# SDGs Report 2021

# HIROSHIMA UNIVERSITY





# The SDGs start with peace.

# Hiroshima University,

# a university pursuing peace

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# **Greetings from the President**

Hiroshima University is a research university that advocates the five principles of its Guiding Principles: "The Pursuit of Peace," "The Creation of New Forms of Knowledge," "The Nurturing of Well-Rounded Human Beings," "Collaboration with the Local, Regional, and International Community" and "Continuous Self-Development." In 2017, we formulated the long-term vision "SPLENDOR PLAN 2017" and embodied the five Guiding Principles that had been the spiritual pillars until then as an action plan aiming to establish "Science for Sustainable Development." They are exactly in line with the principles of the Sustainable Development Goals (SDGs) adopted by the United Nations General Assembly in 2015, and we determined to further contribute to humankind, society and the future through all the efforts of the university as a whole.

Based on this determination, we established the FE/SDGs Network or the Network for Education and Research on Peace and Sustainability (NERPS) as an one-stop office for university-wide SDGs-related activities in 2018, as the first year of SDGs implementation. "FE" stands for "Future Earth," an international collaborative research platform that aims to realize a sustainable global society. As a member of the FE Japan committee, NERPS serves as the representative institution of the entire university and as a contact point for internal and external communication regarding the SDGs. Furthermore, it plays a very important role as a research promotion base for the transdisciplinary study "Peace and Sustainability" based on collaboration with various actors.

As a university-wide feature, our university is characterized by the integration of thorough university reform and university-wide efforts to achieve the SDGs. For example, Hiroshima University and Higashi-Hiroshima City, where its main campus is located, collaborated to make the Hiroshima University "Carbon Neutral x Smart Campus 5.0 Declaration" which aims for the co-creation of a new society through the "Town & Gown Concept" and to realize carbon neutrality and Society 5.0 on the Higashi-

THE STREET OF BALL

Hiroshima Campus by 2030. We established Hiroshima University Town & Gown Office as a promotion organization to realize the declaration. As the 4th medium-term target period of the National University Corporation will start in FY2022, this initiative is positioned alongside education and research, and the entire university will make efforts to contribute to the achievement of the SDGs.

At the same time, by establishing the Academy of Hiroshima University to which all faculty members belong and by integrating and reorganizing the graduate schools from 11 to 4 graduate schools, we have become able to cope with both cross-disciplinary education and research and offer more efficient and flexible problem-solving types of interdisciplinary and practical education and research that includes the SDGs to meet the diverse and complex needs of society. Furthermore, the Researcher Directory, allows you to easily search for researcher information, and understand how the researchers' education and research content and research outcomes contribute to achieving the SDGs at a glance.

In this way, Hiroshima University has positioned contributions to the SDGs as a top university-wide priority, and makes further contributions in terms of various aspects of research, education, and social contribution through synergistic effects with thorough university reforms and university-wide efforts to achieve the SDGs. We hope that this report will give you a better understanding of the SDGs initiatives of our university, and we ask for your continued guidance and support.

Mitsuo Ochi President, Hiroshima University

## Greetings from the Director of NERPS

It has been three years since Hiroshima University started SDGs implantation in full swing, and Hiroshima University has steadily made efforts toward achieving the SDGs.

First, there has been steady progress on HU members' activities on advancing the SDGs, and interest and awareness level of the SDGs throughout the university have increased. "THE University Impact Rankings," a participatory university ranking to promote and evaluate the university's efforts toward advancing the SDGs, was inaugurated in 2019, and Hiroshima University has been participating in the ranking since its inception. The ranking is gradually increased every year, and in 2021, Hiroshima University was ranked 100-200 in the world and tied for first place in Japan, out of 1117 universities in the world and 75 universities in Japan participating.

The SDGs awareness survey conducted every year since 2019 shows that the awareness of the SDGs among HU members has exceeded 90% and suggested that the term "SDGs" has become widespread. The survey also revealed that HU members are highly motivated to contribute to the SDGs achievement. In addition to the fact that contributions to the achievement of the SDGs have become more important nationwide, this is a result of establishing solid systems that support the achievement of the SDGs throughout the university, such as setting a long term vision of leading "Science for Sustainable Development," the announcement of "Carbon-Neutral x Smart Campus 5.0 Declaration" as the first of its kind at universities in Japan, providing training programs for faculty and staff, and introduction of sustainable development courses as common graduate courses.

The SDGs contribution by HU faculty members has been increased since 2016 when we analyzed the SDGs contributions based on Hiroshima University's unique Achievement-motivated Key Performance Indicators (AKPI) and the publication of academic journal articles. In addition, the mapping exercise of the SDG-related activity was conducted in the summer of 2021, nearly 400 individual cases were submitted throughout the university. Through this exercise, we reconfirmed that HU members engaged in world-class activities to realize a sustainable society and contribute to local and international societies as a national research university. Due to limited space, only a small number of cases are presented in this report, but the rest are posted on the NERPS website, so visit our website and learn about Hiroshima University's wide range of SDGs initiatives.

Second, NERPS has taken a step toward the creation of a worldwide research and education center that leads "Science for Sustainable Development," which is the unique initiative of Hiroshima University. The formulation of international research clusters of transdisciplinary research, "Peace and Sustainability" has been making progress. We are conducting research projects with four universities and research institutes selected out of 23 applications submitted from overseas. In addition, we are hosting and organizing the international academic conference, "Hiroshima International Conference on Peace and Sustainability 2022," scheduled to be held in March 2022, aiming to promote the establishment of the world-class research clusters and expand the international network. All these efforts have been recognized as world-leading education and research activities. Hiroshima University has been nominated for "THE DataPoints Social Impact Award" of "THE Awards Asia 2021" as the only university in Japan.

Hiroshima University will continue and further develop these efforts to contribute to the achievement of the SDGs in 2030 and the realization of a peaceful and sustainable world beyond 2030. We also commit to making these contributions visible from anywhere around the world.

Shinji Kaneko Director, NERPS Executive Vice President (Global Initiatives)



# **Principles and Vision**

### **Guiding Principles**

### Founding Principle

Inheriting the founding principle of "A Single Unified University, Free and Pursuing Peace," we will fulfill our mission as a national university under the five Guiding Principles.



# Hiroshima University Charter

Hiroshima University is a national research university established in 1949 in Hiroshima, which is the first atomic-bomb stricken city in the history of humankind.

Hiroshima University's mission is to contribute to the well-being of humankind by realizing a free and peaceful society based on the following five guiding principles: The Pursuit of Peace; The Creation of New Forms of Knowledge; The Nurturing of Well-Rounded Human Beings; Collaboration with the Local, Regional and International Community; and Continuous Self-Development.

### 1. Respect for human rights

In all its activities, Hiroshima University will not tolerate discrimination or harassment of any kind in relation to ethnicity, nationality, religion, belief, gender, economic or social status, or disability, and will respect and protect the human rights and individuality of each person.

### 2. Education

Hiroshima University will create an environment in which each student can learn independently and flexibly, while nurturing individuals with a rich sense of humanity, broad education, excellent specialized knowledge, and the ability to discover and solve problems on their own, who will contribute to the realization of a society that enables free and peaceful sustainable development.

### 3. Research

Hiroshima University will strive for an in-depth search for the truth and the creation of new knowledge through advanced and innovative research based on the free thinking of its researchers, and will share the fruits of such endeavors with the wider community, in order to continuously create innovations to solve the problems faced by the local, national and international communities.

### 4. Social contributions

As a university aspiring to be open to and trusted by society, Hiroshima University is determined to contribute to local and international society by actively publicizing its activities, securing cooperation and collaboration with local communities, industry and other organizations concerned, and engaging itself in all activities including education, research, and medical care.

### 5. Realization of a sustainable society

Hiroshima University, as a university engaged in world-class activities for the realization of a sustainable society, will strive to lead the world in providing cutting-edge solutions to global issues such as poverty, conflict, the suppression of human rights, infectious diseases, and environmental, resource and energy problems.

The members of Hiroshima University will take pride in their work, reflect tirelessly on the role expected of them by the nation and the world, and continue to fulfill each member's mission by fully demonstrating his/her individuality and abilities, while ensuring full compliance and showing mutual trust and respect.

## Hiroshima University Code of Conduct

As a national research university established in Hiroshima, Hiroshima University is committed to fulfilling its mission of contributing to the well-being of humankind by realizing a free and peaceful society, and at the same time, it is required to be highly ethical, transparent and fully accountable for its activities. In order to live up to this responsibility, the University has established the "Hiroshima University Code of Conduct" as a guideline that all members should always be aware of and follow.

### 1. Respect for human rights and diversity

We will respect the human rights and personality of each individual, will not tolerate discrimination or harassment of any kind, and will realize a campus where all members can fully demonstrate their individuality and abilities.

### 2. Upholding independence and autonomy

While giving due consideration to social norms, ethics, and the integrity of our individual activities, we will uphold academic freedom and the autonomy and independence of education and research. We will aspire to conduct and develop research and education that are of the highest international standard, and return the fruits of such research and education to society.

### 3. Compliance with laws and regulations

In our activities as members of Hiroshima University, we will comply with social norms and rules, relevant laws and regulations, and university regulations.

### 4. Disclosure/Protection of information

In order to fulfill our accountability to society in a transparent and fair manner, we will disclose to society the content and results of our activities and other information held by the University in a timely and appropriate manner, and will hold ourselves to high ethical standards in the use of that information, as well as in the protection of personal information.

### 5. Information management

In order to ascertain the value of Hiroshima University's information assets and to ensure their safety and reliability, we shall fully recognize the threats to information security, and shall manage and operate information appropriately in accordance with our respective duties.

### 6. Appropriate management of expenses and assets

We will manage and use the university's expenses and assets in an appropriate and efficient manner, always being aware that most of the expenses and assets for our activities come from taxes and other forms of social support.

### 7. Maintenance of a safe and secure environment

We will raise awareness of safety in the conduct of our operation and provide a safe, secure and comfortable environment for education, study, research and work.

### 8. Addressing environmental issues

We will take the initiative in addressing global environmental issues such as climate change, large-scale disasters, environmental pollution, and resource and energy problems, to hand over a stable environment to future generations.

# Long-Term Vision "SPLENDOR Plan 2017"

(SPLENDOR: Sustainable Peace Leader Enhancement by Nurturing Development of Research)

### Hiroshima University's Mission (mission and role)

Hiroshima University intends the following: to disseminate information related to our global challenges, with the aim of creating a new concept of "Science for Sustainable Development"; to receive international researchers and students aspiring to knowledge creation; to play a role in creating a global, diversified, free, and peaceful society, by cultivating peace-pursuing, cultured individuals with an international mindset and a challenging spirit in all quarters of society including international communities.

### Goal: Creation of a Worldwide Research and Education Center Leading "Science for Sustainable Development"

In order to establish "Science for Sustainable Development," it is essential to be continuously engaged, in order to create knowledge which leads to a borderless, diversified, and peaceful society in collaboration with society as a whole, by embracing all the existing research fields related to the sustainability of human beings, society, culture, food, environment and nature.

By devoting all available resources to the realization of this goal, Hiroshima University intends to produce the next generation of talented individuals who will contribute to the well-being of humanity, by establishing a worldwide research and education center implementing "Science for Sustainable Development."

### Hiroshima University's Three Visions

**Research**: Enhancement of basic and advanced studies leading to "Science for Sustainable Development." **Education**: Cultivating individuals who can oversee a changing world and can challenge existing norms on a global scale **Social Contribution**: Strengthening of partnerships with regional and international societies



# University-Wide Efforts Toward the Achievement of the SDGs

### Establishing the University-Wide SDGs Hub

### Background

To establish Science for Sustainable Development, implementing "interdisciplinary research," which crosses traditional academic boundaries, and "transdisciplinary research," which aims for problem-solving by going beyond boundaries of academics and different stakeholders, are important.

In April 2014, Hiroshima University launched "Taoyaka program for creating a flexible, enduring, peaceful society". Taoyaka program is a transdisciplinary 5-year master's and doctoral degree program that aims to train students from different academic disciplines to take the lead in the mutual creation of regional culture and state-of-the-art science to offer solutionoriented innovative technologies by working closely with local communities facing complex challenges.

In October 2015, Hiroshima University established the Hiroshima University Future Earth (FE) Education Research Network as a university-wide organization and formally joined the FE Japan Consortium (currently the FE Japan Committee). Through discussions and interactions in FE, which is an international network of scientists and innovators who aim to realize a sustainable society, the potential of implementing transdisciplinary research "Peace and Sustainability" and its importance were suggested.

In April 2017, the new long-term vision "SPLENDOR (Sustainable Peace Leader Enhancement by Nurturing Development of Research) PLAN 2017" was established. Hiroshima University set a mission to contribute to the realization of a diversified, free, and peaceful global society by establishing a new philosophy of peace science, "Science for Sustainable Development".

In May 2018, the FE network was restructured as the Hiroshima University FE/SDGs Network (English official name: Network for Education and Research on Peace and Sustainability (NERPS)) to implement the three purposes indicated below and started implementing the SDGs in full scale and transdisciplinary research "Peace and Sustainability."

