Underwater Robotics: Current Activities at ISME

Underwater robots are largely used in the offshore industry, mainly Oil&Gas, in military applications, and in ocean sciences, including marine archaeology and geomorphology. However, the Level of Autonomy (LoA) of commercially available systems is still rather low. In particular, in industrial practice, close inspection of submerged infrastructures and intervention tasks, such as manipulation, are still performed by tethered, Remotely Operated Vehicles (ROV). Ongoing research in underwater robotics is aimed at increasing the LoA of vehicles and fleets of vehicles. Artificial Intelligence (AI) techniques are being exploited in order to allow underwater robots to implement reactive behaviors, such as active sensing of the environment aimed at increasing quantity and quality of acquired data, and semi-autonomous manipulation. Cooperation among underwater vehicles and hybrid (optical – acoustic) perception of the environment are hot topics as well. ISME, a consortium of nine Italian Universities, has been performing research in underwater robotics for more than 20 years. Some recent experiences of ISME nodes in the development of underwater robot technology will be shown, with emphasis on the projects performed by the Tuscan Universities of Pisa and Firenze.

Theme 2: Addressing Marine Pollution, Restoring Marine Ecosystems

Thierry Coosemans

Moderator

the Vrije Universiteit Brussel (Belgium)



Thierry Coosemans obtained his PhD in Engineering Sciences from Ghent University in 2006. After several years in the industry, he became a member of the MOBI research team at the VUB, where he works now as the co-director of the EVERGi team on sustainable energy communities. He is currently involved in the scientific support for the Green Energy Park Zellik, and had an active role in Flanders Make and the Living Labs Electric Vehicles Flanders. On a European level, Thierry was and is involved in the H2020 and FP7 projects SafeDrive, OPERA4FEV, SuperLIB, Smart EV-VC, Batteries20202, GO4SEM (coord), FIVEVB, ELIPTIC, MOBILITY4EU, FUTURE-RADAR, OBELICS, INTERCONNECT, ENSEMBLE, REDIFUEL, CEVOLVER, and RENAISSANCE, which he coordinates. His main research interests are the development of CO₂-neutral Sustainable Local Energy Systems, electric and hybrid propulsion systems, and the performances of automated electric-vehicle fleets under real-life conditions, including in a V2G perspective. Thierry Coosemans is an active member of the Bridge Initiative and Flux 50.



Yue Gao

AMGC, the Vrije Universiteit Brussel (Belgium)

Professor at Analytical, Environmental and Geo-Chemistry of Vrije Universiteit Brussel, Belgium. Awarded MSc and PhD from Vrije Universiteit Brussel, Belgium in 2003 and 2009, respectively. After working at VUB as FWO postdoc fellow, joined in the same research group as academic member. My research focus on investigation of diverse pollutants in different environmental compartments including water, sediment and soil. Beside this, she also developed novel passive sampling technique for the measurement of limiting elements in the HNLC (high nutrient-low chlorophyll) regions of oceans. She has published 80 peer reviewed papers with H index of 28.

Biogeochemical cycle of inorganic contaminants in the North Sea and Baltic Sea-measurement of trace metal bioavailability

Bioavailable toxic trace metals are a concern for all ecosystems. In the marine environment, bioavailability is influenced by physio-chemical parameters including salinity, pH, redox potential as well as complexation and precipitation processes. The classic procedure to estimate bioavailable metal concentrations in marine systems is to measure the dissolved metal concentration in a filtered seawater sample. However, the dissolved metal concentration includes ions, labile and strong metal complexes and colloids, of which the last two cannot be consumed by phytoplankton, and thus overestimates the bioavailable fraction. The passive sampling technique of DGT uses two hydrogel gel layers, with the diffusive layer allowing only solutes smaller than 10 nm to pass through and with the resin gel layer irreversibly binding the appropriate solutes. Based on Fick's law, the fluxes and eventually the solute concentrations can be calculated. This technique has been widely applied in aquatic systems including freshwater, seawater, sediment and soil to measure labile (bioavailable) metal fractions. In the Belgian Part of North Sea (BPNS), the combination of classic filtration of samples and DGT passive sample makes the determination of metal bioavailability in seawater possible and the assessment of high-resolution metal profiles in sediment feasible.



Richard Sempéré

CNRS senior scientist, Director of Ocean Sciences Institute, Aix-Marseille University (France)

Richard Sempéré, PhD, is oceanographer, marine and atmospheric geochemist and director of research at CNRS. He is currently Director of the Aix-Marseille University 'Ocean Sciences Institute'. His own research studies concern exploration of sources and sinks of natural organic matter in aquatic environments, the intersection of the carbon cycle and microbial communities under global change conditions. He is also studying plastics, plastic additives, endocrine disruptors, and organic contaminants in atmospheric and aquatic systems. Richard Sempéré has been student in French Universities and post-doctoral fellow in Tokyo, Japan. He has been a member of several French governmental committees and PI of several research projects. He is author or co-author of more than 110 scientific publications in peer review journals and supervised studies of numerous PhD and post-doctoral researchers. The last 20 years Richard Sempéré has created and been the director successively of the research laboratories LMGE, Mediterranean Institute of Oceanography and recently the Aix-Marseille University (AMU) -graduate school Ocean Sciences Institute gathering 14 laboratories in marine sciences from Oceanography to law of the sea.

Plastics and their organic additives in the marine environment: Proposals to limit the risks for the Mediterranean Sea

With 400 million tons of plastics produced each year for packaging (for a significant part), construction, automotive, electrical, electronics, clothing, agriculture activities, plastic pollution is one very visible indicator of the Anthropocene. Plastics constitute between 8 and 15% of waste mass generated by human activities. Nonetheless, and even if they are produced in urban areas, their physical and chemical properties make them the predominant part of the litter in natural environments. They also constitute an increasing threat for land and hydrosphere ecosystems. Plastic litter also causes severe economic losses through damage to vessels and fishing gear, negative effects on the tourism industry, and increased shoreline cleaning efforts.

However, about 40% of all plastic products are thrown away within one month and only a very minor part (7%) is effectively recycled. Of the total, 84% end up on beaches and the remaining 16% in the water column or on the seafloor. The issue of widespread plastic waste in the environment is exacerbated by the durability and persistence of these materials in the environment. Land-based activities are, undoubtedly, the main source of marine litter, particularly in a highly populated closed sea basin, such as the Mediterranean Sea. Indeed, the Mediterranean has been reported as one of the major hotspots of plastic contamination in the World. However, despite the existence of regional action plans, legally binding measures and the common will of many countries to end plastic pollution, the effective and efficient implementation of measures is made difficult by the heterogeneous demographic, economic and geopolitical situation of coastal countries. In this presentation, we will recall the risks and prospects of impacts on the Mediterranean Sea. A set of solutions using an interdisciplinary and inter-sectorial strategy is also proposed. This work is largely based on the discussions of the CleanMed consortium initiated in 2022.

Simon Barnes

University of Kent, Canterbury (UK)



Simon Barnes is the Strategic Partnership lead at the University of Kent, he joined the University in 2017 after 30 years in industry. During that time, he was a Director of the Society of Maritime Industries and Chair the Sustainability Working Group in the City of London.

