Promotion of Academic Research, Science and Technology

The Hitachi Global Foundation Science and Technology Seminars

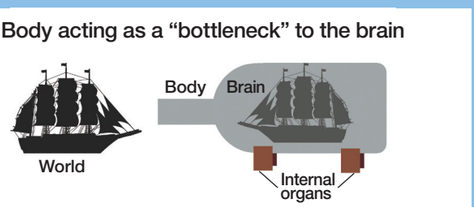
“Brain Decoding – Decoding Brain Images with AI"

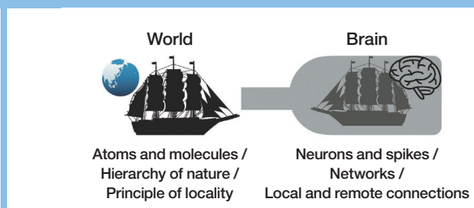
The 18th Hitachi Global Foundation Science and Technology Seminar took place online on November 26 (Sat).

This program offers seminars in a lecture format to provide the general public with opportunities to learn about the latest topics in science and technology.
The aim is to have people of all ages experience the excitement of science and appreciate the importance of seeing things through the eyes of science. Lecturers invited to our program include scientists involved in cutting-edge research and recipients of our Foundation’s research fund, The Kurata Grants.
The 18th seminar invited Dr. Yukiyasu Kamitani, who specializes in brain informatics at The Kyoto University Graduate School of Informatics. He lectured on his research involving brain decoding technology that uses artificial intelligence (AI) to decode and visualize what we think and the content of dreams.

The brain decoding technology developed by the professor treats brain activity as a code for representing mental content and analyzes brain signals through machine learning-based pattern recognition, thereby visualizing the world people see through their eyes and what they see in their dreams. Dr. Kamitani is currently exploring this technology for AI, robots, and other information and communication technologies.

Brain-body relationship presented by Dr. Kamitani





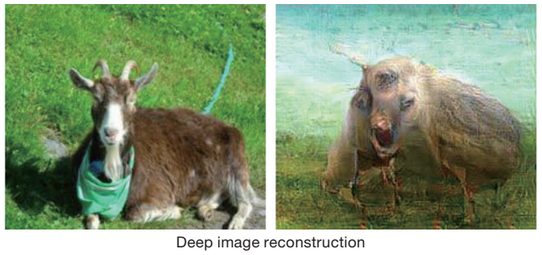
Dr. Kamitani described specific methods for the content below with research data, images, and videos. He also talked about the possibilities of future applications, including communicating with people who struggle with verbal communication.

Externalizing the brain’s world model, “neuroverse”

- Decoding brain images
- Converting brain-to-machine signals
- Brain-machine interface (BMI)

Sharing the “neuroverse”

- Brain code conversion and brain-to-brain communication
- Brain-mediated art


Deep image reconstruction

After the lecture, Dr. Kamitani answered the viewers’ many questions. We received many comments such as "I saw the possibility of brain images being shared through AI.”

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The Hitachi Global Foundation
Nurturing people, connecting to the future

HITACHI
Inspire the Next

News Letter Vol.44/Feb.2023

The Hitachi Global Foundation publishes news letters featuring its many activities. We offer various types of news about our Foundation, ranging from activity reports on symposiums, seminars, awards ceremonies, and other events to our latest topics. Please take a look to find out more.

Realization of an Inclusive Society

Forum: Developing the “Power to Thrive” for High School Students with Foreign Backgrounds

– What support is needed based on the current educational situation

A “Realization of an Inclusive Society” forum titled “Developing the ‘Power to Thrive’ for High School Students with Foreign Backgrounds – What support is needed based on the current educational situation” was held online on December 10 (Sat), 2022. The event featured lectures by Mr. Yoshiaki Ishida from the Ministry of Education, Culture, Sports, Science and Technology, and Dr. Misako Nukaga from the Graduate School of Education, The University of Tokyo. Mr. Ishida spoke on how to enhance educational measures for foreign students, including institutionalizing Japanese language instruction in high schools and other institutions. Dr. Nukaga talked about the educational situation and challenges in Tokyo based on the survey results of Tokyo metropolitan high schools. In the forum’s panel discussion, people with foreign backgrounds in Kanagawa Prefecture shared their experiences and activities to pass on what they experienced in high school and university to their juniors. The participants deepened their understanding of the importance of greater educational support for high school students with multicultural backgrounds.