### Purpose

- To establish "Science for Sustainable Development" which is stipulated in our university's long-term vision "SPLENDOR PLAN 2017" while consolidating the various efforts of Hiroshima University that contribute to solving global issues and strengthening research and educational capabilities to achieve the SDGs.
- 2. To form international research clusters of the transdisciplinary research "Peace and Sustainability" to promote Purpose 1.
- To disseminate the outcomes of education and research on the SDGs, and to promote networking with faculty members, students, staff members, domestic and international researchers, practitioners, and citizens.

SDGs are global norm-building activities. For this reason, the United Nations has created SDGs logos and badges as communication tools. The number of people who agree with this and wear the badges has increased. In general, wearing the badges not only raises public awareness of the organization and initiatives throughout society, but also increases a sense of solidarity among members of that organization, who become committed to the spirit of their organization and initiatives.

SDGs initiatives cover an extremely wide range of fields, and Hiroshima University is working as a whole making a certain direction and applying its own characteristics. This is reflected in the SPLENDOR PLAN 2017, and in order to clearly demonstrate this commitment, original NERPS logos and badges were created to show how peace pursuits and education are being carried out by Hiroshima University. Specifically, we are focused on the initiatives for "Goal 4: Quality Education" and "Goal 16: Peace, Justice, and Strong Institutions," and we are confident that they will further drive our initiatives in relation to other goals. Students are invited to learn about these outlooks and specific initiatives and participate in them. They are encouraged to wear NERPS badges during their job-hunting. Original logos and badges can be used to show that the wearer not only knows about or has individually joined and participated in SDGs activities carried out by the UN, but is also aware of the activities carried out by Hiroshima University as a whole and its active commitments. We hope that more members of Hiroshima University will support and participate in the initiative by wearing these badges.



### Organizational structure



- 4 graduate schools
- WISE Program/LP Seminar

Academic & Social Collaboration Promotion System On-campus joint educational research facilities

# Visualization of University-Wide Contribution to the SDGs

### Estimate the contribution to the SDGs using unique goal-achieving key performance indicators

At Hiroshima University, we use keyword information from academic journal papers published by faculty members of Hiroshima University to identify contributes to each SDG. By combining the keyword datasets and AKPI® (Achievement-motivated Key Performance Indicator) which our university developed on its own, we make an attempt to grasp the efforts of faculty members from a broader perspective, including educational and social contribution activities. Please refer to the bottom of the next page for an overview of AKPI®.

### [Specific estimation method]

- Using the SDGs keyword list (Elsevier 2021 SDG mapping \* 1), we identify contributions to each SDG from Scopus papers published by Hiroshima University faculty members from 2012 to 2020 (employed each year and incumbents as of May 1), and clarifying HU faculty members' involvement in the SDGs by each paper,
- ② We associated the involvement of each faculty member in the SDG items in ① to the AKPI® points for each fiscal year, and accumulated the AKPI® points of the faculty members who were involved in the 17 SDG items. After that, we calculated the average value per person by dividing the points of 17 SDG items by the number of the involved faculty members.

Figure A shows the visualization of the calculation results of papers published in 2020 using the above method. Looking at this figure, we can see that:

- SDGs, which many faculty members involved, are in the order of SDG\_03 (365 people, 688.6P), SDG\_07 (64 people, 870.1P), SDG\_11 (47 people, 1076.4P), SDG\_06 (37 people, 816.3P), and SDG\_13 (35 people, 1121.9P).
- SDG with high AKPI® values are in the order of SDG\_01 (1272.9P, 8 people), SDG\_10 (1245.3P, 4 people), SDG\_08 (1235.6P, 23 people), SDG\_09 (1166.7P, 24 people), and SDG\_04 (1143.2P, 22 people).



### Figure A: Contribution to the SDGs (= AKPI® values of faculty members related to the SDGs) (2020)

Also, Figure B is a visualization the changes over time of the average values of the number of faculty members involved in SDGs and the AKPI® value per person based on the Scopus papers published by Hiroshima University faculty members each year, and information on faculty members employed each year and incumbents as of May 1.

Looking at this figure, we can see that both the number of faculty members working with their SDGs expertise and the average value of AKPI® are gradually increasing.



Figure B: Changes over time in the degree of contribution to the SDGs (= AKPI® values of faculty members related to the SDGs) (2012  $\sim$  2020)

What is AKPI® (Achievement-motivated Key Performance Indicator)?

AKPI® is a key performance indicator to be set as a target value for the next 10 years for one of the world's top 100 universities.

AKPI® is composed of five elements ((1) In charge of classes [300 points], (2) Training of doctoral personnel [150 points], (3) Number of SCI papers [300 points], (4) Acceptance of external funds [150 points], and (5) Internationality [100 points]). And if the total points of the five elements are 1,000 points per faculty member on average, it is an indicator showing that Hiroshima University is one of the top 100 universities in the world. For details, please see Hiroshima University's official website. https://www.hiroshima-u.ac.jp/sgu/page02\_02

\*1 Rivest, M. et al. (2021), "Improving the Scopus and Aurora queries to identify research that supports the United Nations Sustainable Development Goals (SDGs) 2021", Mendeley Data, V1, doi: 10.17632/9sxdykm8s4.1

# Hiroshima University SDGs Awareness Survey

Since 2019, NERPS has been conducting SDGs awareness survey of Hiroshima University members every year in order to understand their SDG awareness levels and contributions and to use it as a material for considering efforts, and to achieve the SDGs. The degree of recognition of the SDGs has exceeded 90%, and the term "SDGs" has become widespread. With many respondents answering "Interested in various goals and want to make a contribution," we can see that there are many people who want to contribute to the achievement of the SDGs. On the other hand, there are still few efforts being made by these respondents at individual levels, so our future challenge is to lead their motivation into efforts.

[Outline of the survey]	The degrees of recognition of the SDGs in Hiroshima University		
Target: All members of Hiroshima University Period: February 8 to March 8, 2021 No. of valid responses: 1058	At least 90% o The tern well-k	At least 90% of people know about the SDGs. The term "SDGs" has come to be well-known in the university.	
Students: 524, staff members: 262, faculty members: 272 This is the third survey, continued from 2019. However, in 2019, the survey targeted only students. Details are available on the following website: https://home.hiroshima-u.ac.jp/tomomi/HU SDGsSurvey 2021.html	56.6	84.31	93.38
	2019	2020	2021

### Outline of 2021 survey results

We asked respondents questions, "What you are interested in," "What you have already worked on" and "What you hope to contribute to in the future," and have them choose up to five goals.





#### What you hope to contribute to in the future 399 37.71% 321 290 284 274 256 30.34% 240 237 230 220 27.41% 211 26.84% 213 25.9% 24.2% 184 165 22.68% 22.4% 20.79% 21.74% 19.94% 20.13% 124 17.39% 15.6% 69 69 11.72% 6.52% 6.52% U

# Search for Researchers on SDGs / Hiroshima University Researcher Directory

We have created a new, easy-to-use system that allows you to search for researchers of Hiroshima University. You can search for the specialized fields and research achievements of about 1,900 researchers belonging to Hiroshima University by "topic," "SDGs," "discipline," and "alphabetical order." You can also search for researchers from each goal of the SDGs.

https://www.guidebook.hiroshima-u.ac.jp/en/sdgs



# Workshop Opportunities for Faculty and Staff Members

### Held IR workshops on the theme of the SDGs (Office of University Strategy).

We held the 3rd and 4th IR workshops for staff members on the theme of the SDGs on December 12 (Thu), 2019 and January 9 (Thu), 2020.

At the 3rd IR Workshop, we set a major goal, "Disseminate information to society." After understanding the outline of the SDGs, the participants conducted group work on how to disseminate the SDGs efforts of Hiroshima University to stakeholders. After the group work, the participants gave brief presentations, and deepened their understanding of the SDGs through each group's presentation.

At the 4th IR Workshop, Professor Shinji Kaneko (Graduate School of Humanities and Social Sciences) gave a lecture entitled "Efforts for the SDGs at Hiroshima University and Future Challenges." Participants broadened their knowledge about NERPS activities, the latest trends of universities in both Japan and overseas, and future issues through lectures.

Office of university strategy will continue to hold IR workshops to promote the university-wide utilization of the data collected and accumulated by the Office and various information within the university, and to improve the knowledge and skills of staff members, and would like to improve the efficiency of its operations.

### Held FD workshops regarding the SDGs (School of Integrated Arts and Sciences).

The School of Integrated Arts and Sciences held a total of six FD workshops in FY 2020. As one of them, we held an FD workshop as follows in order to promote education, research, and social contribution related to the SDGs:

FY 2020 5th School of Integrated Arts and Sciences FD Workshop

- ${\small \textcircled{O}}$  Date and time: February 17 (Wed), 2021 14:10  $^{\sim}$  14:50
- Title: Opportunity to participate in SDGs activities to enhance the strength of the university
- Lecturer: Professor Shinji Kaneko
- Method: Online FD workshop by Teams
- No. of participants: 100 (93 faculty members, 7 staff members)

In addition to the transition from the MDGs to the SDGs, the relationship with Society 5.0 (5th Science and Technology Basic Plan 2016 ~ 2020), proposal of the construction of new peace science for achieving the SDGs as an approach of Hiroshima University in anticipation of Post-SDGs, the history of Hiroshima University toward the SDGs, the two-wheeled system of university SDGs and regional revitalization SDGs (especially about Town & Gown), a regular survey of the degree of recognition of the SDGs among Hiroshima University members, a regular survey on the on-campus contribution to the SDGs using original indicators, characteristic research toward achieving the SDGs, and transdisciplinary research toward achieving the SDGs, the contents are very diverse across the introduction of specific opportunities for Hiroshima University members to participate (in international network joint research, Common project, smart city-related joint research courses and education / research that contributes to the international development of Society 5.0).



# **Progress of NERPS Activities**

### 1. Organizing and Hosting of Webinar Series

Since September 2020, NERPS has been organizing and hosting webinars intended to consider Peace and Sustainability from the perspectives of the global environment, sociopolitics, the economy, and technology innovation.

This webinar series aim to reconsider Peace and Sustainability and discuss new ideas amid the current changes in the global environment, including the COVID-19 pandemic, that is currently occurring around the world. Experts have discussed how resources, technological innovation, immigration, governance, peacebuilding education, conflict mitigation, humanitarian assistance, capacity building and other factors play roles in achieving the SDGs, especially on Goal 16.

At the first webinar, Professor Jeffrey D. Sachs of Columbia University in the United States was invited as a guest speaker via video participation from New York. He talked about how the international community is fair to everyone and how sustainable development can pave the way for peace by overcoming threats and prejudices through international cooperation.



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### Results of holding webinars Hiroshima NERPS - YouTube

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Date	Speakers	Lecture title	Participants on the day	Video views (as of October 28)
September 23, 2020	Dr. Jeffrey D. Sachs	Sustainable development as a path to peace	180 people	298 times
November 25	Prof. Cullen Hendrix	Promoting Peace through Shared Governance of the Seas	23 people	92 times
December 16	Prof. Paul Heidebrecht	PeaceTech and the Prospects for Critically Engaging Technology to Advance Peace and Sustainability	38 people	51 times
January 28, 2021	Prof. Joshua Fisher, Ms. Sophia Rhee	Protected Area Management & Natural Resource Governance-Exploring Pathways for Environmental Peacebuilding	61 people	430 times
February 12	Dr. Florian Krampe	Peace and Sustainability in the Anthropocene	64 people	454 times
February 26	Prof. Ali Cheahmwhzangi	Sustaining the City's Continuity and Enhancing Resil- ience in Facing the COVID-19 Pandemic	70 people	95 times
March 18	Dr. Andrea Bartoli	Initiative for Peace in South Sudan-Insights from the Work of the Community of Sant' Egidio	26 people	74 times
April 9	Prof. Joyashree Roy	SDG framework as core of development diplomacy: Juxtaposing climate action and peace through soft power diplomacy	45 people	115 times
April 15	Mr. Steve Killelea	Ecological Threats, Peace, and COVID-19	32 people	93 times
May 20	Prof. Frank Biermann	Earth System Governance for Sustainable Develop- ment and Peace	82 people	112 times
June 17	Prof. Takako Izumi	Disaster Risk Reduction under Conflict Situation	23 people	53 times
July 29	Prof. Richard Friend	Democratising Science and Research to Address Envi-	18 people	62 times

### 2. Start of the Transdisciplinary Research Projects

### Transdisciplinary Research Project Aiming to Form International Centers



In June 2020, NERPS had secured four cross-appointment professor positions and invited applications on research projects that contribute to formulating research clusters for peace and sustainability. A total of 23 proposals were submitted worldwide, and four outstanding proposals were selected. In December of the same year, NERPS started transdisciplinary study projects with four universities and research institutes. The contents of the proposals are introduced in "The 2020 NERPS Science Plan."

### 3. Hosting and Organizing of the Hiroshima International Conference on Peace and Sustainability 2022



NERPS has been organizing to host its first International academic conference as explained below. We had invited oral and poster presentations, and roundtable session workshop proposals which intended to discuss the complex and dynamic relationship between peace and sustainability as environmental, socio-political, economic and technological changes progress. In addition, the scientific committee of this conference will rigorously select and award outstanding research out of full papers and posters submitted within the deadline. Selected research presented at the conference are planned to be published in a special issue of an international academic journal.