Simon now represents the sector on the Maritime UK Regional Board for the South East of England. For the University he brings together academics from the Business School, Engineering, Natural Sciences and partners to address and research the challenges of maritime decarbonisation in all its aspects.

Decarbonising the maritime sector; complex, challenging and costly?

Legacy fleets, a plethora of technology, different investment strategies, regional, national and international policy and regulation make decarbonisation of the maritime sector especially challenging. This complexity is compounded by a complex energy supply and demand relationship, one that has historically been addressed through a single energy source, widely available, but is in the future likely to be a number of diverse, fragmented 'energy options'. The structure of the sector is quite distinct from other transport sectors where for example the number of technology providers is less fragmented (aerospace) or the industry is following a progressive technology pathway (automotive). The need to re-equip legacy vessels and ports brings unique challenges in energy supply for which existing systems are not fit for purpose. In his presentation Simon will share his thoughts on how and where new and novel technology might be taken up by different fleets in different regions, what this means for continuity of operations both in port and on for vessels. All within the context for the increased demand for decarbonisation from customers and governments for green supply chains.

Interactive Workshop and Brokerage Event B

TOWARDS GREEN ENERGY AND GREEN HYDROGEN

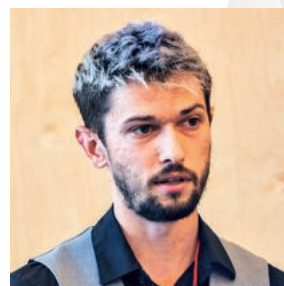
Thierry Coosemans

the Vrije Universiteit Brussel (Belgium)

Moderator

Dominik Richter

Hydrogen Europe (Belgium)



Dominik Richter graduated in M.Res. Degree in Hydrogen, Fuel Cells and their Applications in 2022 at the University of Birmingham in the UK. He has been working at Hydrogen Europe since March, 2021 and holds the title of Innovation Analyst.

He is part of the Hydrogen Europe, Innovation Team, which manages the industry-private contributions to the public-private partnership, the Clean Hydrogen Partnership, between Hydrogen Europe, Hydrogen Europe Research and the European Commission. Besides this, his tasks include a one of its kind supply chain mapping of the European hydrogen industry players and trade matters.

Towards Green Energy and Green Hydrogen: A European Approach

Everyone is aware of the events that led to recent energy uncertainties in Europe and the continent will certainly face challenging years ahead. Consequently, the European Commission instated REPowerEU, meant to battle Europe's dependency on Russian gas imports.

Within REPowerEU, hydrogen was identified as one of the key pillars to do both, reducing European dependency on Russian gas as well as achieving the ambitious climate goals.

Those are just the latest developments of a trend that has been accelerating over recent years – hydrogen is here to stay.

This presentation will give insight and summarise the regulatory developments, targets and measures in regard to hydrogen on a European level, putting it in a global context.



Minoru Takeda

Graduate School of Maritime Sciences, Kobe University (Japan)

Minoru Takeda is a professor in the department of Marine Engineering, Graduate School of Maritime Sciences, Kobe University, Japan. He obtained an MSc and a PhD in Physics from Osaka City University, Japan in 1986 and 1993, respectively. In 1997, he was a visiting researcher in the National High Magnetic Field Laboratory in Florida State University, USA. This year he became the co-director of the Cryogenics and Superconductivity Society of Japan. His research focuses on applications of superconductivity in the field of maritime sciences, and on cryogenics related to production, storage and transportation of liquid hydrogen.

Marine Transportation of Hydrogen Energy: Challenges and Opportunities – the KaitaKu Project

Our research is entitled “Oceans and Hydrogen Energy: Applications of Superconductivity in the Field of Maritime Sciences.” It is being conducted at the Cryogenics and Hydrogen Laboratories located on the Fukae Campus of Kobe University. Our main goal is to establish a carbon neutral society based on renewable and hydrogen energies, using advanced technologies including cryogenic and superconducting devices. First, a helical-type seawater magnetohydrodynamics (MHD) generation system, which generates electricity used to produce hydrogen, is explained as well as a helical-type MHD ship thruster. Second, a new MHD method of separating oil from contaminated seawater using a high-field superconducting magnet, which is based on the difference in the electric conductivity between seawater and oil, is explained with good quantitative agreement between the experimental data and the equation for the separation. Third, fundamental technologies for marine transportation of liquid hydrogen, which has a boiling point of 20 K, are explained, focusing on a superconducting magnesium diboride (MgB₂) liquid level sensor. An overview of the marine transportation of liquid hydrogen (including topics related to the production and storage of liquid hydrogen) in Japan will be given at the interactive workshop and brokerage event B.

Ivar Kruusenberg

CEO, PowerUP Energy Technologies/ KBFI (Estonia)



Dr. Ivar Kruusenberg is a scientist and an entrepreneur holding a Master Degree in molecular technology and Ph.D. in chemistry.

For many years, researcher in institutions around the world like DLR, the European Commission's Joint Research Center, Arizona State University, and the University of California, Berkeley.

After a long career as a scientist and together with a strong desire to have a greener world, he is applying his knowledge in cleantech entrepreneurship, serving as CEO and founder of PowerUp Energy Technologies.

With 17 years of experience in the hydrogen, fuel cells and energy technologies industry, he is one of the leading CleanTech entrepreneurs in the region.

He is also a member of the Science and Innovation Council of the Estonian Government and Member of the Board of the Estonian Research Council.

Hydrogen as a game changer for the maritime sector

Maritime sector is well known to be one of the industry sectors hardest to be decarbonized. Annual CO₂ emission of the maritime sector was around 44 million tonnes in 2019. Recently enormous efforts have been deployed to decarbonize the maritime sector by introducing hydrogen technology.

Boats, ferries, and cargo ships will be running on hydrogen because battery technology has been proven to be too heavy and not suitable for the shipping industry. Shipping is the only transportation that allows us to transport Hydrogen from Australia to Japan and from Middle-east to Europe.

Japan was one of the first countries to commit to pursuing hydrogen as an alternative energy source and invested 84.8 billion yen (US\$802 million) in fiscal 2021. Japanese government has published a roadmap with targeted indicators with the aim of achieving the decarbonization of ships.

For hydrogen fuel cell ships, the roadmap outlines the following prospects:

- To achieve commercial operation of zero-emission ships by 2028
- Achieve the conversion to hydrogen, ammonia, and other alternative fuels in the shipping sector by the year 2050



Isabel François

WaterstofNet vzw, Turnhout (Belgium)

Isabel François started at WaterstofNet in 2016 as project manager and has established the 'Hydrogen Industry Cluster'. This industrial network has now 140 members in Belgium and the Netherlands, all companies that have activities over the entire hydrogen value chain.

Within WaterstofNet, Isabel is also working on the reinforcement of the link between the Flemish knowledge institutes and the industry.

Before starting at WaterstofNet, she has worked for Philips Lighting for 20 years, on the development of high-pressure discharge lamps.

Isabel has studied Physics at the KULeuven and obtained a PhD on superconductivity at KULeuven/ IMEC.