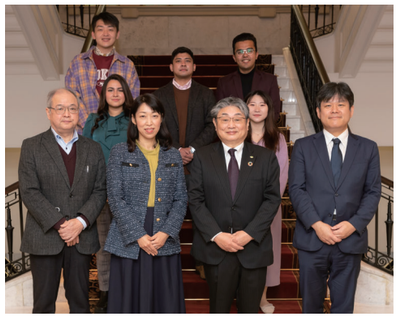


Photo: Front from the left, Mr. Seiju Takahashi, Multicultural Education Network (ME-net) Kanagawa
Dr. Misako Nukaga, Graduate School of Education, The University of Tokyo
Mr. Osamu Naito, President, The Hitachi Global Foundation
Mr. Yoshiaki Ishida, Ministry of Education, Culture, Sports, Science and Technology
Second row from the left, Ms. Shaikh Fujihara Aisha, Ms. Wang Xixuan, Multicultural Youth Project members
Third row from the left, Mr. Sasaki Seisyo, Mr. Naeem Saad Bin, Mr. Yamazaki Rajan Valencia, Multicultural Youth Project members

Lecture❶

“Enhancing Educational Measures for Foreign Students”
– Institutionalizing Japanese language instruction in high schools and other institutions

Mr. Yoshiaki Ishida, Director, International Education Division, Education Policy Bureau, Ministry of Education, Culture, Sports, Science and Technology

Lecture❷

“Challenges and Possibilities for Tokyo to Provide Educational Opportunities and Comprehensive Support for Students with Foreign Backgrounds”
– Based on a questionnaire survey of 79 Tokyo Metropolitan high schools and interviews with 30 schools

Dr. Misako Nukaga,Graduate School of Education, The University of Tokyo

Panel discussion

Activity report on the “Multicultural Youth Project” created by students with foreign backgrounds in Kanagawa Prefecture for their juniors
Alumni members sharing their roles and lives in Japan with their juniors

Questionnaire after the forum some of the many comments received from the participants

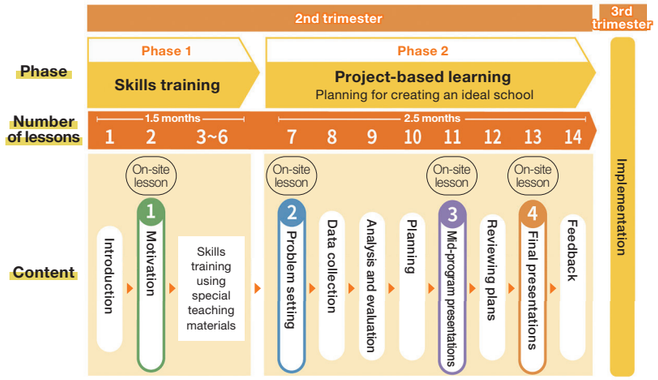
Learning about this topic is first and foremost, after which we should share what we have learned with others not very interested in. I was able to learn about the government’s direction and Tokyo’s current status as well as listen to the voices of young people with multicultural backgrounds. I want to start doing what I can, little by little. / To create a community where people with foreign backgrounds can play active roles, more Japanese people need to accept multicultural differences. / It is important to have future generations involved in this issue. I realized anew that various organizations must work together to build a mature inclusive society able to attract people from around the world for decades to come. / I was impressed with the candid opinions of the Multicultural Youth Project members. I will sincerely support their efforts to tackle future challenges together. I want to join them to help children. / I want to share the Multicultural Youth Project with many people. We adults should play a leading role in creating a society where everyone can pursue their dreams without barriers.

Human Development

Hitachi Future Innovator Program

2nd-4th On-site Lessons

The Hitachi Global Foundation has developed the project-based learning “Hitachi Future Innovator Program” for fifth graders with the aim of fostering the abilities to find and solve problems required of future human resources in science and technology. Since 2016, we have collaborated with Hitachi Group companies to offer on-site lessons at schools.



The FY2022 program was carried out amid the coronavirus pandemic, as in the previous fiscal year, but schools in Japan are now returning to a normal pre-pandemic classroom setting. On-site lessons have been conducted at four schools, with two schools learning online and the other two in-person with thorough anti-infection measures in place.

