



SDGs English ver.  
REPORT 2023  
HIROSHIMA UNIVERSITY



# The SDGs together with peace

Hiroshima University,  
the university in pursuit of peace

02

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# Greetings from the President

Hiroshima University was founded in the place where the atomic bomb was dropped for the first time in the history of humanity. In that sense, its background is unique historically and socially. The university, upholding the philosophy of 'the pursuit of peace', has always fulfilled its mission to lead the development of peace science through the expansion of international education and research. As we strive towards achieving the SDGs by 2030, the importance of peace science will only increase. In the post-SDGs era, it is crucial for each individual to engage with 'peace' as a personal issue and to take proactive action.

To be well-prepared for such an era, Hiroshima University aims to bring reassurance to people through the findings of its education and research activities that contribute to social security, and has established the 'President 5 Initiatives for Peace Sciences – New Peace Science (Creating Peace for Safety and Reassurance)' in May 2023. From the many challenges facing the world, the university has identified the following five issues that will have a significant impact by utilizing its distinctive interdisciplinary resources. The university will leverage the investment from the society and the resources of our university to actively collaborate with internal organizations and existing activities and focus on strengthening these efforts. In this way, the university attempts to expand its functions and works towards realizing the ideal vision of Hiroshima University as a new 'peace-creating' institution.

The first initiative is the "Innovation and Economic Security through Formation of Semiconductor Ecosystem." We will collaborate with semiconductor-related companies to promote R&D and talent cultivation, with the aim of establishing a stable supply system for semiconductor products, which are in short supply worldwide. The second is "Global Health Security through Vaccine, Drug Development, Regenerative Medicine, and Cell Therapy." We will be committed to cultivating global talent and strive to achieve cutting-edge advances in vaccine and pharmaceutical development, as well as regenerative medicine and cell therapy to respond to emergencies such as pandemics. The third is "Peace through Comprehensive Radiation Disaster Management." This issue directly addresses the mission of leading peace science, enhancing the university's ability to respond to radiation disasters from both medical and

social science perspectives. The fourth is the "Ocean and Maritime Governance and Sustainability through Asian Center of Excellence." In collaboration with international organizations, administrations, and companies such as the World Maritime University, we intend to establish an interdisciplinary hub for education, research, and social collaboration, bringing together diverse experts to provide innovative solutions to global maritime challenges. The fifth is "Food Security through Livestock Industry Reform to Improve Nutrition in Developing Countries." The university will contribute to the domestic supply of highly nutritious food by focusing on poultry research and dairy cattle research, both of which we boast top-level research capabilities and facilities in the country.

Our strength lies in 'comprehensive knowledge,' breaking free from the confines of existing academic disciplines. Fields of natural sciences and the humanities and social sciences at Hiroshima University consistently work together to solve challenges from an interdisciplinary perspective. In this way, Hiroshima University is positioning its contribution to the SDGs as a top priority for the entire university. We aim for a synergistic effect between thorough university reforms and comprehensive efforts towards achieving the SDGs, aspiring to make further contributions in all aspects of research, education, and social engagement. We hope this report provides a deeper understanding of our university's SDGs initiatives. As always, we are counting on your continued guidance and support in promoting our initiatives into the future.



President of Hiroshima University  
**Mitsuo Ochi**



# Greetings from the Director of NERPS

It has been five years since Hiroshima University (HU) started SDGs implementation in full swing, and Hiroshima University has steadily made efforts toward achieving the SDGs.

First, there has been steady progress in HU members' activities on advancing the SDGs, and interest and awareness level of the SDGs throughout the university have increased. The British higher education journal Times Higher Education (THE) published its Impact Rankings 2023 — a list that assesses universities against the United Nation's Sustainable Development Goals (SDGs) in June 2023.

"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 has gradually increased every year. In 2023, Hiroshima University placed 3rd in Japan with Keio University, Kobe University, Tohoku University, and the University of Tsukuba. 78 universities in Japan participated in the rankings in 2023. For the overall ranking, HU ranked 101-200th among 1,591 universities worldwide. HU was also listed in the top 100 globally in six of the 17 UN SDGs, compared to five in 2022.

In March 2023, Times Higher Education (THE) also placed HU among the eight finalists — for the second year in a row — for the International Strategy of the Year category of THE Awards Asia. Now in its fifth year, THE Awards Asia, which began in 2019, aims to recognize outstanding reform efforts by Asian universities. HU's international efforts to achieve the SDGs were highly evaluated and led to the nomination for this award. About 500 universities from across Asia and the Middle East applied for the awards, and only eight universities were selected as finalists in each category.

The latest SDGs awareness survey conducted every year since 2019 shows that the awareness of the SDGs among HU members is close to 100%, suggesting that the term "SDGs" is adequately recognized university wide. The survey has 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 supports the achievement of the SDGs throughout the university, such as setting a long-term vision of leading "Science for Sustainable Development," announcing "Carbon-Neutral x Smart Campus 5.0 Declaration" as the first of its kind at universities in Japan, establishing Hiroshima University Smart City Co-creation Consortium, providing training programs for members of faculty and staff, introducing sustainable development courses as common graduate courses, and launching a new graduate degree program, the Graduate School of Innovation and Practice for Smart Society.

Furthermore, the SDGs contribution by HU faculty members has 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. HU members engage in world-class activities to realize a sustainable society and contribute to local and international society as a national comprehensive research university. Due to limited space, only a limited number of cases are presented in this

report, but the rest are posted on the website of the Network for Education and Research on Peace and Sustainability (NERPS), so please 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 a unique initiative of Hiroshima University. The formulation of international research clusters of transdisciplinary research on "Peace and Sustainability" has been making steady progress in cooperation with universities and research institutes overseas.

Following "Hiroshima International Conference on Peace and Sustainability 2022 (HICPS 2022)", which we successfully hosted in March 2022, we partnered with the Asian Institute of Technology (AIT) in hosting the NERPS Conference 2023 (NERPS 2023) from February 28 to March 3, 2023, in Thailand. There were 187 researchers, practitioners, and students from 69 universities and institutions from 24 countries who participated in the conference. This includes 33 eligible students who received conference scholarships. The conference was organized in collaboration with eight institutions including the three universities and one research institute that have been cooperating with HU in carrying out the transdisciplinary research on "Peace and Sustainability". Those partner institutions contributed substantively to the conference by, for example, organizing panel sessions and workshops, or chairing breakout sessions. NERPS will hold the international conference on peace and sustainability and their nexus every year to facilitate continued inter- and trans-disciplinary research and policy conversations as well as networking among students, researchers, and practitioners working on issues related to peace, sustainability, or their nexus. The next NERPS conference is scheduled to be held at Hiroshima University's Higashi-Hiroshima campus in March 2024.