Hydrogen status Flanders-Belgium

This presentation will give an overview of the hydrogen pilot projects and developments that have been realized in the region Flanders-Belgium-South of the Netherlands, with WaterstofNet as a facilitator.

For the near future, regional and federal hydrogen strategies have been developed in Belgium, with focus on import of hydrogen and development of technology & expertise to become leading region in hydrogen.

Plans for infrastructure (hydrogen backbone) are ready to be rolled out and large hydrogen production projects in the port areas are being developed.

Several technology players with a diversity of products related to hydrogen are ready to implement their products in various application areas.

Ander Martinez Alonso

MOBI - Vrije University Brussel (Belgium)



Ander Martinez graduated in M.Sc. Degree of Industrial Engineering in 2015 at the Public University of Navarre in Spain after successfully completing an exchange program with the INP-ENSEEIH, in France where he achieved the specialization in Renewable Energies. He also holds a Bachelor's Degree in Mechanical Engineering from University of La Rioja.

He is currently doing his Ph.D. in MOBI – Evergi at Vrije Universiteit Brussel and is expecting to get a joint-PhD awarded with Kobe University. His research interests include modelling and control of Multi-Energy Systems, Hydrogen Technology and Optimization.

Hydrogen as an energy vector, a Multi-Energy System approach.

The energy transition towards a carbon-neutral European economy by 2050 is catalyzing a new era of investment and research activities to develop hydrogen as a sustainable energy vector. The fast increase in wind and solar electricity generation, among other Renewable Energy Sources (RES) in combination with hydrogen power-to-gas and/or power-to-power technologies, can not only enable extensive decarbonization, but also help to increase renewable penetration and enhance operational flexibility and economic performance of energy systems.

Techno-economic assessments and optimal operation of these systems, which necessarily implies a Multi-Energy System (MES) approach, are key in the realization of the potential of green hydrogen as an energy vector. Not only because its multi sector coupling ability, but also because electrolyzers and fuel cells necessarily connect, at least, two different energy vectors: Hydrogen molecules and electrons. If not more, as certain technologies can increase their efficiency with heat recovery systems.

Hydrogen is not the magic solution to the whole problem of decarbonizing the planet and evolving towards a greener future. It's overall low energy efficiency process makes it very challenging to integrate. However, along with other factors and technologies, we can ensure that it will definitively play a key role in the upcoming years, and in order to overcome all its challenges, optimization models for optimal operation and techno-economic assessment must be developed.

Parallel Session 3 10:30-13:30

**SEAS, SCIENCE AND SOCIETIES: BUILDING AWARENESS
ENGAGING COMMUNITIES**

*Theme1: Science and Society: A Holistic Approach
for Healthy Oceans*

*Theme2: Oceans Bridges: Building Ocean Awareness
and Literacy, Engaging Communities*

Interactive Workshop and Brokerage Event C 14:30-16:00

(SOCIAL SCIENCES AND HUMANITIES)



Session 3:

Parallel Session 3 was produced by two Kobe University professors, Ken-ichi Yoshida and Chiaki Ogino, and Professor Farid Dahdouh-Guebas, Vrije Universiteit Brussel (Belgium) Entitled “Seas, Science, and Societies: Building Awareness, Engaging Communities”, the session was divided into two themes as follows.

Theme 1: “Science and Society: A Holistic Approach for Healthy Oceans” was moderated by Mr. Patrick Vittet-Philippe, an Adviser to KUBEC. The first speaker was Professor Chiaki Ogino (Graduate School of Engineering, Kobe University) (by video), who talked about the technological development of sustainable, marine-adapted new materials, including itaconic acid-based polymers. Next, Ms. Sigi Gruber, Active Senior Expert at the European Commission, gave an excellent talk on restoring the Mediterranean by reducing plastic pollution. Professor Michel Claessens of the Vrije Universiteit Brussel (Belgium), followed on from this with a presentation on ocean science and society, emphasizing the importance of science education. The last speaker was Professor Siri Granum Carson, NTNU Norwegian University of Science and Technology. She spoke passionately about tackling complex marine issues that cannot be solved by technology alone. These presentations inspired lively discussions and exchanges of ideas.

Theme 2: “Oceans Bridges: Building Ocean Awareness and Literacy, Engaging Communities” was moderated by Professor Farid Dahdouh-Guebas. The session was initiated by Professor Stefano Cannicci, University of Florence (Italy), who spoke about the importance of mangrove forests for carbon sequestration and the need for multidisciplinary understanding of the various roles played by these ecosystems. Next, a joint video presentation was given by Professor Laura Bocchi, University of Kent, and Professor Nobuko Yoshida, University of Oxford. They introduced their collaboration with the NSF project Ocean Observatories Initiative, in which they applied typing theories for programming languages to support the governance of cyberinfrastructures for ocean observation. The last presentation was made by Professor Margaret Chen (VUB), who spoke about rising sea levels and efforts to build up the resilience of coastal areas. This session prompted many questions from participants.

In the afternoon, Professor Ken-ichi Yoshida moderated Interactive Workshop C: “Ocean Awareness: The Role of Communities and Media” with the following three talks co-produced by Mr. Vittet-Philippe and Prof. Ken-ichi Yoshida. The first speaker via video link was Mr. Robin Takashi-Lewis, the co-founder of MyMizu. MyMizu is a global movement that combines technology and community involvement to address the problem of plastic waste. Mr. Takashi-Lewis shared some examples of how they have reduced plastic waste through technology, citizen participation, and community building. The next speaker, Mr. Jonas Abs of the German Aerospace Centre, gave a specific presentation on ‘Plastic Pirates - Go Europe!’. This citizen science initiative helps researchers identify sources of plastic pollution and come up with appropriate mitigation measures. The project has been funded by the EU Commission for 30 months in recognition of its pioneering nature. It is set to massively expand upon existing data and improve scientific understanding and knowledge, which may result in systematic solutions to prevent, reduce, and eliminate plastic waste in rivers and oceans. The fact that the German government is already supporting such a collaboration between scientists and citizens strongly impressed the audience with its progressive nature. The final speaker was Mr. Tetsuji Ida (by video link), a famous journalist from Kyodo News in Japan, who has been covering environmental and development issues for more than 35 years as a correspondent and reporter in various countries and has published numerous books. Mr. Ida described various aspects of the ocean crisis, including global warming, acidification, oxygen depletion, eutrophication, plastic pollution, declining marine resources, and biodiversity loss. One of the most impactful statements he made during the lecture was the warning that “The crisis in the ocean is invisible to us.” He stressed the urgent need to strengthen international cooperation and establish a multistakeholder forum for comprehensive policy-making. The audience appreciated his willingness to answer their questions online despite the time difference, which nicely concluded the day.

Parallel Session 3

Theme 1: Science and Society: A Holistic Approach for Healthy Oceans

Patrick Vittet-Philippe Moderator

Kobe University Brussels European Centre (Belgium)



Patrick Vittet-Philippe is a former senior European Commission official, with special interest in international cooperation in research and innovation, science communication and science diplomacy.