- Date of the conference: March 1 (Tue) ~ 3 (Thu), 2022
- Keynote speaker: Professor Jeffrey Sachs, Columbia University (March 1, Higashi Hiroshima Arts and Culture Hall Kurara; TBD)
- Venue: Hiroshima University Higashi-Hiroshima Campus (TBD; may be held online)
- Language: English (no interpreter)
- Organizer: Hiroshima University Network for Education and Research on Peace and Sustainability (NERPS) For updated information, please visit our website: https://www.nerps.org

### "Sustainable Regional Development and University Reform" led by Community Development that Integrates the University and the Community



### "Town & Gown Concept" aiming to realize a new regional revitalization model

The "Town & Gown (TG) Concept" is a concept in which the university and the local government in the area where the university is located work together for sustainable regional development and the university reform by sharing a vision of a sustainable future, by building comprehensive, daily, continuous and organizational relationships, by utilizing the administrative resources of the local government and the education and research resources of the university while fusing them. Under the TG concept, the university and the community together can contribute to make Japan dynamic from the

regional perspective, realize regional revitalization through the social implementation of science and technology innovation that contributes to the solution of regional issues. The formation of a place for regional co-creation for human resource development industry-academia-governmentprivate partnership ecosystem in collaboration with local governments, universities, private companies, entrepreneurs, investors, and citizens.

And the "Town & Gown Office (TGO)" is a promotion organization jointly established by Hiroshima University and Higashi Hiroshima City as a forerunner of the concept in Japan.



Left: Mayor Hironori Takagaki of Higashi-Hiroshima City, Right: President Mitsuo Ochi of Hiroshima University

### What is the Town & Gown Office?

The "Town & Gown Office (TGO)" is an organization that has been introduced mainly in cities where universities are located in Europe and the United States. The organization promotes cooperation as a hub for the city and universities in order to aim to solve issues toward community-building by a united body of Town (local community) and Gown (universities) and the achievement of the SDGs.

Higashi-Hiroshima City and Hiroshima University will work together closely to solve social issues through TGO by the city providing various administrative data and issues, and by Hiroshima University providing the latest academic knowledge and research capabilities.

To this end, both the mayor and the president, the heads of these organizations share the vision of community-building, and establishing a system to promote projects in an integrated manner through staff dispatch and cross-appointment.

# Chart of the "Town & Gown Concept" Promotion System of Higashihiroshima City & Hiroshima University



### Carbon Neutral x Smart Campus 5.0 Declaration

Hiroshima University aims to practice "Science for Sustainable Development" through a virtuous cycle of global development and regional revitalization, under the founding principle of "A Single Unified University, Free and Pursuing peace." Toward the realization of the SDGs and Society 5.0, we have been cooperating with Arizona State University in the United States as well as local governments, and are proceeding with initiatives with an eye on international development.

In January 2021, in line with the conclusion of a comprehensive cooperation agreement (Higashi-Hiroshima City and Sumitomo Corporation) regarding the realization of Society 5.0 and smart cities in Higashi-Hiroshima City and surrounding areas, we adopted the "Carbon Neutral x Smart Campus 5.0 Declaration" with the target year of 2030.

Toward 2050 carbon neutrality, it is required that we develop cutting-edge technologies and put them into practical use for the realization of a green society, and to create advanced decarbonized areas. Aiming to realize a carbon-free society ahead of the rest of the world, we would like to collaborate with local governments and companies in order to increase the value of our university in the world by clarifying our stance, including research, education, and international development.



### Launched public bid for the Solar Power Purchase Agreement (PPA) Project

In 2021, we set up solar power generation facilities on the land and buildings of the Higashi-Hiroshima Campus, which is a vast site, and launched a public bid for a PPA project intended to supply power to the university and the surrounding areas.

By introducing energy from solar power generation facilities that will be installed sequentially from 2022, we will promote carbon neutrality on the campus and utilize surplus electricity with the aim of distributing green electricity and environmental value derived from the university to the region.



### Proposal for the Next-generation University Town-building Plan meeting

It is difficult to solve various problems caused by population decline and aging as an extension of the existing measures, and some strong driving force is required especially in rural areas.

Hiroshima University and Higashi-Hiroshima City concluded a comprehensive cooperation agreement with Sumitomo Corporation in January 2021, and SoftBank Corp. and Fujita Corporation in July 2021 in order to expand their commitment while involving stakeholders who consider local social issues as their own problems. Currently, lively discussions are being held within TGO for proposals at the "Next-generation University Townbuilding Plan meeting" (organized by Higashi-Hiroshima City), which will consider new town development visions with the participation of companies and organizations that are interested in the vision.

We would like to continue to expand the circle of co-creation with these partners and develop activities as a consortium that embodies regional revitalization.



# Publicize Initiatives through Japanese Magazine Articles

"Toyo Keizai ACADEMIC: Special Feature on Universities Working on the SDGs Vol.2" (Toyo Keizai Inc., published in July 2020) and

"Toyo Keizai ACADEMIC: Special Feature on Universities Working on the SDGs Vol.3" (published in July 2021)

In the advertisement article, we introduced the "Town & Gown Concept" in which Hiroshima University and Higashi-Hiroshima City work together in town-building, and President Mitsuo Ochi and Mayor Hironori Takagaki of Higashi-Hiroshima City respectively commented. In the special feature article, Director Shinji Kaneko explained the possibilities and challenges of a sustainable society created by the university and the community in a unified fashion.



In the advertising article, Director Kaneko talked about the purpose, characteristics, and expected results of the transdisciplinary study project "Peace and Sustainability" promoted by NERPS. In the special feature article, President Mitsuo Ochi expressed his enthusiasm for the "Carbon Neutral x Smart Campus 5.0 Declaration" that our university announced on January 26, 2021, and Mayor Hironori Takagaki of Higashi-Hiroshima City and Masayuki Hyodo, President/CEO of Sumitomo Corp gave their comments.



# SDG-Related Activities at Hiroshima University

Hiroshima University is engaged in various activities that contribute to achieving the SDGs. We have published these efforts on our website. If you scan the QR code, you can see our activities by goal and by activity category. In addition, from page 20 onward, we will introduce the characteristic activities of Hiroshima University.



### The Sustainable Development Goals

#### What are the SDGs?

Even if you know that the SDGs (Sustainable Development Goals) are something that seems to be good for the earth or international goals related to environmental and social issues, probably not many people know the contents in detail. I will briefly explain the origins of the SDGs and each goal of the SDGs.

The SDGs which consist of 17 goals and 169 targets are international goals adopted by the United Nations in 2015. The SDGs aim to realize a sustainable world where no one is left behind by 2030 with the cooperation of all developed and developing countries, companies and individuals. As shown in the table above, the SDGs consist of items related to human development / social issues, economic systems, and social issues related to the global environment, as well as the means of implementation.

Specifically, "Transforming Our World: The 2030 Agenda for Sustainable Development" (hereinafter "the 2030 Agenda") was adopted at the United Nations Summit in September 2015, and came into effect in January 2016. Sustainability issues, which have been discussed separately, and international development issues, the Millennium Development Goals (MDGs), have been integrated into the 2030 Agenda that includes the SDGs.

The SDGs cover not only developing countries' development issues, such as poverty alleviation and social development, but also global issues including those of developed countries, such as climate change and sustainable consumption and production. The nature of the SDGs has changed from the MDGs, which were the goals for governments of developing countries and development assistance agencies, requiring the participation of diverse actors, not only governments, but also private and civil sectors. This is a groundbreaking agreement in the aspects of accelerating the efforts of all actors and asking each country to keep track of their progress. However, in order to achieve the SDGs, in addition to cooperation by the international community, developing countries, emerging countries, and developed countries need to change their economic and production/consumption patterns in their respective contexts. The involvement of each and every citizen is also important for transforming our world.

### Support activities for students who are living in poverty in the COVID-19 crisis

### Office of Funding



To save students who are living in poverty due to the spread of the new coronavirus infection, Hiroshima University raised money for an "emergency student support fund" ahead of other universities nationwide (April 21, 2020 ~ June 15, 2020). We have received words of encouragement and many donations from many people, and we are providing support funds (30,000 yen per month) to students one by one. Students can apply for the support fund as many times as they want if they continue to be living in need. In addition, we asked for donations through crowdfunding in order to implement "Efforts for students to work hard at school and lead a student life with peace of mind" after interviews with students about what they are worried about when they are having a hard time in the COVID-19 crisis. The donations we received were used to purchase non-contact thermometers to be used by extracurricular activities groups and to provide financial support to student who participate in teacher training. Furthermore, the university received support from anonymous donors to help students and international students who are having difficulty living due to a sharp decrease in income such as from part-time jobs. We planned an initiative to deliver assorted groceries to students, and put the plan into practice together with a local company, Fresta Co., Ltd. For students who have lost their part-time jobs and opportunities for communication due to the COVID-19 crisis and are in a difficult financial and mental situation, we raised funds through crowdfunding and provided Japan's most inexpensive and nutritionally balanced school cafeteria meals.



### Creating a society where people can listen to the "voices" of the poor

Hiroshi Sasaki, Associate Professor, Graduate School of Humanities and Social Sciences



Cooperation of "research," "education," and "movement" in order to create a society where "voices" of the poor can be listened to.

In poverty research, the difficulty of economic hardship people expressing their opinions, that is, giving their "voices" to society has been pointed out. This is because not only is poverty making it difficult, but also society tends to ignore and sometimes suppress their "voices." With Japan in recent years in mind, we can recall events, such as the rise of bashing of public assistance users and discriminatory remarks by celebrities on SNS toward the poor. Poverty robs people of their "voices." To overcome this problem, I have been promoting research and education conducted in collaboration with "Seikatsu to Kenko wo Mamorukai (SKM)," an organization of poor people that raise their voices, since 2011.

As part of my research activities, I have conducted a regional organization survey of the SKM and clarified the difficulties when poor people raise their "voices." Since 2020, I have launched a research project (Grants-in-Aid for Scientific Research) under the theme of the movement history of the "Social Protection of Life and Health" along with several researchers This research has also been developed as a university's practical education class (Hiroshima University, School of Integrated Arts and Sciences, Specialized Course "Social Research Exercises I and II"). The above activities are expected to contribute to the creation of a society where the "voices" of the poor can be listened to by revitalizing the activities of each of the three parties: research organizations, university education organizations, and the organizations concerned.



# [Zero Hunger] End hunger, achieve food security and improved nutrition and promote sustainable agriculture.

Aiming to achieve sustainable food production and solve environmental problems through interdisciplinary plant-related research

Jun Wasaki, Professor, Graduate School of Integrated Sciences for Life (Director of the Research Core for Plant Science Innovation)



# The Plant Research Center to create a Green Revolution that saves the next generation from Hiroshima University

To achieve food production that supports the world's ever-increasing population, there are many issues that need to be addressed, such as global warming, resource depletion, the need to reduce environmental impact, and lack of suitable farming land. In Japan, the slump in food self-sufficiency is also an important issue, and in order to improve this, it is necessary to increase the added value of crops, to improve yields, and to reduce the labor required. Based on these problems, we envisioned the "Plant Research Center to create a Green Revolution from Hiroshima University that saves the next generation."

At the Research Core for Plant science Innovation, we conducts interdisciplinary research utilizing the strengths of plant-related research at Hiroshima University, aiming to bring about a "next-generation Green Revolution" that solves environmental problems while achieving sustainable food production. In aiming for this, we need to understand and solve these problems in a multifaceted manner not only from the traditional agricultural viewpoint but also by gathering a wide range of knowledge of academic fields related to plant production, such as plant physiology, ecology, microbiology, symbiosis, soil science, and organic chemistry. This aims to revitalize interdisciplinary joint research by researchers of Hiroshima University, who had been limited to individual and small group levels, gathering knowledge, with organic connections centered on this research center.

Necessary application issues include enhancing oligotrophic tolerance, stress tolerance, and functionality. It is expected in these fields that concrete research will proceed through mutual understanding, and at the same time, support from basic research will also encourage research promotion. Therefore, we have conducted joint research while promoting individual research by establishing the "nutrition group" that solves oligotrophic tolerance, the "stress group" that solves cultivation in unsuitable areas for cultivation, and the "functional development group" that aims to increase the added value by improving yield and adding functional components, and the "basic research group" that supports research on a basic research basis.

### Greenfield Project through joint research with companies

JFE Steel Corporation and Hiroshima University have established the "Joint Research Course (Phase 2)" with the aim of achieving the SDGs and contributing to society. In this joint research, we are considering measures to effectively utilize chemical elements useful for plant growth, such as phosphorus and silicon, which are unused resources contained in steel by-products.

### Contributing to the establishment of sustainable agriculture through technological development that utilizes the functions of microorganisms

Junichi Kato, Professor, Graduate School of Integrated Sciences for Life



Microorganisms in the environment make full use of their substance sensing function to coexist or infect the host plant. We are developing technologies to elucidate the details of the substance-sensing function of environmental microorganisms, promote their symbiosis (leading to the promotion of plant growth), and control infections (control of plant diseases). This technology helps establish sustainable agriculture with minimal reliance on pesticides and fertilizers.