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 are also committed to making these contributions visible from anywhere around the world.



Director, NERPS  
Executive Vice President for Global Initiatives  
**Shinji Kaneko**



# Principles and Vision

## Guiding Principles

Hiroshima University will fulfill its 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.

# Principles and Vision

## 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 and Its Role

Hiroshima University intends to disseminate information related to our global challenges, with the aim of creating a new concept of “Science for Sustainable Development”. It also strives to invite international researchers and students aspiring to knowledge

creation and plays 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.

### ▶ Establishment 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



# President 5 Initiatives for Peace Sciences

## Towards a university that creates peace

The “President 5 Initiatives for Peace Sciences: Creating Peace to Realize Safety and Security” was formulated in May 2023. The idea behind the Initiatives is for Hiroshima University (HU) to bring peace to people by making the best use of the “convergence of knowledge” that HU excels in and that can be generated by bringing together all the researchers in the humanities, social sciences, and natural sciences, and by implementing

the research and education findings that contribute to the security of society. By addressing the five themes of the Initiatives---the main catalysts for driving major social change---with an interdisciplinary approach, we will deepen our collaboration with the various stakeholders associated with the University and realize “the Defined Goals of Hiroshima University”.

### 1 Innovation and Economic Security through Formation of Semiconductor Ecosystem

To establish a stable supply system for semiconductor products, which are in short supply worldwide, by promoting R&D and human resource development in cooperation with semiconductor-related companies.

### 2 Global Public Health Security through Vaccine and Drug Development, Regenerative Medicine, and Cell Therapy

To develop a global workforce with the capacity to create vaccines and other medical treatments for pandemics and other emergencies, as well as to advance the field of regenerative medicine and cell therapy.

### 3 Peace through Comprehensive Radiation Disaster Management

Fulfilling the primary objective of peace science by enhancing abilities to respond to radiation disasters using medical and social science approaches.

### 4 Maritime and Ocean Governance and Sustainability through Asian Center of Excellence

Aiming to provide innovative solutions to global marine and maritime issues by forming a center for interdisciplinary education, research, and social collaboration that brings together diverse experts in cooperation with international organizations, governments, and businesses.

### 5 Food Security through Livestock Industry Reforms to Improve Nutrition in the South

Contributing to the supply of highly nutritious food with a focus on poultry research and dairy cattle research, which boast the highest level of research capabilities and facilities in Japan.



Initiative Leader

**TERAMOTO Akinobu**

Director  
The Research Institute for Nanodevices



Initiative Leader

**TANAKA Junko**

Executive Vice President  
(Kasumi Campus, Faculty Personnel and Public Relations)



Initiative Leader

**HIGASHI Yukihito**

Director  
Research Institute for Radiation Biology and Medicine



Initiative Leader

**KANEKO Shinji**

Executive Vice President (Global Initiatives)



Initiative Leader

**SHIMADA Masayuki**

Dean School of Applied Biological Science



President 5 Initiatives for Peace Sciences Overall Structure Chart

# Hiroshima University's Efforts to Achieve the SDGs

## Establishment of 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 the boundaries of academics and different stakeholders, are important.

In April 2014, Hiroshima University launched the “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 solution-oriented 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 on “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 on “Peace and Sustainability.”

### Purpose

1

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 on “Peace and Sustainability” to promote Purpose 1.

3

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.



## Organizational Structure



## NERPS badges

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.

# Hiroshima University's Efforts to Achieve the SDGs

## Visualization of University-Wide Contributions 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 contributions to each SDG. By combining the keyword datasets and AKPI® (Achievement-motivated Key Performance

Indicators) which our university has developed on its own, we try 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

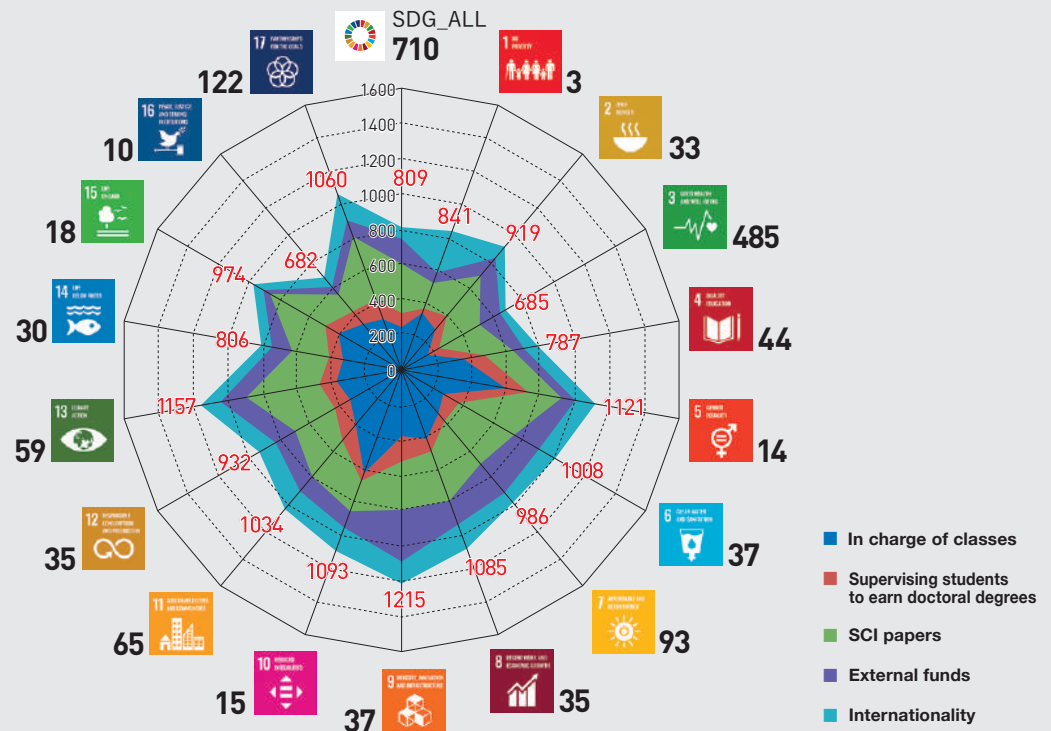
- (1) In this effort, "contribution to the SDGs" is calculated based on "the number of faculty members involved in the SDGs (writing academic papers related to the SDGs)" and "AKPI® points of faculty members who are authors".
- (2) The Scopus papers published from 2013 to 2022 that include Hiroshima University faculty members (who are affiliated with the university as of May 1 of each year) as authors and the related SDG information (Elsevier 2023 SDG mapping\*) for each paper are extracted using the research analysis tool SciVal (Elsevier). After clarifying the relationship to the SDGs for each paper, we identify which authors are involved in which SDG items through which papers.
- (3) The data on involvement in the SDG items for each faculty member from (2) are linked to the AKPI® points for each fiscal year, and we accumulate

the AKPI® points of the faculty members involved in the 17 SDG items. The points of each SDG are then divided by the number of involved faculty members to calculate the average value per faculty member.