A graduate of Ecole Normale Supérieure, he taught at Trinity College Dublin and Merton College Oxford, and was attaché de recherche at the French Centre National de la Recherche Scientifique.

Before joining the EC, he spent 14 years in the French Diplomatic Service, as press and cultural attaché with postings in Tel Aviv, London and New York. After a period with the European TV industry, he joined the Commission as expert-adviser on Information Society Technologies and the digital economy, representing the EC in key international fora (OECD, World Economic Forum), and at parliamentary hearings, think tanks events (CSIS, Brookings Institution) and major industry conferences (MIP-TV, COMDEX, Internet World).

He moved in 2001 to DG Research and Innovation as press and Information officer, responsible for commissioning TV magazines and documentaries on EU research (e.g. Futuris magazine on Euronews), and organising press conferences and science events (EU-China S&T Week at Shanghai World Expo). Moving to the International Cooperation Directorate, he was in charge of the Japan and Russia Desks between 2011 and 2015. In this capacity he was directly involved in the preparation of successive EU-Japan Joint S&T Committees, of the S&T chapters of the EU-Japan summits, as well as in the scoping exercises for the EU-Japan EPA and SPA. He launched many EU-Japan research cooperation projects and initiatives, such as Concert Japan.

Patrick Vittet-Philippe was invited by Kobe University to join its Kobe University Brussels European Centre, as adviser responsible for communication and outreach, policy watch, and for the development of cooperation and joint projects between the University and its EU partners. He has been a lead organiser of the last five editions of Kobe University Annual Symposium.



Chiaki Ogino (by video)

Graduate School of Engineering, Kobe University (Japan)

Chiaki OGINO is a professor of the Department of Chemical Science and Engineering, Graduate School of Engineering, Kobe University, Japan. He received his B.Sc., M.Sc., and Ph.D. in Chemical Engineering from Kobe University, Japan. He has supervised more than 70 master's course students, and 15 doctoral course students at Kobe University. He is the author or co-author of over 265 peer-reviewed journal papers and 40 reviews and book chapters. His extensive research interests concern: the production of biofuels and chemicals from biomass based on synthetic biotechnology using yeast, fungi and Actinomycetes, and the development of novel drug and gene delivery systems based on nanobiotechnology. His most recent aim is to develop a bio-degradable polymer by using several microbes from renewable resources.

Development of Marine Degradable Polymers to Create a Sustainable Marine Environment

There is an urgent need to develop marine degradable polymers to replace petroleum-based polymers. Itaconic acid (IA) is monomer molecule, and it can be made marine degradable through dimerization. Thus, this dimerized monomer has attracted attention as a new marine degradable polymer. IA is also known as one of 12 bio-based chemicals with extremely useful applications in agriculture, as well as in the pharmaceutical industry. Consequently, the demand for IA is increasing and market value has exceeded 102.3 Million USD in 2022. Therefore, lowering the production costs is an urgent requirement.

The filamentous fungus *Aspergillus. terreus* exhibited the highest productivity and 400 t of IA are produced every year using glucose. However, IA production from edible carbon-sources clashes with food production. Therefore, it is necessary to develop bioprocessing for IA producers that are capable of utilizing renewable carbon sources such as lignocellulosic biomass. In the current study, we evaluated the effectiveness of using different carbon sources in the production of IA from *Corynebacterium glutamicum*. We also assessed the effects of *C. glutamicum*'s usage of a mixture of substrates on cell growth and IA production. In this workshop, we would like to discuss the current development progress for sustainable, marine-adapted new materials, including IA-based polymers and other polymers.

Sigi Gruber

Active Senior Expert – European Commission (Belgium)



Prior to her recent retirement, she was the Head of Unit for the EC's Healthy Ocean and Seas Unit, in the Directorate General for Research and Innovation. The work of the Unit focused – amongst others - on co-creating the European Mission on 'Restoring our Ocean and Waters by 2030'; implementing the All Atlantic Ocean Research Alliance and other European and global initiatives; shaping marine research in Horizon Europe. Sigi Gruber started to work for the European Commission in 1991 with responsibilities in the area of Education and Training, Researchers Careers, the European Institute for Technology (EIT), Research and Universities, and International Cooperation. Prior to joining the European Commission, she worked in the public and private sector in Italy and Germany.

Fighting Plastic Pollution, Restoring our Ocean: from the Mediterranean to the World

The Mediterranean is polluted by an estimated 730 tonnes of plastic waste every day. How can we prevent plastic pollution from destroying vulnerable marine ecosystems, the food we eat, the beaches we love? How can research and innovation turn this problem into solutions, into new opportunities and develop value chains?

How will the Mission Restore our Ocean and Waters by 2030 contribute to ensure that our ocean and waters will be less polluted? The session will provide some answers to these questions and showcase examples of good practice funded by the EU Framework Programme for Research&Innovation and by other key stakeholder to inspire participants and invite them to engage to jointly provide the much needed solutions.



Michel Claessens

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 National Association for Innovation Strategy, AAAS, TEDx, etc.). He is currently developing an international alliance to promote science culture. His latest books, "ITER, The Giant Fusion reactor" and "The Science and Politics of Covid-19", have been published by Springer (2018 and 2020).

Ocean Science and Society: Securing the Role of Science in the Political debate

Why doesn't society pay the right tribute to ocean science? The presentation will review case studies highlighting the interactions between science and society, and science and politics. Although there is evidence that scientific results disseminate slowly, there are also interesting initiatives in articulating the scientific and political worlds, which are then interacting with each other and progressing jointly, even if there is no global consensus. The aim should for the society be to achieve a "co-construction" of expertise and decision-making in order to provide scientific grounds for political decisions and present research results in a suitable way for political action.

The presentation will review good practices developed in the past years for scientists dealing with media and politics. Still, science is not the magic trick that can solve the planet's problems. This is not its role, although some discoveries and innovations may create wonders. It is up to scientists not to leave any ambiguity.

There is no doubt that science has here an important role to play. According to the latest Eurobarometer (2021), 68% of Europeans believe that scientists should intervene in political debates to ensure that decisions take into account scientific evidence. However, the survey shows that science literacy is not progressing. A huge project is left behind: science education.

Siri Granum Carson

NTNU Norwegian University of Science and Technology (Norway)



I am director of NTNU Oceans, a strategic research area at the Norwegian University of Science and Technology, and leader of the National committee for the UN Ocean Decade in Norway. As a Professor of Applied Ethics, my disciplinary background is in philosophy of agency. My main research area is corporate social responsibility, focusing on the role of business organization in a globalized economy, specifically in the Nordic context. At NTNU, I have been teaching research ethics, business ethics and professional ethics at all levels and parts of NTNU. At NTNU Oceans, my job is to “connect the dots” between different parts of ocean science and technology, encouraging interdisciplinarity in research, education, and innovation.

An Ocean of Knowledge – Towards a More Inclusive Ocean Science

Technology will be instrumental in reaching the goals of the Ocean Decade, such as a comprehensive ocean observing system. However, we cannot forget that technological development is also what has literally fueled some of the problems of our oceans today: Over-fishing, pollution, biodiversity loss. Technology is what makes us capable of destroying the very foundation of our existence on this blue planet, and this demands us to apply precaution even when we act with the best intentions. Because technology alone cannot solve the challenges.

