



**EU-Japan research projects on sustainable transport display great cooperation results during the first EU-Japan Research Cluster event on**  
**“New e-Fuel production methods for sustainable transport”**  
**REPORT**

*In collaboration with fellow projects ORACLE and 4AirCRAFT*

Wednesday, 22 November 2023  
09:30 – 16:00 (UTC +9)  
Hongo Campus, The University of Tokyo, Japan

***Introduction & Welcome words***

The LAURELIN Consortium organised on 22 November 2023 the first EU-Japan e-Fuels research projects Cluster event. Researchers of the three EU-Japan funded research projects – LAURELIN, ORACLE & 4AirCRAFT – met at the Hongo Campus of the University of Tokyo to exchange their knowledge and intermediate research findings. Presentations were held by project representatives. Additionally, two scientific round table discussions were held on Catalysts, e-Fuels and New generation of chemical reactors. The event was organised in presence the Ambassador of the EU to Japan H.E. Jean-Eric Paquet – and Mr. Shigeo Morimoto, Vice-President of the Japanese Science and Technology Agency (JST).

The event was opened by **Professor Teruoki Tago (Tokyo Institute of Technology), Project Co-Coordinator of LAURELIN**, welcoming all panelists and honourable guests. Prof. Tago stated that the research conducted by the three EU-Japan funded projects – LAURELIN, 4AirCRAFT and ORACLE – is key to the further development of renewable e-fuels needed for the further decarbonisation of our modern societies. With the event, he stressed, the three projects aim at providing opportunities & insights for new production methods of renewable e-fuels. To conclude his introduction Prof. Tago outlined the agenda points of the conference, while also introducing the main speakers of the day.

**Ambassador of the EU to Japan, H.E. Jean-Eric Paquet** delivered a keynote introduction to the event, acknowledging the importance of the three projects, in his former capacity as the Director-General for Research & Innovation, European Commission. Together with the Japan Science and Technology Agency (JST), he overviewed the joint call, which resulted in selecting the three proposals. The Ambassador stressed that the event would touch upon what is at the heart of the EU-Japanese relations –both sides having complementary

scientific cultures and complementary strengths. Also, the three research projects would contribute to EU's and Japan's clean tech & climate revolution. Finally, he added, that this substantial collaborative research, inspired the current discussions on a possibility of associating Japan to the EU Research and Innovation Framework Programme, currently, Horizon Europe.

A more intensified scientific relationship would result – according to the Ambassador – into positive mutual research benefits for both actors due to burden & result-sharing. The Ambassador claimed that scientific interactions between the Union and Japan are relevant for both actors, which is being demonstrated by the current three projects.



*H.E. Jean-Eric Paquet, Ambassador of the EU to Japan*

*Photo credits: Aliénor 2024*

### **Opening remarks by Japan Science and Technology Agency (JST)**

**Prof. Wataru Ueda (Kanagawa University) Program Officer at Japan Science and Technology Agency (JST)**, then took the floor, representing JST. Prof. Ueda not only thanked the participants & organisers of the event, but he also underlined the need to initiate implementing the research insights done by the three projects in the society. This as the project results would help the future energy transition with the use of new catalyst technologies and capacity processes. Prof. Ueda concluded his speech by expressing his hope that the event would open further discussions about the EU-Japan Research relationships.



*Prof. Wataru Ueda (Kanagawa University) JST Program Officer  
Kanagawa University  
Photo credits: Aliénor 2024*

### ***EU Strategies and support (video message)***

The introductory part was finalised by a video message by **Dr. Maria Georgiadou, Senior Expert – European Commission, Directorate-General for Research and Innovation**. She expressed her wish & expectation that the three projects will bring new insights to novel fuel development and innovation. As the middle point of most of the projects is nearly reached, she underlined that very interesting scientific results are evolving regarding processes (i.e. catalysts) process materials (i.e. novel chemical reactors) as well as the novel fuel reactors production and deployment challenges themselves. She concluded her message stating that novel and sustainable e-fuels are gaining more importance because of their benefits to tackle the reduction of greenhouse gas emissions.

### ***Presentations of the three EU-Japan funded projects***

The meeting then proceeded with keynote presentations by each project Coordinator of the three EU-Japan funded projects - LAURELIN, ORACLE and 4AirCRAFT. During their speech, researchers presented their respective projects achievements. The presentations can be found on our [event's landing page](#).

**Mr. Luis Iranzo Martínez** – LAURELIN coordinator – underlined the many benefits of working with Japanese partners, giving access to more knowledge as they also keep improving the project and its partners. As the LAURELIN project has reached its middle point, Mr. Martínez could share with the attendees some early results. LAURELIN has indeed already developed new types of reactors which are currently running. Also, the efficiency of

the production methods analysed by LAURELIN is improving and more work will be done with new catalyst characterizations.

**Dr. Emil Drazevic, ORACLE** project coordinator, presented his project by video message. ORACLE aims at electrifying the ammonia production process using three different approaches: thermocatalysis, plasma (electro)catalysis and electrocatalysis. ORACLE is trying to develop a technology that is easier to deploy in smaller plants focusing on lower CAPEX but not necessarily lower OPEX than the classical approach. The project's main goal for the coming months is to increase productivity while also decreasing the energy consumption of the overall process.