Figure A shows the visualization of the calculation results of papers published in 2022 using the above method. Looking at this figure, we can see that:

- SDG, which has many faculty members involved, are in the order of SDG\_3 (485 people), SDG\_17 (122 people), SDG\_7 (93 people), SDG\_11 (65 people), and SDG\_13 (59 people).
- SDG with high AKPI® values are in the order of SDG\_9 (1215P), SDG\_13 (1157P), SDG\_5 (1121P), SDG\_10 (1093P), and SDG\_8 (1085P).

Figure A: Contribution to the SDGs (2022)



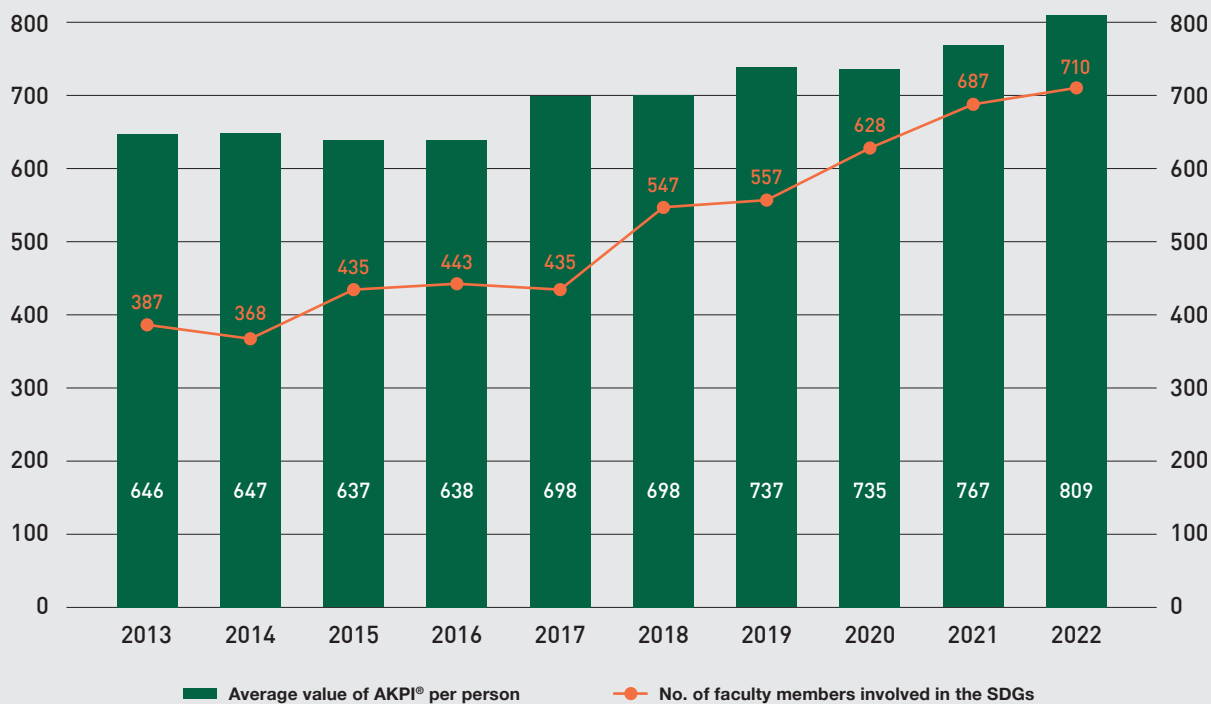
The numbers next to the logo indicate the number of faculty members involved in each SDG item, and the numbers in red indicate the average AKPI® points per faculty member.



Also, Figure B is a visualization of the changes over time in 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, based on the information on faculty members employed as of May 1 of each year.

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, indicating a greater contribution to the SDGs.

**Figure B: Changes over time in the degree of contribution to the SDGs (2013 ~ 2022)**



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

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) Supervising students to earn doctoral degrees [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/en/sgu/page02\\_02](https://www.hiroshima-u.ac.jp/en/sgu/page02_02)

\* Bedard-Vallee, Alexandre; James, Chris; Roberge, Guillaume (2023), "Elsevier 2023 Sustainable Development Goals (SDGs) Mapping", Elsevier Data Repository, V1, doi: 10.17632/y2zyy9vwzy.1

# Hiroshima University's Efforts to Achieve the SDGs

## Hiroshima University SDGs Awareness Survey

NERPS has been conducting an annual SDGs awareness survey since 2019 to understand the current status of awareness and efforts toward the SDGs among the members of Hiroshima University (HU), and to provide material for consideration of future efforts.

The level of awareness of SDGs among the members of HU in FY2023 has reached 99%, or nearly 100%, the same as in the previous year. On the other hand, the responses to the question of "want to incorporate" or "have incorporated" SDGs in terms of research, education, and daily life have not yet reached that level, although the trend is increasing year by year. Among the three, efforts in daily life tended to be the highest. It is hoped that efforts made toward the realization of SDGs related to research and education will

also increase in the future.

The top three things HU members are "interested in" and "want to contribute to in the future" in addressing each of the 17 SDGs are consistent: Goal 4 (quality education), Goal 3 (good health and well-being), and Goal 16 (peace, justice, and strong institutions). On the other hand, the top three "already working on" are Goal 12 (responsible consumption and production), Goal 4, and Goal 5 (gender equality), in that order, consistent with the FY2022 results. It is hoped that the results of this survey will promote future efforts toward Goals 3 and 16, to which the members of HU "are interested in and want to contribute."

Please find a summary of the results below.

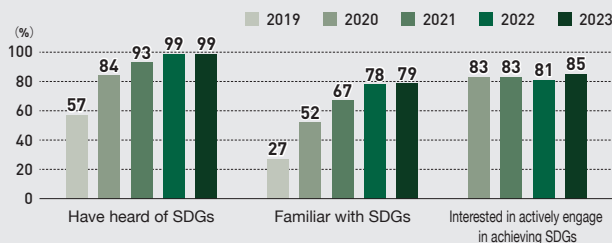
### Outline of the survey

**Target** | All members of Hiroshima University  
**Period** | July 25 to August 23, 2023  
**No. of valid responses** | 1085 (students: 485, staff members: 317, faculty members: 283)  
 This is the fifth survey, continued from 2019. However, in 2019, the survey targeted only students.