This is a starting point for us at NTNU Oceans, a strategic research area at Norway’s largest university, aiming to address complex ocean challenges through interdisciplinary cooperation. We connect researchers and students from technology and the social sciences, from natural sciences and the arts, from humanities and economy.

Responsible ocean research and innovation depends on an ability to view our challenges as well as the proposed solutions from all perspectives, to try to anticipate possible outcomes and how they may affect all stakeholders. The decade of ocean science is not only about engaging the scientists, but rather, it is about expanding ocean science to reach across disciplines and sectors. It even calls for the active participation of citizens.

Theme 2: Oceans Bridges: Building Ocean Awareness and Literacy, Engaging Communities

Farid Dahdouh-Guebas

Moderator

Department of Biology, Vrije Universiteit Brussel
Department of Organism Biology, Université Libre de Bruxelles
(Belgium)



Farid Dahdouh-Guebas, Head of ULB/VUB Systems Ecology and Resource Management Research Unit and Founding/Managing Director of the Erasmus Mundus excellence Master in Tropical Biodiversity and Ecosystems (TROPIMUNDO), seeks to understand and predict how and why spatio-temporal dynamics in mangrove vegetation and landscapes occur, using transdisciplinary approaches (tropical botany, VHR-remotesensing and ground-truth, ethnobiology, historic archive research,...), an integrative analysis (GIS, multivariate-multicriteria analyses,...) to generate outputs for fundamental understanding of ecosystem functioning (health, resilience) and for its management (conservation, restoration, governance). The research is done on spatial scales from case-studies in different countries to the global level and explores the science-policy interface.



Stefano Cannicci

Department of Biology, University of Florence (Italy)

Stefano Cannicci is the Vice President for Postgraduate Studies and Full Professor of Zoology in the Department of Biology, University of Florence, Italy. He is also Honorary Associate Professor at the School of Biological Sciences, The University of Hong Kong, Hong Kong SAR, where he was Associate Professor and Associate Director of the Swire Institute of Marine Science from 2015 to 2022. He obtained his PhD in Behavioral Ecology from the University of Florence in 1994 working on the ecology of mangrove associated fauna in East Africa. The ecological role of mangrove fauna is still his main research focus.

Functional Mangrove Restoration Beyond Blue Carbon: Communities' Roles and Impact

Mangrove forests are considered a crucial component of tropical and subtropical seascapes. The perception of their ecological importance, however, changed only recently and their ecological status

has gone from zero to hero thanks to the “blue carbon” paradigm. Once perceived as putrid forests to be cleared for coastal development, over the last decade they gathered increasing interest among scientists and stakeholders, due to their high carbon sequestration potential. This new focus on mangrove carbon dynamics is shaping the approaches to mangrove management and rehabilitation, which are supposed to facilitate climate change adaptation.

Carbon sequestration is increasingly used as justification for mangrove restoration, but large research gaps remain in the other ecosystem functions played by these forests and in the socio-economic sciences and humanities domains. Mangrove forests are multi-purpose and multifunctional ecosystems, and their faunal and floral components are providing services that go beyond blue carbon. Moreover, holistic studies assessing the socio-economic implications of blue carbon initiatives for local communities remain poorly considered. Incorporating knowledge of the ecological role and functions of the various ecosystem components and of diverse social and cultural values will also improve restoration practices and approaches.

Laura Bocchi

University of Kent, Canterbury (UK)



Laura is a Reader in Computing at the University of Kent. She is interested in static and dynamic verification of distributed systems by using behavioural types (ie., types that describe desirable patterns of communication behaviour). Her current research is on time-sensitive systems and reliable systems. She is currently a WP leader in the EU RISE project ‘BehAPI’ on behavioural APIs, and in the EPSRC project ‘Session Types for Reliable Distributed Systems (STARDUST)’. As a postdoctoral researcher at Imperial College London, she contributed to the NSF project

Ocean Observatories Initiative (Subcontract for OOI CI) Conversations and Governance.



Nobuko Yoshida (by video)

University of Oxford (UK)

Yoshida's research in Computer Science focuses on the development of theories, and supporting programming languages and software for the foundations of concurrent and distributed systems. Her particular interest is in session types, a type-based approach to the verification of message-passing programs. She is currently holding an EPSRC Established Career Fellow, a fellow of British Computing Society and an Honorary Fellow of Glasgow University. She is appointed as a Statutory Chair of Oxford University, Christopher Strachey Chair of Computing from October 2022. Built on the theory of session types, she deployed runtime monitoring to cyber infrastructure in the US Ocean Observatories Initiative.

Laura Bocchi & Nobuko Yoshida

Applying typing theories of programming languages to ocean observation & the Ocean Observatories Initiative (Subcontract for OOI CI) Conversations and Governance

This talk is about adapting and applying typing theories for programming languages to support governance of cyberinfrastructures for ocean observation. It reports on our collaboration (2011-2013) with the NSF project Ocean Observatories Initiative.

Most modern systems are a composition of distributed software entities that interact by sending and receiving messages to each other. Several problems may occur during these interactions: an entity may receive unexpected communications (wrong data types, senders, ...) or receive expected communications too late or not at all. Session types can be used to discipline the conversations of these distributed entities, providing formal guarantees that they will enjoy safety properties and obey certain pre-defined behavioural protocols.

In 2011-2013, in a subcontract project for OOI CI -- Ocean Observatories Initiative Conversations and Governance -- we have been looking at applying session types to discipline conversations across a large-scale cyberinfrastructure for ocean observation. The requirements of OOI have ignited new research directions, such as the enrichment of session types with assertions, time-constraints, and the pairing of static verification with run-time monitoring. We will discuss how the learnings from our collaboration with OOI has steered our research focus on typing theories for programming languages.

Margaret Chen

Vrije Universiteit Brussel (Belgium)



Margaret Chen is professor at the Vrije Universiteit Brussel (Belgium). Her expertise is in the research domains of hydraulic, hydrodynamics, morphodynamics, and sediment dynamics. Her research encompasses engineering applications and nature-based solutions to mitigate and adapt to global change. Recent research includes climate resilient coast, coastal structure-process interaction, flood defense in riverine, estuarine and coastal environments, and integrated sustainable watershed management. She is a member of the Coastal Resilience at European Marine Board.

Rising Sea Levels: Involving Coastal Stakeholders for Building Coast Resilience

Coastal zones are the most popular settlement areas throughout human history. Nearly 2.4 billion people (about 40% of the world's population) live within 100 km of the coast. Sandy coastlines are under threat of erosion. The erosion process is being driven by sea-level rise, meteorological and marine forces, anthropogenic activities, and other factors. This leads to increased vulnerability which becomes increasingly important to protect our coasts against flooding in view of changing climate and sea level rise.