Microorganisms' control of soil-borne infections.

However, lack of the rhizosphere settlement ability of PGPR is a problem.



agricultural production system

Contributing to an environmentally friendly

So, PGPR's plant chemotaxis was thoroughly strengthened.

Promoted the plant growth and control soil infections based on the thorough utilization of PGPR's chemotaxis!!



# [Good Health and Well-being] Ensure healthy lives and promote well-being for all at all ages.

### Health project in Bangladesh

Michiko Moriyama, Professor, Graduate School of **Biomedical and Health Sciences** 



Health education project that utilizes mobile health technology for residents with high blood pressure and chronic kidney disease in rural areas

There are many patients with high blood pressure and deaths caused by the disease in developing countries. In Bangladesh the self-reported prevalence of hypertension is 12.5%, but it is estimated that one-third of the population has never measured their blood pressure. It has been pointed out that high blood pressure is caused by not only dietary habits, but also due to the effect of seawater draining into well water as an impact of global warming in Bangladesh, lowland areas.

In this project, women living in rural areas have been trained as community health workers (CHW), and the residents became aware of their daily salt intake by utilizing food and urinary salt measuring devices developed in Japan. In addition, we regularly measured the residents' blood pressure, etc. using portable medical checkup devices, and provided health guidance through home visits to residents and by using SMS. As a result, we were able to show a high behavior change and blood pressure improvement effect.

Also, there is no opportunity to routinely screen the renal function (presence of kidney disease) in Bangladesh, and there are many death cases without receiving medical treatment. For this issue, we identified the proportion of people with impaired renal function by measuring the renal function of the residents and their risks using a surveillance system in collaboration with a local research institute (icddr, b). In addition, after widely providing health education on "protecting the kidneys" to local residents, we were able to see significant improvements.



changes by addressing and managing health issues of climate and lifestyle changes in a developing country focusing on hypertension

### Educational project to prevent blindness caused by diabetic retinopathy

Diabetes is one of the leading causes of loss of eyesight. Bangladesh has a high prevalence of diabetic population, but with its fragile medical system, and underdeveloped eye screening system, many people with diabetes go blind. Lack of awareness and knowledge of diabetic retinopathy has been reported to be the number one reason why many diabetic patients do not follow the instructions to take a retinal screening, which are relayed from primary care medical institutions to specialized hospitals.

This time, we conducted an educational project in collaboration with a medical institution in Bangladesh, to encourage diabetic patients to visit a specialized hospital. We used culturally appropriate communication materials that people can understand even in a country with low literacy and provided health education (face to face and over phone), which led to a high consultation rate.

### Health education increased referral compliance



This project was collaborated with the Fred Hollows Foundation and icddr,b, and conducted by the international student at Hiroshima university

School health project with pilot school nurses (for introduction of health examinations and improvement / prevention of malnutrition (undernutrition and overnutrition) and intestinal parasites)

Children's health (school health) is the basis for improving national health indicators. In Bangladesh, there are no school nurses or regular health checkup systems. Even today, the major health risks for children are infectious diseases, such as pneumonia, diarrhea and intestinal parasites, as well as nutritional disorders, mainly undernutrition. With the cooperation of the local Grameen Caledonian College of Nursing, this project will experimentally assign school nurses to multiple elementary schools in an attempt to improve children's nutritional status and reduce cases of infectious diseases. In collaboration with Grameen Communications, we will carry out lifestyle-related / dietary surveys and health examinations for all students at pilot elementary schools, and provide them health education for one year while feeding back the results to the parents of the students. In the COVID-19 pandemic, it is important to improve the hygiene and nutrition of individuals and to prepare a hygienic environment. In this project, we plan to develop school nurses for future assignment by preparing a training curriculum for school nurses on a trial basis, and asking teachers and graduate students of the nursing college to adopt the curriculum.



[Kaken Grant-in-Aid for Scientific Research (B) ] A challenge to reduce infectious diseases and malnutrition by school nurse placement to develop school-based health education awareness developing country

### Project Research Center for Epidemiology and Prevention of Viral Hepatitis and Hepatocellular Carcinoma

Junko Tanaka, Professor, Graduate School of Biomedical and Health Sciences



Project Research Center for Epidemiology and Prevention of Viral Hepatitis and Hepatocellular Carcinoma conducts epidemiological research on the long-term course of hepatitis virus infection and elimination, as well as grasping the status of hepatitis virus infection such as hepatitis C and hepatitis B in Japan. The center is conducting research to present basic materials that will be the scientific basis for policy planning, formulation of standards, and administrative measures. In addition to achieve the 2030 viral hepatitis elimination goal adopted by World Health Organization (WHO), we are conducting research on the clarification of issues that differ in each municipality area and on measures according to the characteristics such as the actual treatment conditions in each region.

It is estimated that 2 billion people are infected with hepatitis B virus (HBV) worldwide, 350 million people are HBV carriers, and about 600 thousand to 1 million people die from HBV-related liver disease every year. As of 2002, Asian and African countries are HBV-endemic areas. In addition to domestic epidemiological research on hepatitis virus infection, our center also conducts the sero-epidemiolocial research internationally in Cambodia, Vietnam, and Burkina Faso.

Since 2016, under international joint research with the Ministry of Health of Cambodia, University of Health Sciences (Cambodia), WPRO (WHO Western Pacific Regional Office (Manila)), and CDC (Centers for Disease Control and Prevention), we conducted a nationwide survey of hepatitis virus infection status throughout Cambodia. In 2018, Cambodia demonstrated that it had achieved its WHO target of reducing Hepatitis B surface antigen (HBsAg) positive rate for 5-year-old children to 1% or less. In addition, from the results of the same survey, as the infection rates in the mother population and in children with HBsAg-positive mothers in Cambodia were found to be as high as 4.39% and 10%, respectively, the strengthening of the infection control of mother-to-child transmission of HBV was identified as the country's challenge. Since 2019, under international joint research with the Maternal and Child Health Center of the Ministry of Health of Cambodia and WHO Cambodia, we have been conducting the sero-epidemiological surveys for pregnant women and their newborn infants at three medical institutions in Siem Reap Province; northwestern Cambodia.

Since 2018, we have also been conducting international joint research with the Clinical Research Unit of Nanoro (CRUN) to investigate hepatitis B virus status in Burkina Faso, which is located in West Africa to the south of the Sahara Desert. The research is expected to yield favorable results as a basic material for achieving the 2030 viral hepatitis elimination goal adopted by WHO.



### Efforts for complete prohibition of smoking on Hiroshima University campus

Finance and General Affairs Office, Finance and General Affairs Department, General Affairs Group





① Hiroshima university is a highly public place where many people gather, including students who are still underage minors and patients, and the possibility that it may cause unwanted passive smoking damage, and

(2) as an educational institution, we aim to nurture our students to not maintaining a smoking habit, and they can complete their university education and become a member of society with both a healthy heart and mind

Based on above backgrounds, Hiroshima University has been working toward a no smoking campus since January 2020.

This has been widely disseminated. We let both the members of the university and outside the university, including local governments and local residents, know. The information is also available on university official website. Regarding the fact that students and staff members smoking on or around the campus have been seen here and there, we have grasped the situation by means of the passive smoking consultation service (website), e-mails, telephone calls, etc. Staff members have conducted regular patrols. Regarding damage such as passive smoking, for example, if there is a complaint in a laboratory, we contact a relevant department and ask it to give a warning.

For those who wish to quit smoking, we provide free prescriptions for smoking cessation aids to students and introduce a smoking cessation clinic to faculty and staff members.

**(**Quality Education**)** Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

### Hiroshima SDGs Consortium



The Hiroshima SDGs Consortium Project was accepted as the "MEXT FY 2021 UNESCO Activity Subsidy (Leader Development for Achievement of the SDGs (ESD) Promotion Project)". The purpose of this project is to improve the teaching skills of school teachers and to train them so that they can develop the global competencies required to achieve the SDGs. We have implemented a spiral-structured teacher training program that combines training sessions, lectures, and workshops for in-service teachers and students who want to become teachers, primary and secondary school education providers in the future. While utilizing human resources centered on

the Graduate School of Humanities and Social Sciences, the Board of Education, teacher training universities in Hiroshima prefecture, companies, ESD activity support centers, and various organizations are collaborating to build a network as a consortium.

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広島SDC	Gsコンソーシアム	
SDGsを達成するため スキルアップを目指し	に、グローバル・コンピテンシーを達成できる教員の って活動しています。	
SUSTAINABLE GOAL	LS	

### Providing opportunities to learn about the SDGs through language learning — Cultivate the ability to disseminate the SDGs

Institute for Foreign Language Research and Education



# "Be the Change! Transforming our future with the SDGs"

### Associate Professor Marshall Higa

We have developed a full-fledged introductory book on English teaching materials that deals with the SDGs systematically and comprehensively. It is designed to be used in university liberal arts education English classes, and carefully selected materials that are easy to understand from AFP's video materials so that students can more realistically grasp the contents as their own issues. All English texts were written by the authors, and we prepared high-quality discussion topics so that learners could not only understand the contents but also disseminate them. (Scheduled to be published within FY 2021)

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### Dealing with SDGs-related themes in English classes

#### Professor Keiso Tatsukawa Associate Professor Peter Howell

We offer courses to develop the ability to understand and disseminate topics related to the SDGs in English and to acquire basic knowledge and awareness of problems intended to act in consideration of various topics related to the SDGs, focusing on "peace," "humanitarianism," and a "coexistence society" in the global era.

#### Master German using the SDGs as teaching materials Associate Professor Takako Yoshimitsu Associate Professor Axel Harting

Students study the circumstances of German-speaking areas under the themes related to topics such as intercultural communications (SDG 10), garbage separation (SDGs 7 and 12), and partnerships (SDG 5). For example, in a class under the theme of "garbage," students learn how garbage is actually separated in Germany, which is an advanced ecology country, through various tasks. Then, based on what they learned, they have discussions in the class to deepen their understanding. In addition, they also learn vocabulary and grammar so

That they can understand and think about the SDGs in German, and transmit them in German on media such as SNS.



### Hiroshima Prefectural UNESCO Liaison Council

Tadamichi Nagata, Associate Professor, Graduate School of Humanities and Social Sciences



The Hiroshima Prefectural UNESCO Liaison Council, which has its secretariat within the Graduate School of Humanities and Social Sciences and School of Education commends excellent practical activities related to the spread and promotion of ESD / UNESCO Associated Schools from

elementary, junior high and high schools and private activity groups in the prefecture, in order to support the improvement of the practices of ESD (Education for Sustainable Development) led by UNESCO and the Japanese government. Since ESD is considered to be the key to achieving the goals of the SDGs, we have been proceeding with the the Hiroshima Prefecture UNESCO ESD x SDGs Grand Prize since the 7th council in 2021.



### Aiming to develop human resources who can design educational visions for next-generation

### Educational Vision Research Institute (EVRI)



# Assisting the Development of Curricula and the Establishment of new Teacher Education Colleges (TECs) in Cambodia

Educational Vision Research Institute (EVRI), in collaboration with the Hiroshima Peace Contribution Network Council, implemented a JICA Partnership Program (JPP) "Support for social studies curriculum and textbook development for building a sustainable society in Cambodia" commissioned by Japan International Cooperation Agency (JICA). Over the course of three years, we worked on improving the social studies curriculum and the expertise of textbook developers, and developing and practicing a "model unit" with an eye on support for democratization and citizenship education.

As a continuation and development of the above-mentioned, another project was adopted by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) under the scheme of "Dissemination of Japanese-style Education using the Public-Private Collaborative Platform (EDU-Port Japan)." In this project we helped to build "Developing and Applying Textbooks System" in Cambodia from the perspective of Japanese-style education that is open to teachers' independent research on teaching materials and children's exploratory learning. Through this initiative, we have promoted the professional development of editors who envisage and edit textbooks from an expert perspective and teachers who make good use of them autonomously.



Since fiscal 2017, EVRI has cooperated with PADECO Co. in "Project to Establish Foundations for a Teacher Education College" commissioned by JICA. Through this project, we provide (1) Training for the staff of two Teacher Education Colleges (TECs) to be established in Cambodia, (2) Technical assistance t for creating a teacher training curriculum, and (3) Technical assistance for establishing university management system, etc.



## Developmental Research on inclusive Education System in Secondary Education

Professor Norimune Kawai, a member of EVRI, organizes a "Developmental Research on Inclusive Education System at the Secondary Education level " which gained "FY 2020 Practical Research Grant for Healthy Development of Children and Teenagers" supported by Nippon Life Insurance Company Foundation. With an aware of diversity in a classroom, this project focuses on students who have foreign roots or with disabilities that may feel difficulties in learning and lives we develop lesson plans and methods for School subjects which raise their satisfaction and self-confidence in learning.



In collaboration with the Hiroshima Prefectural Board of Education and Hiroshima Global Academy, an integrated public junior and senior high IB school, EVRI has helped teachers to develop their curriculum design skills through elaborating units about "peace" and "Hiroshima." Also, with the cooperation of the Higashi-hiroshima City Board of Education, EVRI provides model classes online among different schools which raise students' interest in local issues and motivate their social participation, in order to improve teachers' abilities in plan and implement online classes of citizenship education.