### Degree of interest and awareness regarding the SDGs at Hiroshima University

**Awareness of the SDGs is nearly 100% and their understanding is closer to 80%.**

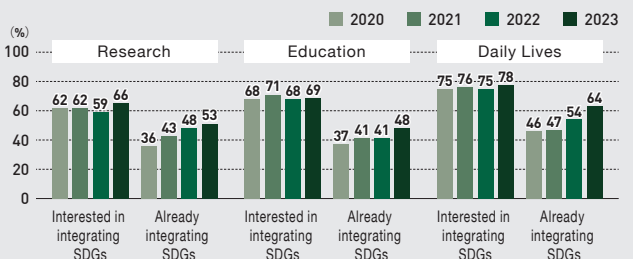
All-University members of Hiroshima University; N=1047 (2019 (students only)), 1039 (2020), 1058 (2021), 1044 (2022), 1085 (2023)  
 Respondents were asked whether they had heard of the SDGs, were familiar with them and whether they wanted to actively engage in achieving them.



### Status of SDG initiatives

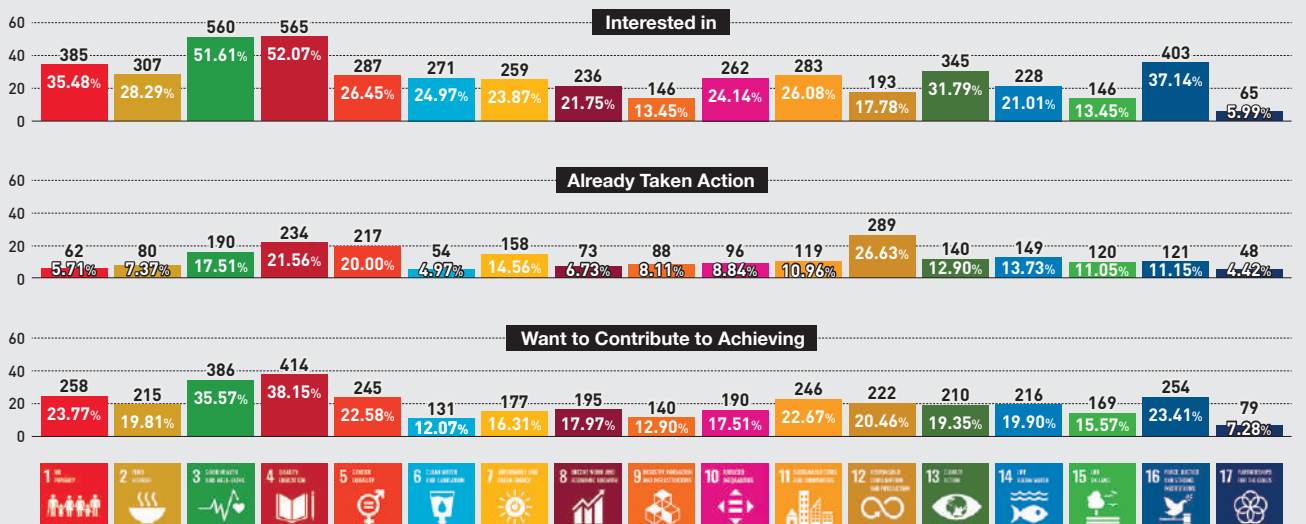
**The degree of interest and implementation rates of SDG initiatives gradually increase year over year.**

Faculty and Research staff; N= 179 (2020), 263 (2021), 231 (2022), 283 (2023)  
 We surveyed respondents on whether they are currently integrating the SDGs into their research, education, and daily lives and whether they would like to do so in the future.



### Degree of interest and status of initiatives for each Goal (2023 overview)

For each SDG goal, all university members were asked to select up to five goals that they are interested in, are already working on, or would like to contribute to in the future.



## Search for Researchers on SDGs / Hiroshima University Researcher Directory

We have created an easy-to-use system that allows you to search for researchers at Hiroshima University. You can search for the specialized fields and research achievements of about 2,100 researchers belonging to Hiroshima University by “genre,” “SDGs,” “area,” and “phonetic order in Japanese.” You can also search for researchers from each goal of the SDGs.

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



## Research workshops under the themes relevant to SDGs in which Dr. Dahlia Simangan, Associate Professor, The IDEC Institute, and a NERPS core member, played a major role

### Research Workshop: Local Environmental Peacebuilding in Nepal



On April 20, 2023, Dr. Dahlia Simangan of the Network for Education and Research on Peace and Sustainability (NERPS) at Hiroshima University (HU) organized a research workshop on Local Environmental Peacebuilding in Nepal, jointly with the Hiroshima University Scholars' Alumni Nepal (HiUSAN) and the Department of Conflict, Peace and Development Studies at Tribhuvan University (TU). Ranjan Prakash Shrestha (President, HiUSAN), and Rajib Timalsina (Assistant Professor, TU) served as the co-organizers. Several HU alumni based in Nepal participated and contributed to the success of the workshop. The workshop was covered by New Spotlight, a premier news magazine that provides the latest development trends, news, in-depth analysis and ideas about Nepal's national issues. 43 participants from 18 academic institutions/government agencies/think-tanks/NGOs came together to discuss the challenges and opportunities for achieving peace and environmental sustainability in Nepal. Environmental peacebuilding is a set of conflict-sensitive approaches to managing environmental issues. It encompasses the technical reduction of environmental scarcity and degradation, the restorative potential of biophysical environments, and equitable resource distribution for sustainable peace and development. While it provides the conceptual lens for understanding peace-promoting practices amidst environmental issues, environmental peacebuilding approaches are generally focused on macro-level and top-down efforts. More research is needed to better understand the local dynamics and bottom-up approaches to environmental peacebuilding. This workshop aimed to highlight everyday practices of environmental peacebuilding in local communities affected by water-related conflicts and security issues, such as in Nepal. Workshop participants from academic, government, and development sectors were encouraged to answer the question: how do ordinary people disrupt environmental conflicts to maintain peace in their everyday lives? The workshop concluded with closing remarks by Dahlia Simangan (NERPS, HU) on NERPS activities, publication options, and pathways for future collaboration. Gita Ghimire of HiUSAN and Pitambar Bhandari of Tribhuvan University also shared their reflections and congratulatory remarks to the organizers, presenters, and participants.