The Belgian coast is one of the most vulnerable coastlines in Europe. Our coast research is to protect the coastal region until 2050 and beyond against a 1000-year storm. To build coast resilience, besides rigorous interdisciplinary research, we promote participatory approaches to engage coastal stakeholders in identification and formulation of regional priorities and ambitions, to get feedback and assessment of our research and development, to share benefits of research with coastal communities at large. To monitor and to achieve coast resilience, with the engagement of local governments and coastal communities, lately coastal defense strategies have progressively evolved from conventional hard engineering and soft engineering to the concept of building with-nature. This ultimately leads to directly and indirectly safeguarding coast resilience.

Interactive Workshop and Brokerage Event C

OCEAN AWARENESS: THE ROLE OF COMMUNITIES AND THE MEDIA

Ken-ichi Yoshida

Moderator

Graduate School of Science, Technology and Innovation, Kobe University (Japan)



He obtained a PhD at Kyoto University in 1993, and has held faculty positions at Fukuyama University (-2004), INRA France (1996-97), and Kobe University (2004-). He has specialized in the structural and functional genomics of bacteria since the very beginning of his career to date. He once served as a Program Officer in MEXT (2005-07). He was the executive director of Kobe University Brussels European Centre (2014-19), and the Executive Director, Centre for EU Academic Collaboration of Kobe University (2019-2022). Currently, he is a Professor of Applied Microbiology (2009-), in parallel acting as FEMS Ambassador (2019-), Head of Europe & Africa division, Office for International Strategic Planning (2022-), and again the executive director of Kobe University Brussels European Centre (2022-).



Robin Takashi-Lewis (by video)

Co-Founder, Mymizu

Representative Director, Social Innovation Japan

Board Member, Shibuya QWS (Japan)

Robin is an award-winning social entrepreneur and educator based in Japan. He is the Co-founder of mymizu, a global platform to reduce plastic waste through the power of technology and community. He is also the Representative Director of Social Innovation Japan, a platform for social good focusing on the UN Sustainable Development Goals (SDGs), named by Nikkei as one of the '100 companies building the future of Japan' and a two-time winner of Japan's 'Minister of Environment Prize'. For 10+ years, Robin has worked with social enterprises, NGOs and inter-governmental organisations, including the World Bank and UNDP, and has managed sustainable development projects around the world, including in Japan, Haiti, Vanuatu and Mozambique.

In 2022, he took on a sponsored expedition to walk 1,000+kms along Japan's coastline to document the changing landscapes since the 2011 Fukushima nuclear crisis and promote tourism to the disaster-affected area. In 2020, he was recognised by M.I.T. Technology Review's 'Innovators Under-35' Awards and in 2022, won Business Insider Japan's 'Beyond Millennials' Award. He holds Board Member positions at Shibuya QWS, serves as an advisor/mentor to a wide range of impact organisations, and graduated with an M.A. in International Business from Edinburgh in the University.

The 'mymizu' (My Water) Movement: Leveraging Community and Technology to Tackle Plastic Waste

"Every minute, over 1 million plastic bottles are used around the world, many of which end up as waste in landfills, waterways and oceans. Furthermore, plastic pollution globally is set to double by 2030, and the UN predicts that there will be more plastic than fish in the oceans by 2050.

This session will dive into the issue of plastic waste through the lens of a case study that highlights the use of technology, citizen engagement, and community building to tackle the plastics crisis. mymizu ("mizu" means water in Japanese) is an award-winning initiative to tackle plastic waste. The freely available mymizu smartphone app - a crowdsourced web platform - connects people to 200,000 free water refill stations globally and has enabled users to save millions of plastic water bottles through co-creation and gamification. Using mymizu, it's possible to refill your water bottle anywhere – it's good for the planet, the body and the wallet!

The organisation behind mymizu, Social Innovation Japan, also provides creative educational experiences and sustainability leadership training to thousands of people every year, building a movement for sustainable living across age groups and sectors."

Jonas Abs

DLR Project Management Agency

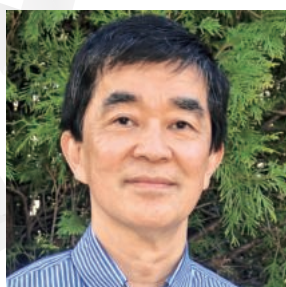


Project Manager and Senior Consultant at German Aerospace Centre Project Management Agency | European and International Cooperation | Cooperation with Third Countries and International Organizations. He holds a Master Degree and is lecturer for international politics and geopolitics. Jonas Abs is working on several projects at national and European level especially in strategic cooperation.

"Plastic Pirates – Go Europe!": On a Mission to Fight Plastic Waste Together with Citizen Scientists

While there is already a fair understanding of the origins of plastic litter in a few selected European regions and river systems, research data across Europe so far is largely fragmentary, if existent at all. By applying the citizen science approach to investigate the importance of rivers as pathways to ocean pollution, the ongoing Plastic Pirates – Go Europe! citizen science initiative enables researchers to

identify sources of and mitigation measures for plastic pollution. Citizen science projects will only reach their full potential and maximum EU added value if implemented on a transnational and Europe-wide level. It can massively extend existing data, improve scientific understanding and knowledge and, thus, help to develop systematic solutions for the prevention, reduction, and removal of marine and riverine pollution, particularly plastics. As part of the ERA campaign “Bring Science closer to Citizens”, the expansion of the initiative contributes to the realignment of the ERA (ERA Policy Agenda 2022-2024). As one of the first pilot initiatives, “Plastic Pirates – Go Europe! has a pioneering character for future initiatives of the new European Research Area, also in other thematic areas. The EU Commission is funding its introduction across Europe over a period of 30 months. DLR is coordinating the entire initiative and supporting the new partner countries.



Tetsuji Ida (by video)

KYODO NEWS (Japan)

Born in Tokyo in 1959, graduated from the University of Tokyo in 1983. He has covered environmental and development issues for more than 35 years as a science correspondent, a Washington correspondent, and a senior staff reporter for Kyodo News. He has reported on environmental destruction and poverty in more than 70 countries in Asia, Africa, and Latin America, as well as the people working to solve these problems. He has also covered many international conferences, including the UNFCCC and CITES. He has authored or coauthored more than twenty books on primate conservation, climate change, toxic chemicals and ocean environment.

Facing a multidimensional crisis of the ocean environment

Global warming is causing ocean heat waves, ocean acidification and oxygen depletion. Eutrophication in coastal areas, plastic pollution, and decline in fisheries’ resources and loss of biodiversity are also serious issues. Destruction of coastal mangrove forests and decreasing amounts of seaweed in cold-water systems is happening in many places.

The ocean environment is now facing multiple crises. However, ocean crises are invisible to people. It is not so difficult to see deforestation on the land, but it is difficult to see the decline in kelp forests under the sea. It is not very easy for people to notice the fish stock crisis, because huge amounts of seafood are delivered to our table every day. In Japanese restaurants and supermarkets, endangered fish species like eels, tuna, and shark are sold in large quantities.

We need to make fundamental social and economic changes to solve these multiple crises. However, in addition to the fact that the crisis is invisible, it is very difficult to achieve transformative change with so many stakeholders involved. Increased investment and the elimination of harmful subsidies, increased international cooperation, and the establishment of a multi-stakeholder forum for a comprehensive policy-making system are urgently needed.