In addition, EVRI organizes an annual international seminar, PELSTE (Peace Education and lesson Study for Teacher Educator) about the principles and methods of peace education and lesson studies. Participants from member universities of the International Network of Educational Institutes (INEI) are invited to exchange their experiences and expectations on how to promote peace education and lesson studies according to each local context.



# [Gender Equality] Achieve gender equality and empower all women and girls.

### Creating a university that respects sexual diversity

Research Center for Diversity and Inclusion



The Research Center for Diversity and Inclusion, the Accessibility Center, Health Service Center, and Harassment Consultation Office worked for Hiroshima University's "Policies and Guidelines at Hiroshima University for Respecting Gender and Sexual Diversity for LGBT+ Students" (enforced in April 2020). We also engage in advocacy, distributing our original educational pamphlet to new students every year, and posting more detailed explanations and booklists on the official website of the Research Center for Diversity and Inclusion. Moreover, the Introductory University Education, which is compulsory for all students, educates students about this issue, and also in the training for newly employed faculty members by the university, the guidelines are also made known to all.



### Development of a program for empowerment of women to participate in disaster prevention activities

Mayumi Kako, Associate Professor, Graduate School of Biomedical and Health Sciences



In Japan, a disaster-prone country, it is said that there is a large gender gap from non-disaster ordinary times and this gap influences on in such situations as women's disaster risk reduction activities in communities social participation. To promote women's activities in disaster prevention activities, we support regional and community-based disaster prevention activities in Hiroshima from the community level. Under the development of a program for empowering women to participate in disaster prevention activities, which was launched in 2020, we support the activities and network formation by local practitioners, including disaster risk reduction prevention officers (Bosai-shi) who are active in the region.



# [Clean Water and Sanitation] Ensure availability and sustainable management of water and sanitation for all.

### Methodologies and technologies for wastewater and waste treatment and their advanced utilization, and restoration and creation of the water environment

Satoshi Nakai, Professor, Graduate School of Advanced Science and Engineering



We are developing research on wastewater and waste treatment and its advanced utilization, as well as methodologies and technologies for the restoration and creation of water environments. For example, we are conducting research on carbon circulation in which products obtained by culturing microorganisms that produce docosahexaenoic acid and eicosapentaenoic acid with the use of wastewater and waste from food manufacturing plants are used as substitute fish oil for the cultivation of marine fish, and research on toughening the reverse osmosis membrane to be used to secure drinking water.



Culturing of oil-producing algae using secondary treated sewage water

### Development of a sewage treatment reactor system applicable to developing countries

Akiyoshi Ohashi, Professor, Graduate School of Advanced Science and Engineering



In sewage treatment, a method using aerobic microorganisms called the "activated sludge method" has become the mainstream in developed countries. However, this activated sludge method is not accepted in developing and emerging countries. It is clear that even if the activated sludge method, an expensive treatment technology that is only realized by spending a lot of money and energy as in the case of Japan, is transferred as it is, it will not take root. Therefore, it is an urgent task to develop an "appropriate" sewage treatment system according to the actual conditions of the regional economic structure and social structure, etc.

Against this background, we have been involved in the development of low-cost, energy-saving, and easy-to-maintain sewage treatment Downflow Hanging Sponge (DHS) reactors that can be applied to developing countries. As a result, the first DHS sewage treatment system in the world was installed in the city of Agra, India in 2014, and the prospects for sewage treatment in developing countries are on the horizon. In addition, I have been involved as a coordinator in the subject-specific training "Wastewater Treatment Technology" for JICA Latin American engineers. Most of the trainees want to introduce the DHS system in their own country instead of the conventional activated sludge method, and put the education of and introduction activities for the DHS system into their action plan after returning to their own countries. However, the system is not yet widespread. The high introduction cost for the construction of DHS is a hindrance. As such, we are developing an improved DHS system in order to reduce the cost.





# [Affordable and Clean Energy] Ensure access to affordable, reliable, sustainable and modern energy for all.

### Toward the use of electric energy without waste

Minoru Nohara, Professor, Graduate School of Advanced Science and Engineering



Developed a thermoelectric conversion material with generated electric power 1.5 times that of conventional material



# Increase power generated with thermoelectric materials 1.5 times that of conventional generation

In modern society, waste heat is ubiquitous from power plants that use fossil fuels, to automobiles, garbage incinerators, and the remaining hot water in the bathtub. We are working to improve the performance of thermoelectric conversion materials that enable the direct extraction of electric energy from this waste heat, especially to achieve "power factors" that surpass conventional materials. In order to increase the "power factor," which is an index of electric power that can be extracted from thermoelectric materials, it is necessary to achieve both "metallic electrical conduction" and "huge thermoelectromotive force." To this end, it is necessary to create a substance with a unique band structure, such as a "multi-pocket structure" or "pudding-mold-like structure," which have large asymmetry of electron-positive hole excitation. Based on this guideline, we proceeded with research on material development and clarified that power generated with the power factor of platinum compounds with a prite-type crystal structure reached 1.5 times that of conventional materials. In the future, we plan to develop thermoelectric materials using less expensive elements by utilizing theoretical methods based on firstprinciples calculations.

### Toward zero electric supply loss: Search for superconducting materials at room temperature

When electricity is sent from a power plant to a home or a factory, the electrical resistance of the power cables causes transmission loss. That volume has reached about 5% of the total power generated, and the power of several nuclear power plants is lost in Japan as a whole. This loss can be reduced to zero if we use superconductors for the power transmission lines. Superconductivity is a phenomenon in which the electrical resistance of metals and alloys becomes zero at or below a certain temperature. However, there is a problem that the temperature required to move the normal conductivity to superconducting state at a higher temperature. So far, we have developed a substance that moves into a superconductivity state at minus 226 degrees Celsius (absolute temperature: 47 Kelvin), which is the second highest temperature among iron-based superconductors. In addition, we have succeeded in reducing costs by reducing the content of rare-earths materials, such as lanthanum and praseodymium, from the proportion of 25% to 5%. In the future, our goal is to develop substances that show superconductivity at higher temperatures.

### Research and development on the creation of innovative material conversion technology

Hiroki Miyaoka, Associate Professor, Natural Science Center for Basic Research and Development



To realize decarbonization and establish a sustainable society, it is necessary to use renewable energy efficiently, and research and development of various elemental technologies are underway. Our research group is conducting research intended to create innovative substance conversion technologies that utilize the functions of light elements such as lithium and sodium. In particular, we are paying attention to the research and development of energy conversion technologies such as hydrogen production / storage technology as secondary energy and ammonia synthesis.



### Contributing to sustainable agricultural production in harmony with the environment through solar sharing

Hirofumi Saneoka, Professor, Graduate School of Integrated Sciences for Life





Solar sharing (farming-type solar power generation) is an effort to share sunlight between agricultural production and power generation by setting up braces on farmland, installing solar power generation equipment (solar panels) in the upper space, and cultivating agricultural products under it. Solar panels for general housing and industrial use are installed on unused land and on the rooftops of buildings, but solar sharing is a new agricultural problems, such as a shortage of successors, population aging, and an increase in the amount of abandoned farmland, solar sharing can be expected to effectively use fallow land and abandoned farmland, and agricultural management in harmony with the environment based on the creation of new jobs and the introduction of renewable energy, and will contribute to the achievement of the SDGs.

In the "West Energy Solution / Hiroshima University Solar Sharing Joint Research Course," various crops are cultivated under the solar panel (photo) installed in the precision experiment field of the Graduate School of Integrated Sciences for Life, and based on their growth, yield, and quality evaluation, we examined the selection of crops suitable for solar sharing and their cultivation methods, and are working on the establishment of a futuristic agricultural production system using solar sharing.

### Development of carbon recycling technology

### Tsunehiro Aki, Professor, Graduate School of Integrated Sciences for Life



We are aiming to develop carbon recycling technology that converts CO<sub>2</sub> emitted from thermal power generation into high-value-added products by utilizing the fermentation function of microorganisms for the purpose of sustainable utilization of limited resources and measures against climate change.

Having set up an experimental facility next to the high-efficiency thermal power generation demonstration plant in operation on Osaki Kamijima, Hiroshima Prefecture, we are currently working on the establishment of technology for fermenting and producing lipids as a raw material for health foods, healthcare products and chemicals with the use of CO<sub>2</sub> that has been separated and recovered at the plant as feed, and the construction of the related manufacturing processes.

### Contributing to the development of a sustainable palm oil industry through economic, social and environmental impact assessments

Shinji Kaneko, Professor, Graduate School of Humanities and Social Sciences(Director of NERPS)





Palm oil is contained in many products we use every day (food and daily necessities). While being treated as a bad guy mainly because of the heavy environmental burden in the production process, palm oil, with high production efficiency and people who make a living in the palm oil industry, is indispensable to our lives.

The palm oil industry, which accounts for one-third of the world's edible oil supply, is extremely important as an industry that supplies inexpensive vegetable oil for food and ingredients. At the same time, the palm oil industry generates a large amount of waste biomass, and its sustainability has been questioned. For that reason, the utilization of waste biomass by the palm oil industry, which enhances sustainability, is attracting attention as one of the possibilities of energy use especially as a measure against climate change. On the other hand, the expansion of palm oil production has led to the expansion of oil palm plantations in production areas such as Malaysia and Indonesia and consequent deforestation. In addition, social problems, such as child labor at oil palm plantations have been pointed out, and the sustainability of the palm oil industry is jeop-ardized also from a perspective other than waste.

The SATREPS (Science and Technology Research Partnership for Sustainable Development) program accepted in 2019 focuses on old oil palm trees that are discarded after a 25-year production cycle among the unused waste of the palm oil industry. Industryacademia collaboration is working on a transdisciplinary approach to realize the idea of taking old oil palm trees from oil palm tree plantations, recycling them, producing pellets, transporting them to Japan, and using them for power generation as biomass fuel. In addition to technical discussions, this approach includes the tasks of confirming the sustainability and economy of the system that integrates palm oil-producing countries and the Japanese market, with Professor Shinji Kaneko of Hiroshima University as the group leader, by performing LCA (Life Cycle Assessment) analysis and cost-benefit analysis.

### Heavy metal wastewater treatment and rare metal recovery using microorganisms

Yoshiko Okamura, Professor, Graduate School of Integrated Sciences for Life





producing Cds quantum dots



Recombinant E. coli conferred a metal tellurium synthesis ability.

The technology for recovery of metal resource is important for sustainable society. Heavy metals are indispensable as additives to improve the properties of electronic, magnetic and functional materials. Rather than calling them "heavy metals," it might be easier to understand their rarity and importance if we call them "rare metals". The reason of "rare" is because their existing amount in the Earth's crust is relatively small and the refining cost is high. Rare metals are an indispensable material in most manufacturing industries in modern society. Solid metals can be melted, refined and separated into elemental substances, but once rare metals dissolved in waste liquid as ions, it requires more energy to be taken out as elemental metals. Thus, metal ions in wastewater are rarely recycled. Since the bioproces is a low-energy process and environmentally friendly, it has been used for bioremediation (biological environmental restoration) to recover heavy metals in the environment, but we utilize biomineralization process to recovery of heavy metal ions from waste as minerals at normal temperature and pressure. The recovered metal compounds are solid and can be refined into elemental metals using less energy, or elemental metals such as metal tellurium synthesized by bacterium (photo on the right: recombinant E. coli) , for example, they can be recycled immediately. Such like this, development of the recovery technology for rare metal resources from wastewater with low energy through biomineralization will be expected. In addition, the metal compounds synthesized by bacteria are the nano-sized particles and they have the potential to be applied to functional materials. For example, highly toxic cadmium ions were converted into CdS nanoparticles by bacteria (photo: left) , and the quantum-sized nanoparticles and have semiconductor properties. As such, we have developed new biotechnologies in order to contribute to the sustainability of rare metal resources and material synthesis by utilizing the diversity of microorganisms and gene resources.



[Decent Work and Economic Growth] Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.

### Contributing to the development of highly specialized human resources who can realize innovation

Shin Wakitani, Associate Professor, Graduate School of Advanced Science and Engineering (Researcher, Hiroshima University Digital Monozukuri (Manufacturing) Education and Research Center)





# Graduate School of Advanced Science and Engineering, Joint Research Course "MBD Basic Course"

In recent years, model-based development (MBD) has been applied not only in the automobile industry but also in the design and development of various products, contributing to the improvement of product development efficiency. However, it still takes more time for all developers involved in these operations to master MBD development methods. Furthermore, it is an urgent task for Japanese industries to accelerate the development of human resources who can freely manipulate models and realize innovation.

In view of this situation, we have formulated a curriculum for developing highly specialized human resources related to MBD, developed teaching materials, and published them as a textbook. In addition, under the industry-academia-government collaboration with the Hiroshima Council for the Promotion of Collaboration between Government, Academia, and Automobile Industry (Hirojien) and the Hiroshima Digital Innovation Center (HDIC), we have made these efforts on a large scale as part of "MBD process training" focusing on manufacturing companies in Hiroshima Prefecture.