### Workshop: Evaluating the SDGs and Their Interactions Using Spatial Data and Social Indicators



The purpose of this workshop was to bring about a new paradigm in understanding and evaluating the SDGs. More precisely, we planned to develop a methodology that could evaluate how much we had achieved in meeting the goals and what had to be done to make it realistic, relevant, and conceivable to the policy community, academicians, and other partners. We still have eight years to achieve the goals and their specific targets. For this, we need primary data that can be transformed into accessible indicators from geographical regions where data compilation is not a norm. We also need a better understanding of the interactions between the SDGs to identify the mutually reinforcing factors and trades-off between them. Thus, we designed a workshop to brainstorm the methodology for data compilation from inaccessible or conflict-ridden regions. We then discussed how to present geospatial data and indicators in a way that was easily accessible and comprehensible for policymakers and practitioners to follow the progress and identify the challenges in achieving the SDGs. The scoping workshop brought together researchers from Japan and overseas with extensive international experience in the analysis of peace and security related to climate change and sustainable development. It further provided a platform to initiate a joint research effort between the involved universities for a better evaluation of the interactions between the mentioned SDGs in the context of Africa and the Asia-Pacific regions. This workshop was supported by MIRAI 2.0\*. The core team included researchers from Hiroshima University (Prof. Ayyoob Sharifi and Dr. Dahlia Simangan), Linköping University (Dr. Maria Jernäs and Prof. Björn-Ola Linnér), and the Remote Sensing Technology Center of Japan (Dr. Remi Chandran). Researchers and students from partner universities in Japan and overseas also participated in this workshop.



\* MIRAI 2.0 is a collaboration between 20 Swedish and Japanese universities, aiming to contribute to long-term research collaboration and to promote Sweden and Japan as nations of world-leading large-scale research infrastructure.



# Hiroshima University's Efforts to Achieve the SDGs

## Initiatives in Collaboration with Overseas Universities

### ► Hiroshima University Peace Study Tour 2023 - one of Hiroshima University 75+75th anniversary commemorative events - by Prof. Joshua D. Fisher, Columbia University in the City of New York - Specially Appointed Professor for Peace and Sustainability, Hiroshima University

The 2023 Hiroshima Peace Study Tour was an exceptional opportunity for graduate students from around the world to build knowledge on environmental peacebuilding theory and practice. The tour brought together graduate students from over 15 countries, supported by Columbia University's Negotiation and Conflict Resolution Master Program, the Climate School at Columbia University, and the Sasakawa Peace Foundation. The Peace Study Tour was convened by Hiroshima University from July 29 to August 8, 2023 at the Higashi-Hiroshima campus.



The faculty, staff, and students of the 2023 Hiroshima Peace Study Tour.

The course was designed to provide students with exposure to academic theory, real-world case studies, and practical examples of the ways that environmental management can be a tool for building more peaceful societies. Likewise, the course was designed to enable students to understand how collaboration and peacebuilding can assist policy makers achieve better environmental sustainability. To do this, the course brought lecturers together from several institutions including Columbia University, the Mae Fah Luang Foundation, the Japan International Cooperation Agency, the Sasakawa Peace Foundation, Hiroshima University, the Institute for Economics and Peace, and civil society organizations around Higashihiroshima. In addition to classroom sessions, students were able to visit field sites that explored integrated watershed management at Mt. Ryuo, Saijo's Sakemura district, and oyster fisheries in Akitsu Bay. Students were also able to visit state-of-the-art waste processing facilities at the Chuo Ecopark. The course benefited immensely from the knowledge and expertise of the organizations who hosted the students and shared their passion for environmental management.

The peace study tour was designed to coincide with the 78th anniversary of the atomic bombing of Hiroshima and Nagasaki in order to highlight the ever-present threat that violence and warfare present to the sustainability of the planet and human life. Thanks to the diligent efforts of the Hiroshima University staff, students were able to attend the peace commemoration in Hiroshima City. This solemn event was a once-in-a-lifetime opportunity for students to come together in reverent solidarity and affirm their commitment to advancing peace with Hiroshima City and the world leaders present at the ceremony. This experience was even more impactful for students as they

were able to meet with Ms. Keiko Ogura, a living survivor of the atomic bombing. Ms. Ogura shared her first-hand account of the bombing and the impact it has had for her and the other survivors across their entire lives. For the students, this was a transformative experience that reinforced the theoretical concepts they had learned during classroom sessions like the importance of collaboratively working across ethnic, political, and historical divides to care for and nurture peace. In addition to the living example of Hiroshima City, students were able to meet with the Ambassador of Kosovo to discuss the legacy of war and the urgency of the world's social and environmental crises. They were also able to meet with peace activists in Ukraine who are working every day to address the ongoing legacy of the Russian invasion there. Both experiences were fundamental for reinforcing the lessons learned across the peace study tour.

At the end of the tour, students were asked to provide synthesis presentations to illustrate how collaboration and environmental peacebuilding can support achievement of the Sustainable Development Goals. The student presentations were insightful, sharp, and showcased the knowledge they gained across the peace study tour. Perhaps just as important as the theoretical component, the students built solidarity and professional connections with each other, many of which will last beyond the peace study tour.

For the students, this was a very impactful experience. It also built strong connections across the three convening institutions. The faculty and administrators involved in the course are excited to convene the 2024 Peace Study Tour next year.



Students from around the world work together to explore linkages between peace, collaboration, and sustainability.



Students attend a field visit to learn about forest and watershed management on Mt. Ryuo.



Students of the 2023 Hiroshima Peace Study Tour meet with survivors of the atomic bombing of Hiroshima.

## ■ HU annual peace project held under the theme “Pursuing peace: A-bomb experiences in *kamishibai* and music”

Hiroshima University (HU) marked the 78th anniversary of the atomic bombing on August 6 with its annual Peace Project at the Higashi-Senda Campus in Hiroshima City. The event, titled “Pursuing peace: A-bomb experiences in *kamishibai* and music,” was also part of HU’s 75+75th Anniversary Project.

This year’s peace project brought together approximately 200 participants, among them around 100 individuals from 22 countries who were participating in HU’s summer program.

After President Mitsuo Ochi’s opening remarks, students from our partner institution, the University of Idaho, presented a *kamishibai* — a traditional form of Japanese street theater and storytelling involving illustrated paper slides — to recount the stories of those who lived through the atomic bomb.

This *kamishibai* was created by students from the Hiroshima Municipal Motomachi Senior High School after listening to

the experiences of A-bomb survivor Ms. Keiko Ogura. It was then translated into English by a group of students from the University of Idaho under Ms. Ogura’s supervision.

Following the presentation, Ms. Ogura shared her thoughts embedded in the *kamishibai* and explained how the University of Idaho students became involved in the English translation. The audience listened intently.

