Press Release #1665

February 1, 2024

Japan Science and Technology Agency (JST)
5-3, Yonbancho, Chiyoda-ku, Tokyo 102-8666

JST to fund six projects as a part of the EIG CONCERT-Japan framework of the Strategic International Collaborative Research Program (SICORP)

The Japan Science and Technology Agency (JST) (HASHIMOTO Kazuhito, President) has approved funding for six new international collaborative research projects through the Solutions for Carbon-Neutral Cities call for proposals in cooperation with eight funding agencies from seven European countries as a part of the EIG CONCERT-Japan framework under the Strategic International Collaborative Research Program (SICORP) *1 (Attachment 1, 2).

EIG CONCERT-Japan is an international joint initiative to support and enhance science, technology and innovation cooperation between Japan and European countries (Attachment 3).

In 2023, the tenth EIG CONCERT-Japan call for proposals was conducted from May 23 to August 1 with the theme Solutions for Carbon-Neutral Cities, to which a total of 15 proposals were submitted on topics including sustainable smart urban mobility, water, soil and air quality, and efficient waste management. Following an in-depth evaluation by a scientific committee (Attachment 4) and subsequent deliberations between participating funding agencies, it has been decided that six projects will be funded.

Projects will be supported for a period of three years during which the Japan-side researchers in each project will receive up to 18.2 million JPY.

*1 EIG CONCERT-Japan:
The CONCERT-Japan initiative was funded by the European Union as one of their international cooperation activities within the ERA-NET (European Research Area Network) of the Seventh Framework Programme for Research and Technology Development (FP7). Its continuation, the EIG CONCERT-Japan program, aims to further develop existing cooperation between European countries and Japan by promoting and enabling effective collaboration in science and technology research. (https://concert-japan.eu/)

Attachments

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Annex: Overview of the EIG CONCERT-Japan Joint Call on “Solutions for Carbon-Neutral Cities”

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Attachment 1

EIG CONCERT-Japan
Projects Selected for Funding

* The Consortium Lead is underlined

	Title	Researcher Country/Name/Affiliation/	Research Outline
1	Conversion of atmospheric CO_2 into energy storage in Na-CO_2 battery (CO_2capture)	Japan AOKI Yoshitaka Professor Hokkaido University Faculty of Engineering Poland <u>Damian Kowalski</u> Assistant Professor Faculty of Chemistry University of Warsaw Türkiye Fabienne Dumoulin Associate Professor, Department of Medical Engineering, Acibadem Mehmet Ali Aydinlar University	This project demonstrates the concept of an alkaline metal-CO_2 battery with a cathode reaction of $CO_2 + 4e^- \rightarrow C + O_2$, aiming to simultaneous make possible electricity storage and CO_2 fixation. Specifically, the Japan team will conduct a material survey for Mn and Fe base perovskites, i.e. (La, Sr)(Mn, Fe)$O_{3-\delta}$ catalysts which are exceptionally active for CO_2 reduction in organic electrolytes. Fundamental studies towards understanding of the cathode reaction mechanism will be performed by means of operando XAS at synchrotron facility. The Türkiye team will develop an organic electrolyte solution with an ability of selective CO_2 dissolution. At the same time, the Poland team will develop the battery assembly with integrating 1-D nanotubular electrode for effective accumulation of discharge C products during battery operation. The expected outcome of the project is to achieve the development of a proof-of-concept Na-CO_2 battery that integrates energy storage with CO_2 recycling as a promising technology in moving towards carbon neutrality.

	Title	Researcher Country/Name/Affiliation	Research Outline
2	Multi-Input Deep Learning for Congestion Prediction and Traffic Light Control (TRALICO)	Japan ARAI Ismail Associate Professor, Information Initiative Center, Nara Institute of Science and Technology	This project takes a multidisciplinary approach by combining advanced deep learning techniques with innovative traffic control strategies to predict congestion patterns and optimize traffic light control in order to lessen heavy traffic jams and in turn reduce CO_2 emissions. In particular, the team from Japan will focus on making improvements to transformer models, known for their self-attention mechanism. The Hungary team will aggregate the data and develop an algorithm for traffic light control using the input data from the Japanese team. Lastly, the Türkiye team will apply the algorithm to the real road conditions as a part of a verification test. After integrating the traffic light control strategy with the city infrastructure, the system will be tested first in simulated conditions and then under realistic conditions.
		Hungary Vilmos Simon Associate Professor, Faculty of Electrical Engineering and Informatics, Budapest University of Technology and Economics	
		Türkiye Ayca Merve Yildiz Staff, ISBAK Istanbul IT and Smart City Technologies Inc.	