This curriculum is offered in a lecture format in our university's smart innovation program and has been actively developed for students. In addition, we have established a general incorporated association, "Digication" for the nationwide development of this training. Recently, we have been advocating for "Smart MBD" as a new manufacturing platform based on this MBD, and are advancing related research.

### Investigating the current state of gender in companies

Research Center for Diversity and Inclusion



We conducted qualitative and quantitative surveys on gender at multiple companies in western Japan in collaboration with their personnel officers, including distribution companies with many female workers and manufacturing companies with few female workers. These surveys have been conducted as part of the "Initiative for Realizing Diversity in the Research Environment (traction type)" (MEXT's Human Resource Development Program for Science and Technology), which is conducted by Hiroshima University in collaboration with companies, international think tanks, other universities, and local governments with the aim of fostering professional women.

### Social implementation of human augmentation technologies

Yuichi Kurita, Professor, Graduate School of Advanced Science and Engineering (Director, Applied Human Augmentation Project Research Center)



The services expected from human-augmentation technologies cover the expansion of people's motor, sensory, and cognitive abilities, the improvement of skills in using tools and machines, communication based on the understanding of the relationship between people and people or people and tools, education, training, and support for medical and nursing care. The mission of the Applied Human Augmentation Project Research Center is to develop support systems that improve the convenience of daily life based on research seeds related to the understanding, modeling, and application of human sensory-motor characteristics, and to implement these systems in society in cooperation with other universities, companies, and local governments.

### Aiming to realize a working environment where engineers can feel "well-being"

Takuya Kinoshita, Assistant Professor, Graduate School of Advanced Science and Engineering





For this problem, using technology that qualitatively and quantitatively grasps the state of mind of engineers working at the site, we are conducting research to build a theory and system that can reflect these pieces of information on construction sites and construction machinery. Based on this, we aim to realize a working environment where engineers can feel "well-being" and people's minds and construction work can be adaptively maintained. Specifically, we are working to build a "psychologically adaptive smart system" using a database-driven approach as a system that improves the performance of the entire work site centered on people through co-creation activities with companies.



### Revealing consumers' support toward companies contributing the SDGs

Tomomi Yamane, Researcher and Shinji Kaneko, Director, NERPS



By 2030, the SDGs aim to realize a sustainable world in which no one is left behind, with the cooperation of all countries, businesses, and individuals. In particular, the active efforts of the private sector are indispensable for achieving the SDGs. Companies are expected to contribute to solving social issues through their core business rather than through their corporate social responsibility such as philanthropy and charity. By doing so, we create a society where private companies remain profitable while prosperity continues. However, if companies embedding the SDGs into their core business strategies gain support of stakeholders are not clearly understood. If it is clarified that consumers prefer a company that actively work toward the SDGs, companies may further accelerate their contributions to SDGs. On the other hand, pretending to be working on the SDGs even though they are not actually working on the SDGs is called "SDG- wash." To prevent SDG-wash, it is important for companies to understand the essence of the SDGs and work toward them diligently. It is also necessary for stakeholders to develop an ability to penetrate companies' SDG-wash and support companies that contribute to the SDGs by embedding sustainability practice into their core business strategy.

Against this background, we conducted a nationwide survey to investigate whether consumers would evaluate companies' SDGs contributions when choosing a company. We also measured the effect of raising awareness of the SDGs. These research outcomes have been compiled into four papers and published in international academic journals.

### [Research highlights]

- When purchasing products, investing, and job-seeking, consumers choose companies that actively work toward the SDGs.
- Consumers support companies to gain benefits from their SDG contribu-
- tions. However, the support rate is low. By raising consumers' awareness of the SDGs, support for companies that gain a profit from their SDG contributions increases.
- The younger generation (aged 18  $\tilde{}$  30) expects society, schools and companies to contribute to the SDGs more than older generations does.
- When young people choose a company to work for, while they consider wages and job security important, the support rate of companies that are reluctant to contribute to the SDGs is low even if their expected wages are high (figure).



[Industry, Innovation and Infrastructure] Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.

### Research related to air conditioning equipment and utilization of unused energy

Sayaka Kindaichi, Associate Professor, Graduate School of Advanced Science and Engineering





Image of the use of renewable energy via heat pumps

Improving resource utilization efficiency and introducing a clean technology are indispensable for reducing CO<sub>2</sub> emissions. We have conducted research on energy conservation in buildings, especially related to air conditioning equipment and the utilization of unused energy. Recently, a new system on the demand side (building side) toward carbon neutrality is required. For example, we are working on the development of a supply and demand adjustment method that can be applied to existing buildings, such as a method to efficiently store surplus electricity during the daytime from solar panels as chilled water for air conditioning, using a geothermal heat pump.

### Self-driving shuttle "HIROMOBI" -Aiming for a smart campus

Akimasa Fujiwara, Professor, Graduate School of Advanced Science and Engineering



In March 2021, we initiated the operation of the autonomous driving shuttle "HIROMOBI" on our Higashi-Hiroshima Campus as an initiative for a smart campus where people and goods can freely come and go with mobility services with a low environmental impact. In Phase 2, we expanded the network from on-campus use to operation on public roads.



### Promoting sustainable industrialization and innovation through digital manufacturing

Hiroshima University Digital Monozukuri (Manufacturing) Education and Research Center



### Data-driven smart system

The characteristics of objects and machines change according to changes over time and environmental and operating conditions. Datadriven control is an attempt to realize the maintenance of the same performance against any changes through a control that uses a database. The Digital Manufacturing Education and Research Center has conducted research on data-driven smart systems that are constructed by organically integrating data analysis and machine learning that further promoted this control method. In particular, after creating a database of drivers' characteristics, environmental changes, parts deterioration status, etc., based on the interaction between model-based development, and also utilizing AI technologies, we have conducted research that aims at building a new development platform intended to optimize the control system.





We are working on the development of a technology (material) that achieves both heat insulation and has a sound absorption function. A material that reduces sound (sound absorbing material) and a material that insulates (insulating material) control both sound and heat, respectively. If we can develop a technology (material) that can mange both of these functions at a high level and control them at the same time, we will be able to apply it to many industries, such as automobiles, ships, and housing, and to contribute to the reduction of energy consumption.



### Vibration spectrum camera

"Visualization of vibration" can be achieved by instantly recognizing vibration information invisible to the human eye at the pixel level and by

displaying the results in real time to visualize only the part that vibrates at an arbitrary frequency. By performing vibration inspection and monitoring using this technology in a plant, we can make use of it for high-speed and high-precision abnormal operation detection.



High-speed camera recognizes a vibrating machine in a blink

# [Reduced Inequalities] Reduce inequality within and among

### countries.

### A specific program to learn how to solve diversity and inclusion issues

### Research Center for Diversity and Inclusion

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In 2020, we started the "Diversity Specific Program," a program that all Hiroshima university students can take in order to learn how to solve diversity and inclusion issues. The program includes a compulsory subject, "Introduction to Diversity" for the basics of diversity, and elective, diversity-related subjects across multiple departments in university. The students set their own course plan and learn together across disciplines for individual goals.



### Refinement of the concept of inclusiveness in a diverse society and examination of its function

Kiriko Sakata, Professor, Graduate School of Humanities and Social Sciences



Grant-in-Aid for Scientific Research (B) "Refining the concept of inclusiveness in a diverse society and examining its function" (FY 2021 ~ FY 2024), of which I am the principal investigator, was accepted. For the SDGs, member countries have pledged to "leave no one behind" and there is a great concern about the question of what we should do to include diverse people and utilize their abilities. However, there are very few pieces of social psychological research on the concept and the effect of inclusion in the world. The purpose of this research is to clarify the components of inclusiveness and to empirically clarify the effect of inclusiveness on individuals and groups. By clarifying what factors can make people perceive to be inclusive in the workplace, school, and community, and how inclusiveness functions in a highly diversified group, we aim to provide insights in order to make a diversified society a happy and beneficial place.

### Toward a society that mutually recognizes diversity~Providing guidance to designated schools that established and practice an inclusive education system-

Aiko Kajiume, Assistant Professor, Hiroshima University Hospital





Inclusive education is an initiative for diverse children to study together in the same classroom. Toward the formation of a symbiotic society, it is important for children to gain experience in recognizing each other's diversity. To this end, first of all, with the purpose of deepening the understanding of developmental disorders by educators, I give lectures to school teachers in workshops and lecture sessions at schools four to five times a year. I believe that it is important for medical care, education, welfare, etc. to work together under the common recognition of how to provide appropriate support for children and their families. In addition, we have been actively involved in social activities, such as the members' activities of the "Hiroshima Prefecture Community Health Measures Council Developmental Disorder Medical Support System Review Special Committee," "Hiroshima Prefecture Developmental Disorder Medical Institution Network Construction Project," and the "Hiroshima Prefecture Screening Function Enhancement Project," which aims to extract cases of child-rearing difficulties and children with developmental disorders in infant medical examinations.



# [Sustainable Cities and Communities] Make cities and human settlements inclusive, safe, resilient and sustainable.

### Creating a resilient and sustainable city through disaster prevention education and disaster mitigation research

### The Resilience Research Center





### **Disaster Mitigation Education**

The Resilience Research Center, in cooperation with Hiroshima Prefecture and local governments, has supported the development of Virtual Reality content for disaster mitigation experience for residents and schools, and has generated teaching materials and methods for disaster mitigation education for elementary and junior high schools.

In case of an imminent danger of a disaster, the director of the Center has communicated with the national, prefectural, and local governments, mass media, and residents to implement practical measures for disaster mitigation. In addition, the center has been holding training sessions about once a year for those in charge of crisis management at local governments since FY 2019. In Hiroshima Prefecture, expectations for disaster mitigation education have been surging, with the governor commenting that during the torrential rains of August 2021, raised awareness of disaster prevention encouraged early evacuation, leading to a decrease in casualties.

In commemoration of the second anniversary of the establishment of the Resilience Research Center, we held an open discussion titled "What should we do in the next step for the prevention of 'synergistic heavy rainfall disasters'? In the discussion, researchers at the Center, government officials, and representatives of local communities, including disaster reduction leaders, presented case studies from their own perspectives and exchanged opinions. Since the reports and discussions are useful for future disaster reduction activities and disaster mitigation education, we publicized them on the website of the Resilience Research Center.

### Validation of an early detection system for debris flows in mountain streams in cooperation with local communities

In December 2019, we installed debris flow sensors in Kumano Town, Hiroshima Prefecture, where a debris flow disaster occurred during the torrential rains in July 2018. The debris flow sensor was jointly developed by the Resilience Research Center of Hiroshima University and Keisoku Research Consultants Co. (Hiroshima City). A total of 10 sensors were installed at five locations in the mountain stream on the hillside of Ohara Heights to detect debris flows in real-time. The aim is to monitor the movement of ground and sediment so that the government officials and residents can easily check it using a personal computer.



# Strengthening collaboration with MLIT, Hiroshima Prefecture, local governments, and other organizations for linking research results to practices

Every year, we have invited local government officials from Hiroshima Prefecture to attend a seminar where the research activities on disaster mitigation at Hiroshima University and the disaster mitigation measures by local governments are shared to support their disaster prevention practices. In addition, we have strengthened cooperation with the Chugoku Regional Development Bureau of the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), Hiroshima Prefecture, and other organizations to create a framework for linking research results to actual measures.

### Research on the challenges and possibilities of sustainable tourism

Funck Carolin, Professor, Graduate School of Humanities and Social Sciences



Tourism contributes to many SDGs such as economic effects that lead to the alleviation of poverty, protection of natural resources on land and sea, employment and self-employment of women and securing of water resources At the same time, there are also problematic issues, such as unstable employment, emissions of carbon dioxide associated with traveling, destruction of nature in mountains and the sea, and commercialization of culture.

In the research so far, in order to objectively and scientifically evaluate tourism development as a

regional policy in rural communities, especially islands, we have discussed whether spaces provided by communities can be matched to the needs of tourists and visitors for leisure in the area after grasping the economic and social activities and the use of spaces. Also, we have analyzed the economic, social and environmental effects of tourist behavior and explored the possibilities and problems of sustainable tourism. With my graduate students who have conducted research mainly on Japanese islands and international tourism to Japan, we have discussed the possibility of ecotourism, management of natural resources in popular tourist destinations, the ideal tourism industry in which residents and migrants are involved, and indicators to measure sustainability. As an extension of my research, I have participated in committees and projects held by prefectures, municipalities, and NPOs, and have given advice on policies that can utilize tourism as a means of regional revitalization.



CAROLIN FUNCK MALCOLM COOPE

# **(Responsible Consumption and Production) Ensure sustainable consumption and production patterns.**

### Aiming to develop next-generation plastics by making full use of genetic engineering techniques

Koichi Kato, Professor, Graduate School of Biomedical and Health Sciences





Plastic is an indispensable material in our daily lives. On the other hand, however, we have many serious problems, such as the marine plastic problem and the CO<sub>2</sub> emissions associated with the production of plastic and their adverse effects on global warming. Drastic solutions for these problems require a breakthrough related to polymer materials. Against this background, biode-gradable plastics, which are decomposed and disappear in nature, are attracting attention.