Kashiwa City Sakaine Higashi Elementary School

Fourth on-site lesson (final presentations) on October 17

Three employees from Hitachi Transport System, Ltd. were invited as lecturers to the fourth on-site lesson for the final presentations. The groups gave presentations in a different room as other students watched online in their classrooms. The presenters looked nervous, but they were well prepared thanks to the lecturers’ advice after the mid-program presentations. All 12 groups of two classes did an outstanding job. At the end of the lesson, the principal delivered a warm-hearted message to the sixth graders who had worked so hard. Both teachers and lecturers were impressed by the excellent presentations that showed just how much the students had learned through our program.


Fourth on-site lesson

Toda Minami Elementary School in Toda City

Second on-site lesson (problem setting) on October 13
Third on-site lesson (mid-program presentations) on November 22

For the second on-site lesson, six Hitachi Group company employees visited the school as lecturers. In the gym, students were divided into six groups to work on problem setting with the lecturers while sitting in circles. All groups interacted well with the lecturers by actively asking them questions and sharing their team’s opinions.

In the third on-site lesson, students gave presentations in the gym and the lecturers advised them online. The presentations were streamed online to each class, with the fifth graders carefully watching the other classes’ presentations.


Second on-site lesson

Joyo Elementary School in Tamamura Town

Second on-site lesson (problem setting) on October 12
Third on-site lesson (mid-program presentations) on November 18

The second on-site lesson was held with six employees from Hitachi Solutions Technology, Ltd. invited as lecturers. Students were assigned to three classrooms (computer, music, and fifth grade rooms) where they worked in groups on problem setting with the lecturers. The students quickly got along with the lecturers and shared a variety of information to discuss the challenges facing their school.

The mid-program presentations were given in the third on-site lesson. The students looked a little nervous, but they did their best to present what they had prepared over the past month. With specific advice offered online by the lecturers, the students began discussing their upcoming final presentations in teams.


Third on-site lesson

Oomika Elementary School in Hitachi City

Second on-site lesson (problem setting) on November 4
Third on-site lesson (mid-program presentations) on December 6

Four Hitachi, Ltd. employees were invited as lecturers to the second on-site lesson. Students were divided into teams in three classrooms (art, science, and home economics rooms) where they discussed plans for creating an ideal school with the lecturers. At first, the students looked nervous about the new lecturers, but they gradually spoke up during the team discussions and became actively involved in the program.

In the third on-site lesson, students presented the outcomes of their teams’ work. After the mid-program presentations, the lecturers advised the students on their final presentations. They carefully listened while taking notes.


Second on-site lesson

Promotion of Academic Research, Science and Technology

The Hitachi Global Foundation Asia Innovation Award

FY2022 Recipients

The Hitachi Global Foundation Asia Innovation Award is an award program launched in 2020 to promote science, technology and innovation that contributes to solving social issues and realizing a sustainable society in the ASEAN region. This award recognizes individuals and groups that undeniably served public interests through their outstanding achievements in research and development (R&D) in the fields of science and technology, including their visions of an ideal future society and social implementation plans for R&D as a means of achieving SDGs.

In the fiscal year of 2022, we solicited research and R&D achievements from 23 universities in 6 ASEAN countries (Cambodia, Indonesia, Laos, Myanmar, Philippines, and Vietnam) contributing to each of selected targets of Goal 6 (Clean Water and Sanitation) and Goal 11 (Sustainable cities and communities).

Goal 6 "Clean Water and Sanitation"
Targets **6.1** Access to safe and affordable drinking water, **6.2** Access to sanitation and hygiene, **6.3** Reducing pollution, minimizing release of hazardous chemicals and materials, **6.4** Increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater, **6.5** Integrated water resources management, **6.6** Protect and restore water-related ecosystems

Goal 11 "Sustainable Cities and Communities"
Targets **11.1** Upgrade slums, **11.3** Inclusive and sustainable urbanization, **11.5** Reduce damage and economic losses caused by disasters, **11.6** Paying attention to air quality and waste management, **11.7** Access to green and public spaces, **11.b** Develop and implement disaster risk management

Sixteen recipients were selected after thoroughly reviewing the applications accepted through recommendations from eligible universities. In January 2023, we held an award ceremony for the Best Innovation Award winners from FY2020 through FY2022 and announced the FY2022 awardees on our website.

Best Innovation Award 3 million yen

Bio-based Aerogels from Agricultural Waste for Water Treatment
Country Vietnam Institution Ho Chi Minh City University of Technology
Name Dr. Phung Thi Kim Le
6.3

Dr. Phung Thi Kim Le has successfully developed an environmentally friendly technology and process to produce aerogels from agricultural waste. Recycling agricultural waste causing serious environmental problems into high-performance products for water pollution control has great importance. She plans to promote aerogel production on an industrial scale and apply the finished products to wastewater treatment systems, canals, and riverbeds.