Finally, **Dr. Vanesa Gil – 4AirCRAFT** project coordinator – presented her project, which focusses on the production at mild conditions of synthetic kerosene and other liquid fuels produced from CO<sub>2</sub>, green H<sub>2</sub> and renewable electricity. To improve production of such long chain hydrocarbons, the project Consortium is looking at the hybrid catalyst process and hierarchical reactor design. The next step for 4AirCRAFT is to produce this type of e-fuels by different approaches while also validate the proof of the concept, while researching the material components and module reactors. The 4AirCRAFT technology is modular and it could be applied in many other sectors apart from aviation depending on the targeted long-chain hydrocarbon.

After these presentations, the event continued with two scientific round tables on **E-Fuels and New generation of chemical reactors**. Both round tables were moderated by members of the LAURELIN Consortium and stressed the importance of intensified overseas collaboration, the role of e-fuels in a future-proof society and the need for simplified administrative procedures to ensure that scientists can concentrate on doing what they do best: researching.

### ***1<sup>st</sup> Round Table on e-Fuels: challenges and opportunities***

**Moderated by: Dr. Adolfo Benedito Borrás** – AIMPLAS, member of the LAURELIN Consortium

#### **Participants:**

- **Dr. Raf Roelant** – Process Design Center, member of the LAURELIN Consortium
- **Prof. Toru Wakihara** – University of Tokyo, member of the LAURELIN Consortium
- **Dr. Vanesa Gil** – Aragon Hydrogen Foundation and ARAID, member of the 4AirCRAFT Consortium
- **Prof. Kiyoharu Tadanaga** – Hokkaido University, member of the 4AirCRAFT Consortium
- **Prof. Fernando Rey** – ITQ-CSIC, member of the LAURELIN Consortium

- **Prof. Chris Hardacre** – University of Manchester, member of the LAURELIN Consortium

This first round table opened the discussion on the advantages of **e-Fuels** over **Biofuels** and the conventional **fossil fuels**. In his opening speech, **Dr. Adolfo Benedito Borrás** underlined the fact that there is a strong pressure on science and scientists to deliver new technologies in light of the decarbonisation of societies. **Prof. Fernando Rey** added that in order to divert from fossil fuels, a lot of research still has to be done, adding that the regulatory framework must remain stable and predictable so that science and industry can set up clear targets and develop ways of proceeding.

The panel concluded that no decisions should be imposed on the use of certain types of fuels – except for fossil fuels, which should be phased out. The type of fuels used in the energy mix will depend on several factors. Each country and/or region must be able to decide by itself which renewable fuels to adopt. Indeed, production methods highly depend on the availability of raw materials such as sunlight, landmass, wind, water, etc.



*From left to right: Dr. R. Roelant, Prof. T. Wakiyara, Prof. K. Tadanaga, Dr. V. Gil, Prof. F. Rey, Prof. C. Hardacre, Dr. A. Benedito*

*Photo credits: Aliénor 2024*

## 2<sup>nd</sup> Round Table on Catalysts for a new generation of chemical reactors

Moderated by: **Dr. Raf Roelant** – Process Design Center, member of the LAURELIN Consortium

### Participants:

- **Prof. Stefan Wuttke** – Basque Center for Materials, Applications and Nanostructures & Ikerbasque, member of the 4AirCRAFT Consortium
- **Dr. Jonas Gorauskis** – Instituto de Nanociencia y Materiales de Aragón INMA-CSIC and ARAID, member of the 4AirCRAFT Consortium
- **Dr. Jun Maruyama** – Osaka Research Institute of Industrial Science and Technology, member of the ORACLE Consortium
- **Prof. Luis Miguel Martínez Prieto** – CSIC, member of the LAURELIN Consortium
- **Prof. Andrew Beale** – University College London, member of the LAURELIN Consortium
- **Dr. Rudolf Emmerich** – Fraunhofer Institute for Chemical Technology, member of the LAURELIN Consortium



*From left to right: Dr. R. Emmerich, Prof. A. Beale, Prof. L.M. Martínez Prieto, Dr. J. Gurauskis,  
Dr. J. Maruyama, Prof. S. Wuttke, Dr. R. Roelant*

*Photo credits: Aliénor 2024*

The second round table discussed the topic of the new generation of chemical reactors. In his introduction, **Dr. Raf Roelant** outlined that a chemical reactor should:

- Bring together reactants in suitable (surface) concentrations, and
- Set the right temperature, providing energy to sustain endothermic reactions or removing energy to tame reaction exotherms.

In short, the reactor needs to provide the right atmosphere for fruitful encounters of molecules.

Dr. Roelant added that intensifying the design of a reactor allows better control, allowing increased productivity and selectivity while reducing safety risks. As an illustration of this, profs. Martínez Prieto and Wuttke and Dr. Maruyama commented on some specific material and reactor innovations they are working on in their projects.