Poly(lactic acid) is a typical example. Since raw materials can be obtained from natural resources such as corn by using fermentation, it can reduce the impact on the ecosystem. However, poly (lactic acid) alone cannot achieve the numerous functions required to replace all conventional plastics. Therefore, the Biomaterials Laboratory, Graduate School of Biomedical and Health Sciences, has conducted research on next-generation plastics (green plastics) based on green chemistry with the aim of expanding the variety of biodegradable plastics.

Although the research has just begun, I am wondering if it is possible to use a protein that has been molecularly designed by utilizing genetic engineering techniques as a component (gene recombination experiment on "creation of protein / polymer": institutional approval number: 2020-245). This method has a high degree of freedom in molecular design and can be scaled up in the manufacturing process, so we expect that it can be an attractive method.

### Visualization research of marine plastic waste

Yuji Sakuno, Associate Professor, Graduate School of Advanced Science and Engineering



There is a strong interest in the problem of marine plastics around the world, as represented by the charging for plastic shopping bags at convenience stores. However, the reality of marine plastic waste is unclear. In our laboratory, as basic research for exploring and visualizing marine plastic waste using remote sensing technology, we have investigated the spectaral reflectance characteristics of plastics on the coast and taken up the challenge of plastic visualization research together with local high school students.



Balloon experiment



Spectaral reflectance measurement of plastic waste

# [Climate Action] Take urgent action to combat climate change and its impacts.

Investigating the effects of rising seawater temperature on marine resources due to climate change and considering adaptation measures

### Wataru Nishijima, Professor,

Environmental Research and Management Center



### Impact on sand lance resources

Sand lance Ammodytes japonicus is a typical planktivorous fish of the Seto Inland Sea, and is popular as boiled sand lance "Kugini". It is also an important fish that supports the higher-level production of the Seto Inland Sea as food. Ecologically, the fish has the characteristic of diving into the sand and sleeping in the summer, and there is concern about the effects of increasing water temperature during the aestivation. Therefore, we investigated the effects of increasing seawater temperature due to climate change on sand lance resources in the eastern part of the Seto Inland Sea, and at the same time discussed adaptation measures.



Estimated survival rate throughout an estivation period at the current, mid 21st and end of the 21st century for the current observed condition factor range. Results are summarized decidal estimates of each periods and each condition factor settings.

# Impact on aquatic organisms and aquaculture in the Seto Inland Sea

The increases in seawater temperature in the Seto Inland Sea due to climate change changes the distribution of various organisms in the Seto Inland Sea. In particular, the invasion of warm-sea herbivorous fish such as rabbitfish Siganus fuscescens and parrotfish causes the seagrass beds to decline and impacts the production of cultured laver and wakame seaweed, so we evaluated the effects.

### Changes in marine ecosystems along the Pacific coast of Shikoku

Along the Pacific coast of Shikoku, coral habitat is expected to expand north as the increases in seawater temperature, but there are concerns over the northward expansion of crown-of-thorns starfish and the progress of coral bleaching. We have verified possible changes in the future and discussed adaptive actions that link the changes to the promotion of tourism and the fishery industry.



Average sea-level water temperature in August based on the climate change scenario

### Aiming to mitigate climate change by reducing methane gas emissions from cattle belching

Taketo Obitsu, Professor, Graduate School of Integrated Sciences for Life



Methane gas produced in the cow's stomach (reticulorumen) and released into the atmosphere through eructation (belching) has a great influence on global warming. We are aiming to develop farming techniques those suppress the methane gas emission from cow's belching by conducting research, using dairy cows raised in the experimental farm of Hiroshima University, for modifying feeding methods, developing natural materials that suppress the methane production, and bleeding cows with low methane emissions.



### Research on the interaction between aerosol particles and marine ecosystems

Yoko Iwamoto, Associate Professor, Graduate School of Integrated Sciences for Life



Some aerosol particles contain nitrogen, phosphorus, and iron, etc. When they are deposited on the surface of the ocean, they supply nutrients needed for phytoplankton to the sea surface, which can lead to the proliferation of phytoplankton. In addition, the prosperity and decline of phytoplankton changes the concentration of trace substances in seawater, affecting the formation and composition of aerosol particles of marine origin. Aerosol particles function as the "parasol" of the Earth by directly scattering sunlight and acting as the core of cloud particles. To refine

future climate change predictions, it is necessary to learn the physical and chemical characteristics of aerosols originating from the ocean, which occupies about 70% of the Earth's surface. Against this background, we have installed atmospheric observation equipment on campuses, coastal sites, and ships to measure aerosol particles in various sea areas.





[Life Below Water] Conserve and sustainably use the oceans, seas and marine resources for sustainable development.

### Providing high-quality education internationally as a base for education on marine biology

Marine Biological Laboratory, Graduate School of Integrated Sciences for Life



As a Joint Usage / Education Center of MEXT, we provide inclusive, fair and high-quality education to all people and promote lifelong learning opportunities. Specific contents include the provision of marine biology course for elementary, junior high and high school students, and seminars on the renewal of teacher's licenses for elementary, junior high and high schools, and implementation of next-generation human resource development project Global Science Campus in which Hiroshima University participates, provision of credit-compatible courses to students of national, public and private universities nationwide, and provision of cutting-edge science education for university and graduate students from around the world using the JST Sakura Science Project. In that case, we visit the Peace Memorial Museum and other related sites in Hiroshima City and conduct peace education specializing in Hiroshima at the same time. To promote opportunities for lifelong education, we hold face-to-face courses at the Hiroshima Study Center, Open University. In this way, we provide high-quality education internationally, from primary education to secondary education, higher education, and lifelong education.



### Hiroshima University SATO Research Center

Shinichi Onodera, Professor, Graduate School of Advanced Science and Engineering



The SATO Research Center aims to clarify water resource management in the Seto Inland Sea area (Hiroshima, Okayama, Kagawa, Osaka, Nara), evaluation of flood and sediment runoff due to climate change, and its impact on coastal areas in its activities. In addition, we compare the results with the cases in Indonesia and China as part of our international joint research. Based on the creation of a healthy cycle (including people and food) between urbanized cities and their surrounding areas in Asia, and cases of the Seto Inland Sea basin, which has successful cases, such as satoyama / satoumi, we aim to create a new academic research field that contributes to solving problems in Asian countries.



[Life on Land] Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

### Relationships between environmental movements and communities, and ideal use of natural resources that are compatible with nature conservation

Toshihisa Asano, Professor, Graduate School of Humanities and Social Sciences



The ecomuseum explores and expresses the relationship between the environment and humans in a certain area with the participation of residents, with the aim of contributing to the intrinsic and sustainable development of the local community.



As my main research themes, I am conducting research to clarify 1) the relationship between environmental movements and communities and 2) ideal use of natural resources that is compatible with nature conservation.

In the first theme, my research fields are sites related to the conservation of the water environment and the satoyama environment, and my activities include not only research but also practical activities, such as serving as an officer of a civic group for environmental conservation.

In the second theme, deeming the entire area as a museum, we are working on research, education, and practical activities on ecomuseums that aim to preserve and utilize the natural and cultural heritage of the area. Regarding ecomuseums, in addition to being involved in the operation and dissemination activities of the Japan Ecomuseological Society, I have also conducted research activities on local resources in Higashi-Hiroshima City, etc., and have discussed the operationalization of ecomuseum tours. We also disseminate and give guidance for nature games, which are citizen-centered environmental education programs. In addition, I have also continued joint research on creating a mechanism to encourage citizens to participate in environmental preservation movements.

### Leaving nature for future generations through activities to preserving Miyajima's natural environment and to prevent natural disasters

Hiromi Tsubota, Associate Professor, Miyajima Natural Botanical Garden, Graduate School of Integrated Sciences for Life



### Conserving resources by the utilization of discarded beach Vitex growing on Miyajima Island, and improvement of natural habitat environment

The beach vitex, Vitex rotundifolia, which has until now been discarded following maintenance and management of roads and waterways in Miyajima Island, one of the World Heritage Sites, is being used for the production of gin as an efficient reutilization of resources. It is offered as a product to Sakurao Brewery & Distillery Co., Ltd., and through the proceeds, it contributes to education and research for the conservation of the island natural environment. Activities like volunteer work to pick up trash, such as marine plastic waste, will significantly improve the environment of the natural coast, including beach vitex habitat, and halt biodiversity loss.



# Revegetation project for sustainably managing forests and prevention of natural disasters in Miyajima Island

We are engaged in revegetation projects for forest conservation and prevention of natural disasters in Miyajima Island. Around the Shishi-iwa Terminal of Miyajima Ropeway, the Japanese macaque, Macaca fuscata, which were previously introduced from Shodoshima Island of Kagawa Prefecture were fed. Although the monkeys have now been captured and moved to another facility, the vegetation around the area where the monkeys were raised is still damaged. To restore the original vegetation, revegetation activities have been initiated by government agencies and local schools as well as our botanical garden. Students from the local schools, Miyajima Gakuen (Miyajima Elementary and Junior High Schools of Hatsukaichi City), participate in the activities as a part of environmental education.

# The Hikobia Monthly Botanical Excursion for the general public has been held since 1956

This is an event continued for more than 50 years and is attended by many ordinary citizens, teachers of elementary, junior high, and high schools, and people responsible for environmental surveys and assessments. This activity received the 7th Special Award for Education from the Botanical Society of Japan. It is also used for recurrent education for acquiring qualifications such as biological skill tests, and some of the results obtained at the monthly botanical excursion are reflected in publications such as the journal Hikobia and the book entitled "Flora of Hiroshima Prefecture, Japan" published by the Chugoku Shinbun.





Please scan the QR code for information on the excursion.

### Examination of proper management of invasive exotic plants

Takayuki Nakatsubo, Professor, Graduate School of Integrated Sciences for Life



The invasion of alien species poses a major threat to biodiversity. The progress of global warming may accelerate and exacerbate their impact.

In our laboratory, we have grasped the current situation based on field surveys, focusing on invasive alien plants that are believed to have a particularly large impact on ecosystems and industries, and have advanced the prediction of the expansion of distribution and the impact of these plants in warming environments by cultivation experiments and models. Some exotic plants used as park trees and horticultural plants can become wild and have an adverse effect on the ecosystem. It is not realistic to use no exotic plants for greening, so risk assessment for each species is required. Based on this idea, we are conducting ecological research on plant species that are highly likely to become wild, and are discussing appropriate management methods.



### Deepening understanding of biodiversity through amphibian research and civic education

### Amphibian Research Center



### Comprehensive elucidation of intraspecific genetic diversity for Anderson's crocodile newt

### Takeshi Igawa, Assistant Professor, Amphibian Research Center

With regard to Anderson's crocodile newt, one of the endangered species of Amami Oshima, Tokunoshima, and northern Okinawa Island, which were registered as World Natural Heritage Sites, and a natural monument of Okinawa and Kagoshima prefectures, we have comprehensively elucidated the genetic diversity within the species that is essential for the conservation plan. (Igawa et al., 2020). In addition, while continuing the breeding and propagation of this animal within the center as part of the extraterritorial conservation project for various endangered and natural monument amphibians including this species, we exhibit living Anderson's crocodile newts for the purpose of raising social awareness of biodiversity.



### Genetic research of sex and speciation using wild frogs Ikuo Miura, Associate Professor, Amphibian Research Center

Focusing on the populations that make up the species, we aim to elucidate the mechanism by which one species evolves into a new species. One of the points of interest is to investigate the genetic differences between populations in detail and clarify their genetic continuity and discontinuity. We pay particular attention to the boundary area. The second point is to investigate the causes and mechanisms of reproductive isolation. We are investigating how differences in sex-determining patterns and gonad formation occur, and how mutual recognition of the genome changes in germ cells, focusing on the above points.

Although the Japanese archipelago is an island nation separated from the continent, it has experienced a mass influx through connection to the continent several times. In addition, geographical isolation is remarkable in Japan due to many mountain ranges, rivers, and crustal movements. In addition, the population may be reunited after being released from isolation. In this way, repeated geographical isolation and fusion have caused various genetic changes in the population, and it is no exaggeration to say that this country is truly an experimental site for evolution. Therefore, the evolution of species in amphibians has been very active and is still in progress.

#### Holding public exhibitions Hajime Ogino, Professor, Amphibian Research Center

For the purpose of symbiosis between mankind and nature, we held biological exhibitions to deepen the general public's understanding about amphibians that are susceptible to environmental destruction. A total of 416 ordinary citizens directly touched live frogs and newts and learned about their ecology.





[Peace, Justice and Strong Institutions] Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.

### Aiming to become globally recognized research clusters of transdisciplinary research "Peace and Sustainability"

### NERPS

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In 2020, NERPS started international transdisciplinary research projects on peace and sustainability jointly with four universities and research institutes (University of Denver, Stockholm International Peace Research Institute, Columbia University, University of Nottingham, Ningbo, China). Total of six research clusters, including four led by researchers from these partner organizations and two led by researchers of Hiroshima University, were formulated. Then in the fall of 2020, NERPS published "The 2020 NERPS Science Plan," which described details of six projects, and officially started these research projects, with the aim of becoming globally recognized research clusters.