The event concluded with a short peace concert, featuring instruments crafted from trees that endured the nuclear explosion’s aftermath. Since 2019, instruments have been fashioned using debris from houses and trees affected by the nuclear bomb. Currently, a viola, a cello, and two violins have been created, forming a string quartet performance.

HU hopes these instruments will play a role in peacebuilding through their music.



Students of the 2023 Hiroshima Peace Study Tour meet with survivors of the atomic bombing of Hiroshima.



Comments from Ms. Keiko Ogura



Commemorative pictures with President Ochi



Peace concert

# Hiroshima University's Efforts to Achieve the SDGs

## 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 technological innovation.

These series of webinar 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—awardee of the Blue Planet Award 2015 and a two times consecutive nominee for TIME's 100 most influential people—was invited as a guest speaker via video participation from New York. Up to September 30, 2023, a total of 24 NERPS webinars have been carried out.

Hiroshima NERPS ▶  
YouTube



### Results of holding webinars

Date	Speaker	Title	Number of participants on the day	Number of video views*
2020/9/23	Dr. Jeffrey D. Sachs	Sustainable development as a path to peace	180	422
2020/11/25	Prof. Cullen Hendrix	Promoting Peace through Shared Governance of the Seas	23	141
2020/12/16	Prof. Paul Heidebrecht	PeaceTech and the Prospects for Critically Engaging Technology to Advance Peace and Sustainability	89	115
2021/1/28	Prof. Joshua Fisher, Ms. Sophia Rhee	Protected Area Management & Natural Resource Governance-Exploring Pathways for Environmental Peacebuilding	79	1205
2021/2/12	Dr. Florian Krampe	Peace and Sustainability in the Anthropocene: Meeting the evolving peace requirements of post-conflict societies	99	587
2021/2/26	Prof. Ali Cheshmehzangi	Sustaining the City's Continuity and Enhancing Resilience in facing the COVID-19 Pandemic	98	170
2021/3/18	Dr. Andrea Bartoli	Initiative for Peace in South Sudan-Insights from the Work of the Community of Sant'Egidio	40	139
2021/4/9	Prof. Joyashree Roy	SDG framework as core of development diplomacy: Juxtaposing climate action and peace through soft power diplomacy	39	230
2021/4/15	Mr. Steve Killelea	Ecological Threats, Peace, and COVID-19	58	179
2021/5/20	Prof. Frank Biermann	Earth System Governance for Sustainable Development and Peace	102	336
2021/6/17	Prof. Takako Izumi	Disaster Risk Reduction under Conflict Situation	30	219
2021/7/29	Prof. Richard Friend	Democratising Science and Research to Address Environmental Conflict	27	118
2021/11/5	Dr. Anders Karlsson	The Power of Data to Advance the SDGs	30	131
2022/1/27	Dr. Yvette Baninla	The State of Climate Change Research in Africa	44	214



2022/2/3	Prof. Akiko Yuge	United Nations 75th Anniversary Declaration, "Our Common Agenda", and the SDGs	53	280
2022/5/25	Prof. Dominique Steiler	From Economic War to a Culture of Economic Peace	26	123
2022/7/27	Prof. Francisco A. Magno	Watershed Conflict and Collaboration in the Philippines	35	150
2022/9/8	Prof. Ricardo Hirata	Integrated Water Solutions for Cities Resilient to Global Climate Change	50	174
2022/10/18	Dr. Srinjoy Bose & Dr. Dahlia Simangan	Positive Peace and Environmental Sustainability: Local Dynamics in Conflict-Affected Societies	17	Not made available for public viewing
2022/12/2	Dr. Xuemei Bai	Urbanization and Urban System Sustainability in the Anthropocene	45	90
2022/12/7	Dr. Hiwa Asadpour	Minority languages and inter-ethnic peace through a linguistic perspective	18	85
2023/1/18	Prof. Henrik Österblom	Exploring Unexpected Collaboration to Advance Biosphere Stewardship	33	64
2023/6/23	Dr. Katherine Alfredo	Drinking Water Sustainability and Source Selection	72	85
2023/9/21	Dr. Vincenzo Bollettino	Understanding Filipino's Perspectives on and Experience with Climate Change and Disasters	95	27

\* As of 2023/10/4

## 2 Transdisciplinary Research Projects

### Transdisciplinary Research Projects Aiming to Form Globally Recognized Research Clusters

#### 1 International Institute for Applied Systems Analysis (Austria)

**Principal Investigator: Ali Kharrazi**

Research on urban policies and applicable strategies to achieve more circularity and sustainability among highly dependent phosphorus importing countries



#### 3 University of South Florida (U.S.A.)

**Principal Investigator: Katherine Alfredo**

Research on how poor households negotiate access to clean water to improve technology implementation and safe water communication in the Indian communities of Eastern Maharashtra and West Bengal



#### 2 Murdoch University (Australia)

**Principal Investigator: Tobias Ide**

How Do Rebel Groups React to Disasters?



#### 4 Columbia University in the City of New York (U.S.A.)

**Principal Investigator: Joshua Fisher**

Research on the Drivers of Peace, Conflict, and Environmental Sustainability Associated with Natural Resources and Protected Areas



From December 2020 to March 2022, NERPS carried out international transdisciplinary research projects on peace and sustainability jointly with three universities and one research institute (Columbia University, University of Denver, University of Nottingham Ningbo China, and Stockholm International Peace Research Institute). From February 2023 to March 2025, NERPS carries out international transdisciplinary research projects on peace and sustainability jointly with three universities and one research institute shown above. Each of the research clusters aims 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 set forth in Hiroshima University's long-term vision.



# Hiroshima University's Efforts to Achieve the SDGs

## NERPS Activities

### 3 A brief report of the 2nd NERPS conference – NERPS Conference 2023

The Network for Education and Research (NERPS) at Hiroshima University partnered with the Asian Institute of Technology (AIT) in

hosting the NERPS Conference 2023 from February 28 to March 3, 2023, in Thailand.



Group photo

Prof. Kazuo Yamamoto, Interim President of AIT, welcomed the participants and shared the sustainability initiatives of AIT during the opening ceremony. Mr. Yuichi Oba, Deputy Chief of Mission and Minister (Economic Affairs), the Embassy of Japan in Thailand, remarked about the significance of the conference in

facilitating dialogue about various global issues. Following that, Prof. Shinji Kaneko, Executive Vice President and NERPS Director, Hiroshima University, Chair of the NERPS Conference 2023, highlighted the value of the conference in bringing people together to share ideas pertinent to peace and sustainability.