Development and Implementation of Hybrid Material-based Adsorbents to Provide Safe Water Sources
Country Indonesia Institution Gadjah Mada University
Name Dr. Sri Juari Santosa
6.3

Dr. Sri Juari Santosa has synthesized magnetite and hydrotalcite to develop an absorbent hybrid material (Mag-HT) that effectively removes dissolved organic compounds (DOCs) in raw water treated for drinking water. He plans to introduce this synthetic material to DOC removal processes for drinking water treatment operators, collaborate with the textile industry, and share his expertise with Vietnam, which faces similar water problems.

Outstanding Innovation Award 1 million yen

Toren Biogas (Torbi) to Recover Biogas and Liquid Fertilizer from Food Waste
Country Indonesia Institution University of Indonesia
Name Dr. Cindy Rianti Priadi
11.3 11.6

Dr. Cindy Rianti Priadi has developed “Torbi,” a cost-effective linear low-density polyethylene (LLDPE) reactor that converts food waste into biogas and liquid fertilizer.

Building Inclusive and Sustainable Urban Periphery through Government-industry Cooperation
Country Indonesia Institution Bandung Institute of Technology
Name Dr. Delik Hudalah
11.3

Dr. Delik Hudalah has worked to facilitate cooperation among seven industrial park managers, governments, and state-owned companies in and around Jakarta to address the issue of declining competitiveness resulting from fragmented and disconnected infrastructure.

Development of a Community Based Multi Hazard Early Warning System
Country Indonesia Institution Gadjah Mada University
Name Dr. Teuku Faisal Fathani
11.5 11.b

Dr. Teuku Faisal Fathani has adopted a technological, social, cross-disciplinary approach to develop an early warning system (EWS) intended to function appropriately and effectively in various disaster areas.

Wetland Roof (WR) System for Domestic Wastewater Treatment and Sustainable Cities
Country Vietnam Institution Ho Chi Minh City University of Technology
Name Dr. Thanh Xuan Bui
6.3

Dr. Thanh Xuan Bui has developed an environmentally friendly, thin-layer wetland roof (WR) system for sewage treatment using local plants and ultra-thin filters.

Encouragement Award 500,000 yen

Development of High Value-added Vinegar Products Using Cashew Apple
Country Cambodia Institution Royal University of Agriculture
Name Dr. Chim Chay
11.6

Freshwater Biodiversity Surveys for Species Discovery, Conservation, and Aquatic Resource Management
Country Philippines Institution Ateneo de Manila University
Name Dr. Emmanuel Diza Delocado
6.6

The Philippine Groundwater Outlook (PhiGO) Project
Country Philippines Institution Ateneo de Manila University
Name Dr. Maria Aileen Leah Guerrero Guzman
6.1 6.4 6.5

SONJO: Humanitarian Movement with Online-Based Social Capital in Yogyakarta during the Pandemic
Country Indonesia Institution Gadjah Mada University
Name Dr. Rimawan Pradiptyo
11.3 11.5 11.b

Blockchain-based Sustainable Building Information Modelling Management Technology for Inclusive and Sustainable Urbanization
Country Indonesia Institution University of Indonesia
Name Dr. Riri Fitri Sari
11.3 11.6

Oryzinc® Bioinoculant Reduces Crop Nitrogen and Zinc Fertilizer Requirement by 50%
Country Philippines Institution University of the Philippines Los Baños
Name Mr. Robert Alejandro Nepomuceno
6.3

Establishment of a Waste-water Treatment System with Biogas Generation, Purification, and Supply System for pig farms and a Production and Distribution Network for Biofertilizer
Country Laos Institution National University of Laos
Name Dr. Sounthisack Phommachanh
6.3 6.4 6.6

Combination of Anaerobic and Aerobic Processes to treat Textile Wastewater
Country Indonesia Institution Bandung Institute of Technology
Name Dr. Tjandra Setiadi
6.3 6.6

Development of Metal Oxide Composites for Wastewater Purification Technology
Country Vietnam Institution Hanoi University of Science and Technology
Name Dr. Tuan Anh Vu
6.2 6.4 6.6

Aloxy - Sustainable Lamp System Using Algae
Country Vietnam Institution Hanoi University of Science and Technology
Name Dr. Yen Thi Thai Doan
11.6 11.7