Pascal Lamy

Coordinator of the Jacques Delors Think Tanks (EU)
Former DG of the WTO; former EU Commissioner for Trade
Chair, Mission *Restoring our Ocean and Waters by 2030*



Pascal Lamy is the President of the Paris Peace Forum and of the European branch of the Brunswick Group. He coordinates the Jacques Delors Institutes (Paris, Berlin, Brussels).

He is also President or member of various boards with a global, European or French vocation (European Starfish Mission (ocean), Mo Ibrahim Foundation, European Climate Foundation, IFPRI, PECC, CERRE, TMEA, Antarctica 2020, Transparency International, Alpbach Forum, Beijing Forum, World Trade Forum, WEF, Global Risks, Europaeum, Collegium international, Musiciens du Louvre, Institut Mendes-France, Colbert Foundation, etc.).

Pascal Lamy is Chairman of the Mission Board for Horizon Europe Mission Starfish 2030 – Restoring our Oceans and Waters by 2030

He is an affiliated professor at the China Europe International Business School CEIBS (Shanghai) and at HEC (Paris).

From 2005 to 2013, Pascal Lamy served two consecutive terms as Director General of the World Trade Organization (WTO). He was previously Trade Commissioner (1999-2004), Director General of Crédit Lyonnais (1994-1999), Chief of Staff of the President of the European Commission, Jacques Delors and his G7 Sherpa (1985-1994), Deputy Chief of Staff of the French Prime Minister (1983-1985) and to the French Minister of the Economy and Finance (1981-1983).

Last publication *Strange New World* (Odile Jacob 2020), *Où va le monde ?* (Odile Jacob 2018).

A Digital Twin of the Ocean: Why and How?

Please let me thank Nakamura-sensei for this introduction and, of course, thank KUBEC for its invitation to this symposium '*Blue Economy, Green Horizons: EU-Japan Research for Healthy, Sustainable Seas and Oceans*'.

The focus of my remarks this afternoon (this morning on this side of the Pacific), is our new European, and hopefully global, new endeavour: building a Digital Twin of the Ocean. I believe that Europe and Japan should work together, given their common concern for the Ocean – an issue which matters greatly to both - and their respective commitments to harness new digital technologies.

I will address two questions. First, why do we need a Digital Twin of the Ocean? And second, how can we achieve such an ambitious target?

To start with the first question: why do we need a Digital Twin of the Ocean ? I see three reasons for that. First, we need to act. Second, we do not know enough. And third, we have a very little time left.

We are confronted with a major threat for the planet. We need to act to stop the degeneration of our hydrosphere - the system that includes the ocean, the seas, the lakes, the rivers, the water tables. Our hydrosphere is in serious danger and needs regeneration. We are faced with the rapid and catastrophic degradation of the hydrosphere. This links of course with the issues of global warming, the loss of biodiversity, the acidification of the oceans, overfishing, the rise in sea levels, extreme weather events, just to name a few.

The second reason, is that we do not know enough about our hydrosphere to act properly. We know Planet Mars better than Planet Ocean. We are confronted with a huge knowledge gap: we do not know 2/3 of what we should know to properly act on this challenge.

The third reason why we need a Digital Twin of the Ocean is that we have a very little time to figure out this science gap. Traditional observation and exploration systems of the ocean have improved in recent decades. But they do not improve fast enough. Figuring out this 'science gap' with traditional technologies we use at present would probably take some 80 years. But we only have roughly 20 years to act! After that, it would be too late. We would have reached too many irreversible tipping points. So we need a shortcut for science, whose name is AI - Artificial Intelligence. This is what a Digital Twin of the Ocean is about.

Which takes me to my second question, which is the operational one. We believe in Europe that we must commit to building of Digital Twin of the Ocean. What is a Digital Twin? A Digital Twin is a combination of models, a digital replica of a real system which aims to describe and emulate the main functions and properties of that system. Based on observations, on equations, on data, and on the latest technological advances such as AI, it is a computing environment which allows new knowledge-based input for more and better informed decision-making across different situations and scenarios. A Digital Twin of the Ocean will unlock all the new knowledge we need, and then allows us to translate this into actions. It is a digital 'co-creation' across all different disciplines and different communities.

This is why the European Union is proposing is a two-pronged approach. The start is to build a European core prototype of the Digital Twin of the Ocean by 2025. And then, hopefully, to move to a Global Digital Twin of the Ocean by 2030. The implementation of the EU Digital Twin by 2025 has already been decided, as announced by EU Commission President Ursula von der Leyen at the Brest Ocean Summit in February 2022. The funding has already been allocated - and it is quite substantial - within the Horizon Europe Research and Innovation programme. This is a key objective of the so-called EU 'Starfish' Mission *Restoring Our Ocean and Waters by 2030*, whose board I have the privilege to chair.

This is a major new development for EU research. To get there we will need to work on many challenging issues mostly related to data, and to services that the Digital Twin of the Ocean can provide. We need data with a higher definition, with better observation, and with the necessary degree of precision. We need to collect more, and more interoperable, data, and making them widely available to the scientific community. Getting data from space is relatively easy and cheap. However

getting data from the ocean itself is more challenging. In order to achieve this we will need to harness new technologies such as marine drones, or sea-borne instruments which beam data directly to satellites. This implies a collective effort by EU ocean data collectors and data owners to collect and make these data available, and treatable using Artificial Intelligence. We have a good basis for this, for example with the Copernicus programme of ocean observation, and with the 20 or 30 EU actions and programmes. These are the products of more than two decades of EU investment in Research Infrastructures to regenerate our hydrosphere.

Assuming that we get these data, we will also need to develop a large array of applications and services that can digest, manipulate, and reconstitute these data. For this we will need to define common collective structural rules in order to be able to plug local or specific 'twins' into an EU Digital Twin of the Ocean. In this area, we are dealing with a rather classic case of EU governance, as we need to move beyond the coexistence of national programs or local Digital Twins. In a word, we need to evolve from coexistence to convergence. This is the first aim of the 'Starfish' Mission – a Mission whose progress will be regularly evaluated and assessed.

But we have a larger and more ambitious objective: to move from the European Digital Twin to a Global Digital Twin. For this we expect similar challenges as those we are used to address within the EU, except that this should happen at a global level, and at a much larger worldwide scale. Building only an EU Digital Twin would make no sense, if we do not achieve, at the end of the day, a global, planet-wide Digital Twin of the Ocean. This is imperative, as the ocean is a system in the scientific acceptance of the term – a system whose parts permanently interact in ways that cannot be understood without assessing how these various systems work together.

We will of course build on the programmes run by the International Ocean Commission - the UN body dealing with ocean science. The IOC is driving the UN Decade for Ocean Science – a timeline which fits with our target of 2030. The IOC has substantial experience in coordinating various international research and innovation programmes on ocean research. However, unlike the EU which has already allocated the money, the IOC at the moment does not have any serious funding for a Digital Twin. That issue of funding at an international level will need to be addressed. So will be the best ways and mechanisms to ensure the transparency, free access, and benefit-sharing of a Global Digital Twin – in particular for less developed countries who do not have the financial, nor the scientific capacities to embark on such a venture.