Prof. Kazuo Yamamoto  
Interim President of AIT



Mr. Yuichi Oba  
Deputy Chief of Mission and Minister,  
Embassy of Japan in Thailand



Prof. Shinji Kaneko  
Executive Vice President and NERPS Director,  
Hiroshima University

Former Deputy Prime Minister of Thailand H.E. Dr. Suwit Khunkitti, and Ms. Armida Salsiah Alisjahbana, Under-Secretary-General of the United Nations and Executive Secretary of the Economic and Social Commission for Asia and the Pacific (ESCAP), delivered the keynote speeches. Concluding the conference was

Prof. Shobhakar Dhakal, Vice President (Academic Affairs) of AIT. During the closing ceremony, Prof. Dhakal, together with conference co-chairs Prof. Ayyoob Sharifi and Dr. Dahlia Simangan of Hiroshima University, presented three best paper awards and three best presentation awards to selected students/early-career researchers.



H.E. Dr. Suwit Khunkitti  
Former Deputy Prime Minister of Thailand



Prof. Shobhakar Dhakal  
Vice President (Academic Affairs) of AIT



A glimpse of the main hall



A glimpse of a session



A glimpse of a session

The conference accommodated a total of 139 oral presentations across 37 sessions, including panel discussions, roundtables, and workshops. Eight universities and institutions contributed as partners to the success of this conference by organizing and facilitating sessions. There were 187 researchers, practitioners, and students from 69 universities and institutions from 24 countries\*1 who participated in the conference. This includes 33 eligible students who received conference scholarships.

As a side event, a Welcome Reception and Networking Social Event was held on the Chao Phraya dinner cruise. On the final day of the conference, the participants could choose an optional event of excursion and the Positive Peace Workshop held by the Institute

for Economics and Peace.

The NERPS 2023 Conference was generously supported by sponsorships from Columbia University, MDPI Japan, and the Embassy of Japan in Thailand. Conference partners\*2 include Kyushu University Urban Institute, Research Institute for Humanity and Nature, Elsevier, Columbia University, University of Nottingham Ningbo China, Earth System Governance, Institute of Environmental Studies at Chulalongkorn University, and the Graduate School of Global Studies at Thammasat University.

The 3rd NERPS conference is scheduled to be held at Hiroshima University from March 6–9, 2024, with the theme, Navigating Peace and Sustainability in an Increasingly Complex World.



A glimpse of participants



A group of participants with the Chair



A glimpse of participants

\*1:

East Asia: Japan, Peoples' Republic of China, Taiwan

South-East Asia: Indonesia, Lao People's Democratic Republic, Malaysia, The Philippines, Singapore, Thailand

South Asia: Bangladesh, India, Pakistan, Sri Lanka

Oceania: Australia

Europe: Austria, France, Germany, Switzerland, United Kingdom

North America: U. S. A., Canada

Middle East & North Africa: Morocco

Sub-Saharan Africa: Mauritius, South Africa

\*2:

Advanced Consortium on Cooperation, Conflict, and Complexity (AC4), Columbia Climate School, Columbia University, U.S.A.

The Earth System Governance Project, Copernicus Institute of Sustainable Development, Faculty of Geosciences, Utrecht University, The Netherlands

The Research Institute for Humanity and Nature, Japan

University of Nottingham Ningbo China, China

The Urban Institute, Kyushu University, Japan

The Environmental Research Institute, Chulalongkorn University, Thailand

School of Global Studies, Thammasat University

Elsevier



# Hiroshima University's Efforts to Achieve the SDGs

## A New Form of Regional Development Pursued by the City and the University

### Collaborative Efforts Aimed at Achieving Sustainable Regional Development and the Evolution of the University



#### ▶ The Town & Gown Initiative

The Town & Gown Initiative is an effort to develop regional communities through social change and invigorate Japan from the local level, where “Town” (the local community) and “Gown” (the university, based on the ceremonial robes worn by professors and students) join hands to share a vision of a sustainable future. By integrating and utilizing the administrative resources of the local government and the educational and research resources of the university, the initiative aims to create a place of co-creation in the region that will solve regional issues through scientific and technological innovation and develop human resources. These collaborative efforts aim to achieve sustainable regional development and the evolution of the university.



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

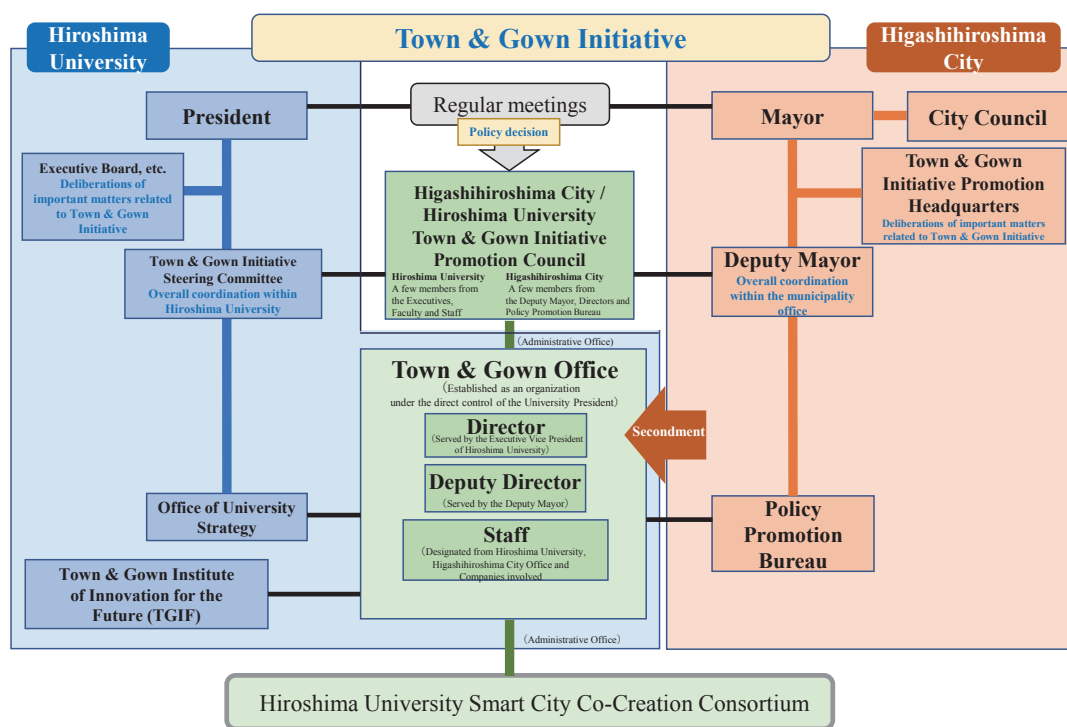
#### ▶ What is the Town & Gown Office?