Title		Researcher Country/Name/Affiliation	Research Outline
3	Investigating the Role of Greenery to Improve Climate Resilience, Water, Soil and Air Quality in Dense Urban Fabric (GREENQUAL)	Japan KITA Michihiro Professor, Graduate School of Engineering, Osaka University	This research aims to achieve four objectives, namely to: first, design and test urban green surfaces (UGSs) that reduce pollutants; second, develop a method for evaluating the accessibility of UGSs; third, develop a planning technology that integrates the richness of people's urban activities with ecological resilience; and fourth, create handbooks for realizing these goals. As a part of this research, the Poland team will be responsible for surveying green spaces in three target cities, designing and testing UGSs, as well as analyzing accessibility by using satellite imagery and GIS. To complement this, the Hungary team will conduct simulations to determine the relationship between environmental factors such as infrastructure, buildings, air and water quality, and resilience. Lastly, the Japan team will systematize the planning theory and technology of urban ecosystems based on green infrastructure by integrating the technologies of the Japanese and European teams.
		Hungary Viktória Sugár Associate Professor, Ybl Miklós Faculty of Architecture and Civil Engineering, Óbuda University	
		Poland Barbara Czesak Associate Professor, Faculty of Environmental Engineering and Land Surveying, University of Agriculture in Krakow	

	Title	Researcher Country/Name/Affiliation	Research Outline
4	Photoactive Mo_6 Clusters/Semiconductors Nanocomposites for Sustainable Water Remediation (PHOTOMOS-H2O)	Japan SUGAHARA Yoshiyuki Professor, Faculty of Science and Engineering, Waseda University Czech Republic Kaplan Kirakci Researcher, Department of Materials Chemistry, Institute of Inorganic Chemistry of the Czech Academy of Sciences France Fabien Grasset Director, Laboratory for Innovative Key Materials and Structures (LINK), National Centre for Scientific Research Régis Guégan Associate Professor, ICMN, CNRS - University of Orléans Spain* Marta Feliz Tenured Scientist, Institute of Chemical Technology, Technical University of Valencia-Spanish National Research Council	This project aims to develop nanocomposite materials offering an environmentally-friendly and energy efficient approach to water treatment. These materials will be based on octahedral molybdenum cluster complexes (Mo_6 clusters) and semiconducting nanoparticles and nanosheets for the degradation of harmful chemicals and photoinactivation of pathogenic bacteria using visible light. In order to achieve this, the Japanese team will produce semiconducting nanoparticles and nanosheets and combine them with Mo_6 clusters. The Czech team will develop Mo_6 clusters and implement photophysical studies and sterilization. One of two French teams (University of Orléans) will prepare graphene and implement surface modifications, prepare composite and their evaluation, and implement composite preparation with polymers. The other French team (National Centre for Scientific Research) will develop the film by a liquid phase method and implement grazing incidence X-ray scattering. The Spain team will implement X-ray photoelectron spectroscopy and decomposition of harmful substances by using a photocatalyst. With this research, this project aims to develop a water treatment method using visible light with high cost-benefit performance, efficiency and low CO_2 emission will be developed to contribute to sustainable urban area water purification.

* In-kind participation (self-funding) and not directly funded under this call.

	Title	Researcher Country/Name/Affiliation	Research Outline
5	Hollow Fiber Heat Exchangers with Reduced Permeability for Smart Cities (HFHX)	Japan Miksik Frantisek Designated Associate Professor, Institute of Innovation for Future Society, Nagoya University	This research aims to develop innovative heat exchangers using polymer hollow fibers. Heat exchangers play a crucial role in all heat transfer processes, including cooling and heating, directly impacting carbon dioxide emissions. The Czech team will work on a new manufacturing method to restrict the permeability of hollow fibers and the production of new polymer heat exchangers from these fibers. The Japan team will focus on the post-processing of polymer hollow fibers, measuring the permeability of the heat transfer medium, and developing and testing new polymer heat exchangers for electric vehicles. The Slovakia team will develop a new application for wide-area air conditioning with unprecedented efficiency. By doing this, this research will enable the development of innovative technologies for hollow fiber preparation, such as post-processing surface treatments and co-extrusion manufacturing for polymer hollow fiber heat exchangers. It will facilitate the realization of new types of heat exchangers that have less than 1/7th of the carbon footprint and 50% weight reduction compared to their aluminum counterparts, while also possessing long operating times and high durability. Additionally, the development of new applications is expected to contribute to the improvement of energy efficiency in current heating and cooling technologies.
		Czech Republic Erik Bartuli Researcher, Faculty of Mechanical Engineering, Brno University of Technology	
		Slovakia Jaroslav Longauer Researcher, Institute of Materials and Machine Mechanics, Slovak Academy of Sciences	