These four transdisciplinary research projects aim:

to investigate the possibilities of managing fisheries conflict through regional fisheries management organizations;

to explore the effects of incorporating long-term ecological considerations into peacebuilding in post-conflict societies for sustaining positive peace;

to investigate an effectiveness of protected area management and natural resource governance for enabling protected areas to contribute to enhancing peace and sustainability; and

to identify and evaluate ICT-mediated and digital technologies for enhancing the resilience of cities from the perspective of peace and sustainability.

Each of them contributes to become a research center backed by internationally viable research capabilities in the future, and to contribute to the establishment of "Science for Sustainable Development" that is stipulated in Hiroshima University's long-term vision.

NERPS will host the inaugural Hiroshima International Conference on Peace and Sustainability for 3 days from March 1, 2022 on Hiroshima University's Higashi-Hiroshima Campus. The progress of the transdisciplinary research projects will also be presented at the conference.

### Peace building and prevention of violent extremism through education for African youth through teacher development

Center for the Study of International Cooperation in Education (CICE)



CICE designed and operated about 10-day field visit and training in Hiroshima, Nagasaki, and Tokyo as part of the training project "Resilience Building and Prevention of Violent Extremism through Education for Youth through Teacher Development in the Sahel," which is conducted by the UNESCO's International Institute for Capacity Building in Africa (UNESCO-IICBA) with support from the government of Japan. It was held online in 2020, but until 2019, CICE had accepted

around 30 trainees each year, including senior officials from the African Union and educational administrators from more than a dozen African countries, and had held lectures and workshops at Hiroshima University; provided opportunities to visit the Hiroshima Peace Memorial Museum and the Nagasaki Atomic Bomb Museum, to hold exchanges with junior high schools in Hiroshima and Tokyo, and to visit parliamentarians and MEXT.



### Support for system construction in developing countries

### Yoko Ishida, Professor,

Center for the Study of International Cooperation in Education (CICE)





# "Project for Strengthening Framework of Implementation of SDGs in the Republic of Indonesia"

I have participated in the technical cooperation project entitled "the Project for Strengthening Framework of Implementation of SDGs in the Republic of Indonesia" (March 2019 ~ March 2022), which has been conducted by International Development Center Co., Ltd. and Hiroshima University as a joint venture under consignment from JICA, as an indicators and statistics expert. In this project, we provide technical support for the four initiatives that the Ministry of National Development Planning / BAPPENAS promotes for the achievement of the SDGs by the Indonesian government: 1) Setting of the definitions and target values for the domestic indicators for the SDGs, 2) Formulation of action plans by the central government and the target provincial governments, 3) Development of a monitoring and evaluation system (e-Monev) and 4) Strengthening of cooperation with various stakeholders in industry, academia and government.

# Development of evaluation systems and human resources of developing country governments

Serving as Vice Chairman of the Japan Evaluation Society, I am involved in the development of evaluation systems and human resources for governments of developing countries. The Ministry of Foreign Affairs has been holding the "ODA Evaluation Workshop" almost every year since 2001 as an information exchange platform for the implementation of development plans and capacity building in order to support the efforts of governments of developing countries to achieve the SDGs. In the 15th workshop "Responses and initiatives by each country to the SDGs" held in Colombo in 2018, I gave a presentation about the "possibility of strengthening SDGs monitoring and evaluation capacity through international cooperation." In fiscal 2020, I conducted a survey as an expert in the "Overall Review of ODA Evaluation Workshop" together with a team of consultants on consignment from the Ministry of Foreign Affairs, and compiled a report. The 17th Workshop in fiscal 2021 will be held online and I will be the chair.



[Partnerships for the Goals] Strengthen the means of implementation and revitalize the global partnership for sustainable development.

### Global partnership in the field of international educational cooperation

Center for the Study of International Cooperation in Education (CICE)



# Making contribution as Co-Chair of the "SDG-Education 2030 Steering Committee"

From January 2019 to August 2021, Professor Kazuhiro Yoshida co-chaired the SDG-Education 2030 Steering Committee, an international coordinating organization related to the fourth goal of the SDGs, "Quality Education."

This committee is an international committee consisting of 44 representatives from UNESCO member countries, civil society organizations, international organizations, etc. from around the world, and UNESCO serves as its secretariat. The other co-chair is Stefania Giannini, Assistant Secretary-General of UNESCO. Prof. Yoshida organized and chaired meetings with the United Nations and other SDGs-related organizations, coordinated and promoted the smooth implementation of various activities, and contributed to promote the SDG's 4th Goal.

### "Africa-Asia University Dialogue for Educational Development" (AA Dialogue) Network

The Africa-Asia University Dialogue for Educational Development (AA Dialogue) Network was established to promote international collaborative research related to educational development in developing countries between universities in Africa and Asia. As its secretariat, CICE has provided a platform for collaborative research and has provided support for the strengthening of the ability to write English dissertations. In 2021, a paper co-authored by member university researchers, "Indicators for the Measurement of Teachers' Professional Identity across Asia and Africa: A Delphi Study" was accepted by the Journal of Asian and African Studies. Currently, 29 universities from South Africa, Kenya, Vietnam, Malaysia, and Indonesia, etc. which have participated in the AA Dialogue, are conducting joint research on the impacts of COVID-19 on educational sites and children in each country and countermeasures.



# JICA training "Education policy formulation and analytical ability development for improving learning"

Every year, as part of JICA's international cooperation program for human resource development, CICE designs and operates around one and a half months training for educational administrators of developing countries aiming to formulate educational development plans, and to strengthen the capabilities of preparation, implementation, and monitoring evaluation of a project intended to promote access to education, and to improve the quality of education.

From 2018 to 2020, CICE provided JICA thematic training "Education policy formulation and analytical ability development for improving learning," and accepted about 20 trainees every year from more than a dozen countries in Africa and Asia such as Kenya, Ethiopia, Uganda, Egypt, Cambodia and Vietnam. In 2021, we also provided online training on the same theme for 10 trainees from 8 countries.





# Japan Education Forum for Sustainable Development Goals (JEF for SDGs)

For the purpose of exchanging opinions on the importance of autonomous educational development by developing countries themselves and the ideal way of international cooperation to support their self-help efforts, the Japan Education Forum for Sustainable Development Goals (JEF for SDGs) is held annually, co-sponsored by the Ministry of Education, Culture, Sports, Science and Technology (MEXT), the Ministry of Foreign Affairs (MoFA), Hiroshima University, and the University of Tsukuba.

At CICE, I served as the secretariat of this forum and have been involved in planning and management. Last year, the 17th Forum was held online on the theme of "Girls Education and Innovation." Following keynote speeches by the Secretary-General of the Ministry of National Education of Senegal and by Professor Emeritus Reiko Kuroda of the University of Tokyo, a panel session on girls' education and innovation was held, and there was a lively exchange of opinions.



# Stakeholders' Comments



Mariko Nishizawa Associate Director of International Collaboration of Peace Promotion Project Team, Hiroshima Prefecture

The webinar series produced by Network for Education and Research in Peace and Sustainability always feature experts working on the front line in different fields. Since such experts share a wide variety of insights with me regarding, for example, crises of the global environment and consequent conflicts, I always enjoy viewing these webinar series.

Today, humans are confronted with various threats, including not only the pandemic currently shaking the world and climate change, but also nuclear weapons, which could instantly reduce all the efforts made so far toward accomplishing the SDGs to nothing.

Last year, the 75th anniversary of the atomic bombing, Hiroshima Prefecture established the Hiroshima Initiative (Outline) to help eliminate nuclear weapons as early as possible, which is a sincere hope of aging A-bomb victims. The initiative calls on all UN member states, international agencies, and civil society once again to take global action toward eliminating nuclear weapons.

(Reference): Hiroshima Initiative

### https://hiroshimaforpeace.com/hiroshima-initiative/

In addition, this April, we established the Hiroshima Organization for Global Peace (HOPe), whose members include Hiroshima University, as the leading organization to proceed with the initiative. (Reference): Hiroshima Organization for Global Peace

### https://hiroshimaforpeace.com/about-hope/

One of the goals of the Hiroshima Initiative is to ensure that the elimination of nuclear weapons is incorporated in a post-SDGs initiative. To this end, we are currently trying to establish the Nuclear Weapon Free Future Group (tentative) as an issue group connecting groups and individuals supporting our cause and raising our voices at the UN on behalf of civil society.

If you are interested in problems of global environment, sustainability, and nuclear weapons, you are encouraged to take this opportunity to join this group and work together with HOPe!

(Reference): Issue Group: https://hiroshimaforpeace.com/nuclear-weapon-free-future-group/



Wayne Miyao President, Honolulu Hiroshima Kenjinkai

# HIROSHIMA UNIVERSITY'S NETWORK FOR EDUCATION AND RESEARCH IN PEACE AND SUSTAINABILITY:

### PROVIDING LEADERSHIP FOR THE WORLD!!

Working under the leadership and guidance of Hiroshima University, on behalf of the Honolulu Hiroshima Kenjin Kai (HHKK), it is an honor and our privilege to join the Hiroshima University's Network for Education and Research in Peace and Sustainability (NERPS). Unfortunately, World War II in the pacific, started with the surprise attack on Pearl Harbor on December 7, 1941 and ended with the devastating bombing of Hiroshima on August 6, 1945. As Hiroshima and Hawaii have been linked in tragedy and suffering, we have strived to promote peace and understanding:

- Since 1980, a Peace Ceremony has been conducted on August 6 each year, for those who lost their lives and those whose lives were forever affected due to the bombing of Hiroshima;
- Developed a "sister" state/prefecture between Hiroshima Prefecture and the State of Hawaii in May 1997. In 2022, we will commemorate the 25th anniversary of this strong relationship;
- Working with the Hiroshima Prefectural and City Governments along with the Hiroshima Chamber of Commerce and Industry, funds were generously raised in Hiroshima for the building of a replica of the world-famous Itsukushima Shrine, which is located in front of Miyajima Island. 2022 will mark the 20th anniversary of its construction, which has become a "landmark" in Honolulu which is enjoyed by visitors and residents of Hawaii.
- In 2013, we raised funds for a permanent exhibition of one of the late Sadako Sasaki's paper cranes at Pearl Harbor. The Sadako Crane Projects continues to be one of the attractions to visitors at Pearl Harbor.

The Honolulu Hiroshima Kenjin Kai was established in 1955, to promote and perpetuate the unique customs and traditions of Hiroshima. As we commemorate our 67th year of service in 2022, we encourage our active participation of our membership to promote nuclear disarmament and world peace! We look forward to continuing working with Dr. Shinji Kaneko and Dr. Hassan Virji. Collectively, our unified efforts along with the support of others will lead to world peace, understanding and sustainability!



**Hironori Takagaki** Mayor of Higashihiroshima City

### Cooperation-Based Community Development under the Lead of the Town & Gown Office

In March 2020, we established the 5th Higashihiroshima City Comprehensive Plan, which sets forth "An international academic research city, rich in nature, reaching to the future" as our ideal future vision. What underlies this vision is the principles of the SDGs, such as "nobody left behind" and "universal values."

I believe that the accomplishment of this future vision entails the realization of a "smart city," where social problems are solved using cutting-edge technology based on integration of the SDGs, which indicate various social problems, and Society 5.0, which advocates the use of technology to address social problems.

To realize this "smart city," our city and Hiroshima University have established the Town & Gown Office, which plays a leading role in cooperation-based community development. Concluding partnership agreements with several private companies interested in this initiative, the office has already begun to generate favorable results, such as specific commitments to realizing carbon neutrality and ongoing discussions toward the establishment of a next-generation academic city environment.

In proceeding with these and other various measures, we have high expectations for the contribution of Hiroshima University, which will demonstrate its R&D ability and play a leading and pivotal role.



Masahiko Morito General Manager, Chugoku (Hiroshima) Office, Sumitomo Corporation

Toward solving community problems and establishing a future-oriented community environment, Sumitomo Corporation is working together with Hiroshima University, which is striving to accomplish the truly ambitious target of realizing carbon neutrality by 2030, 20 years ahead of the national government's target, and also with Higashihiroshima City, which is implementing an SDGs future city action plan. We first would like to express our appreciation for this cooperation.

We would like to continue our cooperation with you in solving problems confronted by society, communities, and universities, and thereby strive to establish a community environment where all citizens can live comfortably regardless of generation, gender and nationality, where cutting-edge technology is always used and leveraged, and constantly updated, and where a sense of vigor is felt throughout the community due to innovation backed by cooperation between universities and local governments. To do so, we will generate ideas for, for example, introducing renewable energy, introducing electricpowered personal mobility, and establishing a data linkage foundation to realize digital twins, and discuss how to refine such ideas. While doing so, we would like to cooperate with Hiroshima University and Higashihiroshima City in establishing a framework to allow research, demonstration and societal implementation to be conducted at universities and in communities.



Laksana Tri Handoko Head, National Research and Innovation Agency (BRIN)

As one of the alumni of Hiroshima University, I am very excited to see that the University is leading the world in its social contribution to the SDGs. I admire the fact that Hiroshima University is not only a comprehensive research university that engages in excellent academic research in science and technology innovation, but also plays an important and continuous social role for world peace and human happiness for a long time. As the head of BRIN, the science and technology innovation arm of the Indonesian government, I would like to also contribute to the SDGs in collaboration with Hiroshima University in various ways.

### Network for Education and Research on Peace and Sustainability (NERPS)

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