To conclude, let me express the wish that, together, we European and Japanese researchers and policy-makers can join forces in delivering this Global Digital Twin of the Ocean – which I see as a major scientific achievement needed for the survival of our Planet.

Closing Remarks

Tamotsu Nakamura

Executive Vice-President, Kobe University (Japan)



Good Afternoon to Brussel and Good Evening to Kobe!

Distinguished Guests, Esteemed Colleagues, Loved Students, Ladies and Gentlemen;

It has been my great pleasure to be with 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 12th Kobe University Brussels European Centre Symposium. I am quite confident that this symposium addressed themes common to Europe and Japan, and enabled participants to exchange the latest research information.

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 innovations". Promoting international partnerships with other organisations is vital in order for us to achieve this great vision. We are determined to strengthen our collaborative relationships with the VUB, the University of Kent and other European partners who have kindly supported our activities and enhanced our presence in Europe so far.

I hope that the excellent presentations and active discussions that took place in each session and workshop will serve as a stepping stone to future exchanges. Today's symposium has been an opportunity to hear about various fascinating research projects and I am sure that it has inspired many of you. I hope that the symposium will encourage further collaborations.

In addition to research collaborations, student exchanges and educational collaborations such as double degree programmes are key components of mutual understanding. Kobe University has participated in various Erasmus+ programmes including Jean Monnet CoE, Jean Monnet Chair and many International Credit Mobilities. I am quite sure that we can work together in these fields as well.

Once again I'd like to thank all of you for participating in today's symposium and I am grateful for your continued warm support.

Last month, I was so impressed with the Archbishop of Canterbury's Sermon for the State Funeral of Her Majesty Queen Elizabeth II. He concluded his beautiful with the title of very very popular song in the UK. I would like to repeat it here: We Will Meet Again.

I'm looking forward to working with you more closely in the near future.

Thank you very much.



Jeremy Carette

Dean for Europe, University of Kent (UK)

Distinguished guests, the University of Kent has been delighted to support this 12th joint annual symposium organised by our close partners Kobe University and the VUB. This is the second year that we have had the privilege of being involved in this notable event, bringing together research and innovation from across the globe. The University of Kent, as many of you know, is the nearest university to mainland Europe. The University of Kent is linked to our neighbours by the sea, the channel, the *transmanche*; it is our connection, our livelihood and our meaning. As part of our heritage of being the UK's European university, we have a campus just down the road; the Brussels School of International Studies, as well as a campus in Paris; the Paris School of Arts and Culture. And this is a part of our connectivity; but connectivity requires that we also respond to the challenges of our time.

This conference has brought together some of the most vital and important issues for sustaining our life here on planet Earth. The impact of marine pollution, rising sea levels, the challenges in the transition to greener technology, the pressures around logistics... But we are also here to find solutions to those problems; identifying them and implementing them through policy and connectivity. Keeping these things at the forefront of our mind, the marine challenges are affecting us all; they are affecting our communities and it is imperative that we act and this conference is a part of that act.

We have heard from experts today bringing together the sciences, the social sciences, and the arts and humanities. Our keynote speakers have shown the importance of engaging the community more widely as through cinema; engaging people initially through the beauty of our world but then also understanding the impact and our need to engage. And also we heard about the importance of technology in responding to those issues. From beauty to technology, it is our challenge to find those solutions, to find the cross-pollination of ideas.

Universities are crucial in this voyage to discovery and knowledge and understanding. It is about driving partnerships further and further to create opportunities and deeper understanding, bringing together our common values for the common purpose of saving our planet. Kent understands that connectivity is vital and our connectivity to our university communities here in Brussels, to the VUB, and our global connectivity, to Kobe University, are vital for our mission going forward. We believe in the strengths of working together. It is the common good of our education's power that will be our solution.

To reflect on Emerson, the poet of the 19th century, in his poem 'Water', he said "Ill used, it will destroy". We have to understand the importance and quality of water, and that what has brought us here. On behalf of University of Kent, I would like to thank Kobe University Brussels (European) Center, VUB for inviting us to be part of this event. We are proud to support this symposium and proud to continue the work of our researchers in the efforts for the future our seas and oceans and our planet. Thank you.

Hugo Thienpont

Vice-Rector, Vrije Universiteit Brussel (Belgium)



Excellencies,
Dear colleagues,
Ladies and gentlemen,

It is my honour to close today's event. And it was a special event once again. This year the symposium was held around the exciting but challenging topic : "Blue Economy, Green Horizons: healthy, sustainable seas and oceans".

Today was the 12th edition of this symposium, and it was our pleasure to be a part of it.

It has once again allowed us to forge strong relationships with Kobe University's Brussels office, and we sincerely hope that this way forward may continue for a very long time.

I would like to take the opportunity to thank some of the actors who have made this symposium possible.

To start off with, we have – Mr. Ryu Uwagawa – from Kobe University. He was an intern at VUB, working partly at the VUB International Relations office and partly at the Kobe University Brussels office. His return to help organize this years' symposium is another testimony of the important relationship between Kobe University and the VUB, and of our valuable work together.

I would like to thank our Japanese visitors for travelling all this way to join us here today and for their precious contributions, in particular, Professor Ken-Ichi Yoshida, driving force behind the symposium, and with him I would like to acknowledge all of his colleagues.

Another driving motor behind the symposium is Mr. Patrick Vittet-Philippe, advisor to Kobe University. Thank you Patrick for devoting your precious time, and for your help and support.

A recent addition to the symposium is the cooperation with Kent University. Our UK colleagues contributed to the symposium by delegating speakers and providing session producers.

In particular, I would like to thank Mrs. Primrose Paskins for exploring the opportunities to team up with all of us.

In addition, my thanks go out to His Excellency, Mr. Yasushi Masaki, Ambassador of Japan to the European Union, and to Mrs Signe Ratso, Director-General at the European Commission's DG for Research and Innovation. Thank you both for your great contributions this morning.

Last, but not least, I would like to put my VUB colleagues from the International Relations office in the spotlights.

Dr. Jacqueline Couder and Mr. Steven Verhulst who made the organisation of this event possible. Today, through lectures and open interactive workshops, we have looked at some highly relevant issues:

- “Economics” – more specific blue economy, global trade flows and governance of the seas;
- “Natural sciences” with a specific focus on scientific advances in marine and maritime science;
- and “Social Sciences and Humanities”, looking at the link between seas and societies; awareness building and engaging communities.

And already at this stage I dare to say that a lot was accomplished in one day.

We’ve taken in a lot of information, and - as always - this leaves us with a lot to consider and contemplate. Indeed today was only a start, but a good one.

Finally, I would like to thank all the speakers of today, all the moderators and session leaders, but also, all of you in the room. Thank you for your active participation in the workshops.

We now have a solid basis to further explore and develop excellent EU-Japan research projects;

We have food for thought on sharing mutual scientific interests and kicking-off collaborations and joint research on sustainable seas and oceans.

So, thank you – all of you in this room and all those who participated, in making today yet another successful Symposium.

Here’s to a successful and continuous cooperation between our universities! Kampai!



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