	Title	Researcher Country/Name/Affiliation	Research Outline
6	A proactive Social-based framework for SMART transportation (SO-SMART)	Japan WAKAMIYA Shoko Associate Professor, Graduate School of Science and Technology, Nara Institute of Science and Technology	In this project, a smart transportation system will be developed using social networks, cloud computing and data science services by drawing on co-design by stakeholders and citizens. It will be tested in the Onna-Ishikawa area of Okinawa, which is currently under severe environmental pressure due to heavy transportation flows. The teams from Japan will manage the project and lead the development of social-based infrastructures and interactions with local authorities, socio-economical partners and community associations. The Hungary team is in charge of the development of data infrastructure using innovative cloud computing approaches. The Türkiye team is in charge of a system of smart transportation and geographical information. Lastly, the France team will contribute with processing and visualization of geographical information. With these efforts, a spatial web framework that leverages current transportation services toward incentives, co-participation and that facilitate transportation behavioral changes will be developed as a part of a smart community with sustainable transportation services.
		Hungary Attila Kertesz Associate Professor, Software Engineering Department University of Szeged	
		Türkiye Ismail Karas Professor, Computer Engineering Department, Karabuk University	
		France Teriitutea Quesnot Associate Professor Department of Geography University of Western Brittany	

Attachment 2

EIG CONCERT-Japan
Participating Funding Agencies

Country	Funding Agency
Japan	Japan Science and Technology Agency (JST)
Slovakia	Slovak Academy of Sciences (SAS)
Czech Republic	Czech Academy of Sciences (CAS)
Czech Republic	Czech Republic: Ministry of Education, Youth and Sports (MEYS)
Türkiye	The Scientific and Technological Research Council of Türkiye (TUBITAK)
Hungary	National Research, Development and Innovation Office (NKFIH)
France	National Center for Scientific Research (CNRS)
Bulgaria	Bulgarian National Science Fund (BNSF)
Poland	National Centre for Research and Development (NCBR)

Attachment 3

EIG CONCERT-Japan
Member Institutions

The EIG CONCERT-Japan consortium is made up of the following 13 funding agencies from 10 European countries and Japan:

Country	Member Institution
Japan	Japan Science and Technology Agency (JST)
Spain	National State Agency (AEI)
Slovakia	The Slovak Academy of Sciences (SAS)
Czech Republic	Czech Academy of Sciences (CAS)
Czech Republic	Ministry of Education, Youth and Sports (MEYS)
Germany	DLR Project Management Agency (DLR)
Türkiye	The Scientific and Technological Research Council of Türkiye (TUBITAK)
Norway	The Research Council of Norway (RCN)
Hungary	National Research, Development and Innovation Office (NKFIH)
France	The National Center for Scientific Research (CNRS) (Secretariat)
France	Agence Nationale de la Recherche (ANR)
Bulgaria	Bulgarian National Science Fund (BNSF)
Poland	National Centre for Research and Development (NCBR)

Attachment 4

EIG CONCERT-Japan
Scientific Committee Member List

Country	Name	Affiliation	Role
Switzerland	Dr. Guillaume Habert	ETH Zurich	Chair
France	Dr. Jean-Benoit Le Cam	University of Rennes	Member
Slovakia	Dr. Martin Nosko	Slovak Academy of Sciences	Member
Türkiye	Dr. Fatma Öztürk	Bolu Abant Izzet Baysal University	Member
Japan	Dr. FURUMAI Hiroaki	Chuo University	Member
Czech	Dr. Miroslav Svitek	Czech Technical University	Member
Hungary	Dr. Janos Tamas	University of Debrecen	Member
Poland	Dr. Blanka Tundys	University of Szczecin	Member
Bulgaria	Dr. Todorka Vladkova	University of Chemical Technology and Metallurgy	Member

Annex

Overview of the EIG CONCERT-Japan Joint Call on "Solutions for Carbon-Neutral Cities"

This EIG CONCERT-Japan joint call for proposals is titled Solutions for Carbon-Neutral Cities and focuses on three key research themes: 1) Sustainable Smart Urban Mobility, 2) Improving Water, Soil and Air Quality in Carbon-Neutral Cities and 3) Efficient Waste Management. The themes focus on research to promote the development of solutions to improve urban mobility, reduce carbon emission, and help build a better society.

1. Prospective Applicants

Researchers are required to form consortia which must include partners from Japan and at least 2 European countries. Research leaders are required to possess adequate insight and experience to effectively implement their proposed joint research during their research period.

2. Evaluation Process

Proposals were subjected to evaluation by online peer review and an evaluation committee made up of experts nominated by the participating funding agencies. The participating funding agencies then met to decide on project selection, which was based on discussion of the results of that comprehensive evaluation.

3. Evaluation Criteria

- Scientific excellence
  - Sound research concept and quality of objectives
  - Ambition, innovative potential and uniqueness of the research idea
  - Scientific track–record, potential of the partners (including publications in scientific journals)
  - Scientific standing of the organizations the applicants belong to

- Impact of project results
  - Impact of the project on the scientific field, community
  - Contribution to enhancing innovation capacity and integration of new knowledge
  - Expected exploitation and dissemination of the results
  - Added value of the multilateral project consortium

- Implementation
  - Quality and effectiveness of the methodology
  - Feasibility of the work plan (in relation to governance, adequate budget, resources, time schedule)
  - Collaborative interaction and complementarity of project partners
  - Expected sustainability of the collaboration
  - Interdisciplinarity
  - Involvement of early-stage researchers and gender balance