In the second half of the conversation, the panelists highlighted the need of international cooperation, expressed perceived trends on funding and hiring opportunities, and explained what aspects of their work motivate them the most. The panel reaffirmed that the cooperation between EU and Japanese partners optimises the overall work. The panel also called for **simplified administrative procedures** to ensure that scientists can concentrate on doing what they do best: research.

## **Conclusions**

The event was concluded by **Mr. Shigeo Morimoto, Vice-President of JST**, who congratulated the three projects' researchers for their contributions towards new production renewable e-fuels production methods and for providing great insights during the two scientific round tables. Convinced that the outcomes of the three projects will contribute to a greener and more sustainable future, Mr. Morimoto underlined that *“this event attests the success of European and Japanese Research Cooperation”*. *“The discussions and presentations held have been a great source of inspiration for further progression on the international EU-Japan cooperation in the field of Research & Innovation”*, he added.

**Mr. Luis Iranzo Martínez, LAURELIN co-project leader**, closed the meeting by stating his opinion that, like a chemical reactor, the event had succeeded in providing “the right

atmosphere for fruitful encounters”, adding his hope that it had brought us closer to the renewable e-fuels of the future.

The three research projects will continue organising clustering activities to commonly contribute to the decarbonisation of the European and Japanese societies. In this light, Mr. Iranzo Martínez argued that the projects are on track to find solutions from different angles, facing the major challenge of this era.



*Mr. Shigeo Morimoto, JST Vice-President*

*Photo credits: Aliénor 2024*

More information about the event can be found [here](#).

### **Next steps**

The three EU-Japan funded projects will come together at the end of 2024 to continue their discussions and share their respective developments. This second EU-Japan Research cluster event will be organised in Europe by the 4AirCRAFT Consortium. Date and location still have to be defined.

For more information, please consult our project websites and sign up to our Newsletter:

- [LAURELIN](#)
- [ORACLE](#)
- [4AirCRAFT](#)



Involving universities, research organisations and SMEs from Belgium, Germany, Japan, the Netherlands, Spain and the United Kingdom, LAURELIN is a 48-month project funded by the European Union's Horizon 2020 programme and the Japan Science and Technology Agency (JST). Learn more about the LAURELIN project by visiting our [website](#) and watching the [project video](#).



*Project representatives of LAURELIN, ORACLE & 4AirCRAFT together with Prof. Ueda (JST – Kanagawa University)*

*Photo credits: Aliénor 2024*

Media contact or for any further information:  
Cécile Fouquet – Aliénor: [cecile.fouquet@alienor.eu](mailto:cecile.fouquet@alienor.eu)

*– End –*

## List of participants

LAURELIN Consortium		
Adolfo	BENEDITO BORRAS	AIMPLAS
Luis	IRANZO MARTINEZ	AIMPLAS
Rudolf	EMMERICH	Fraunhofer ICT
Matthias	GRAF	Fraunhofer ICT
Fernando	REY	ITQ-CSIC
Luis Miguel	MARTÍNEZ-PRIETO	ITQ-CSIC
Raf	ROELANT	Process Design Center
Ema	NEMET	Process Design Center
Piya	GOSALVITR	University of Manchester
Rosa	CUELLAR-FRANCA	University of Manchester
Chris	HARDACRE	University of Manchester
Andrew	BEALE	University College of London
Raquel	SIMANCAS	The University of Tokyo
Toru	WAKIHARA	The University of Tokyo
Teruoki	TAGO	Tokyo Tech
Cécile	FOUQUET	Aliénor
Thibault	VAN LIERDE	Aliénor

ORACLE Consortium		
Jun	MARUYAMA	Osaka Research Institute of Industrial Science & Technology
Zyan	SIROMA	AIST

4AirCRAFT Consortium		
Vanesa	GIL	Aragon Hydrogen Foundation & ARAID
Jonas	GURASKIS	INMA-CSIC & ARAID
Stefan	WUTTKE	BC Materials & Ikerbasque
Kiyoharu	TADANAGA	Hokkaido University

### Japan Science and Technology Agency (JST)

Masato	ASANO	JST
Oscar	RUDENSTAM	JST
Junko	SHIRAISHI	JST
Masae	SUGAMARA	JST
Wataru	UEDA	JST (Kanagawa University)
Keiichi	TOMISHIGE	JST (Tohoku University)
Yasushi	SEKINE	JST (Waseda University)
Miho	YAMAUCHI	JST (Kyushu University)

### Other

Keiichi	TOMICHI	Tohoku University
Hideyuki	HORINO	Tohoku University
Raichi	ASAMI	Tokyo Tech
Kentaro	KIMURA	Tokyo Tech
Koki	AWANO	Tokyo Tech
Misaki	ENDO	Tokyo Tech
Mohamed	ALBAHAR	Saudi Aramco
Yasuhiro	MAGATANI	Hykekom Co. Ltd
Yasushi	SEKINE	Waseda University
Miho	YAMAUCHI	Kyushu University
Zinu	ZHOU	The University of Tokyo
Antonio	ATIENZA MARQUEZ	Yokohama National University