The Town & Gown Office was established as a center of collaboration between Higashihiroshima City and Hiroshima University with the aim of promoting community building in ways that enable the city and the university to grow together. The Town & Gown Office provides the collaborative infrastructure for working together to find solutions to the city's issues through reciprocal sharing of Hiroshima University's knowledge and research capabilities and Higashihiroshima City's various

administrative resources. The goal is to build a sustainable community that attracts entrepreneurs and researchers from around the world through new innovations that incorporate cutting-edge technologies.

To this end, both the mayor and the president, the heads of these organizations, share the vision of community-building and have established a system to promote projects in an integrated manner through personnel exchange.

### Higashihiroshima City/Hiroshima University Town & Gown Initiative promotion system organizational chart



## ■ Hiroshima University Smart City Co-Creation Consortium

Hiroshima University and Higashihiroshima City have general collaboration agreements with Sumitomo Corporation, SoftBank Corp., Fujita Corporation, and other companies that affirm the Town & Gown Initiative, and they have joined with these companies to establish the Hiroshima University Smart City Co-Creation Consortium. Coordinated by Hiroshima University, the Co-Creation Consortium combines the know-how and resources of private companies with the committed support of government agencies. It uses the Higashi-Hiroshima Campus as a place for co-creation (“innovation commons”) involving various stakeholders in

society, including the university, local government, citizens, and industry, and engages in empirical research into community building and resolving social issues. It conducts activities across a wide range of fields, including energy, mobility, healthcare, telecommunications infrastructure, international schools/education DX, and smart agriculture, with the aim of creating a sustainable future society that incorporates Society 5.0, carbon neutrality, and the Vision for a Digital Garden City Nation.

### ■ TGO App

The TGO App, which was developed around the concept of “doors” that build new relationships and make student life more convenient, was released in April 2023. Through collaboration with the Hiroshima University Smart City Co-Creation Consortium, it provides various functions by using open data from industry, academia, and government. There are future plans to extend the app to include Higashihiroshima citizens and students at other universities.



### ■ Multilingual Communication Infrastructure

We are building a multilingual communication infrastructure that provides comprehensive support to international students and foreign citizens, covering everything from university life to daily activities. The brochure in Japanese and English can be downloaded through the Town & Gown Office website to find out more about the services provided by the infrastructure and how to register for the multilingual communication LINE official account.

## ■ Carbon Neutral x Smart Campus 5.0 Declaration

In January 2021, Hiroshima University declared its intention to become a Smart Campus 5.0 and will pursue energy carbon neutrality and society 5.0 on the Higashi-Hiroshima Campus. With the support of local government and companies participating in the Hiroshima University Smart City Co-Creation Consortium, the university will advance research in the field of energy and aim by fiscal year 2027 to reduce CO<sub>2</sub> emissions by 70% over fiscal year 2013.

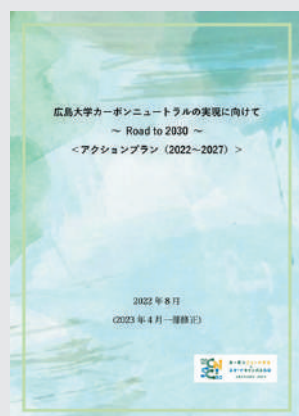
In August 2022, we drew up “Toward 2030 Hiroshima University Carbon Neutrality ~Road to 2030~: Action Plan (2022~2027)”. Based on the “Carbon Neutral x Smart Campus 5.0 Declaration” with the target year of 2030, the action plan makes it clear that we will strive to realize a carbon-free society ahead of the rest of the world, clearly stating our stance on addressing important issues such as research, education, and global expansion, in collaboration with local governments and companies.

As one of the measures that contribute to achieving this goal,

a large-scale solar energy power generation project will be carried out. The project aims at building facilities that generate about 5-megawatt solar energy power in total. The facilities will be built on the rooftop of about 70 buildings and 4 parking lots on the Higashi-Hiroshima campus. The electric power generated by the facilities equals to about 16% of the electric power consumed on the Higashi-Hiroshima campus, and is planned to be consumed on that campus. The project will be carried out under the power purchase agreement between Hiroshima University and the power company. Construction started in June 2023 and the supply of electric power is envisaged to start sometime in the fiscal year 2024. In time of the supply of the electric power generated by the project, electric vehicle sharing service is also expected to start. They are expected to contribute to the realization of Higashihiroshima City Next-Generation University Town Initiative.



Carbon Neutral x Smart Campus 5.0 Declaration



Action Plan (April 2023)



Conceptual diagram of the large-scale solar energy power generation project



# Cases of SDGs Implementation

Hiroshima University is engaged in various activities that contribute to the achievement of the SDGs. We have published these efforts on the NERPS website. If you scan the QR code, you can see our activities by goal and by activity category. In addition, from page 24 onward, we present unique or distinctive activities of Hiroshima University.



## Human development / social issues



**No Poverty**  
End poverty in all its forms everywhere.



**Zero Hunger**  
End hunger, achieve food security and improved nutrition and promote sustainable agriculture.

## Economic system



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

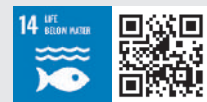


**Decent Work and Economic Growth**  
Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.

## Global environment



**Climate Action**  
Take urgent action to combat climate change and its impacts.



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

Research



Education





### Good Health and Well-being

Ensure healthy lives and promote well-being for all at all ages.



### Quality Education

Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.



### Gender Equality

Achieve gender equality and empower all women and girls.



### Clean Water and Sanitation

Ensure availability and sustainable management of water and sanitation for all.



### Industry, Innovation and Infrastructures

Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.



### Reduced Inequalities

Reduce inequality within and among countries.



### Sustainable Cities and Communities

Make cities and human settlements inclusive, safe, resilient and sustainable.



### Responsible Consumption and Production

Ensure sustainable consumption and production patterns.



### 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.



### 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.



### Partnerships for the Goals

Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development.

## Means of implementation

## SDGs in general



### All SDGs

Matters regarding SDGs in general







No Poverty

# End poverty in all its forms everywhere.

## International Cooperation in the Asian and African Regions Aimed at Eliminating Hepatitis Viruses as a Goal of the SDGs

Project Research Center for Epidemiology and Prevention of viral hepatitis and hepatocellular carcinoma  
Graduate School of Biomedical and Health Sciences

Specially Appointed Professor **Junko Tanaka**



Hepatitis Virus control is one of the SDGs (3.3) and is a crucial global issue. The WHO has set a goal to achieve Hepatitis Virus elimination by 2030.

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.

In Japan, efforts such as the prevention of mother-to-child transmission of hepatitis B virus (HBV), the introduction of blood screening for transfusions, and comprehensive measures focusing on 'testing, diagnosis, and treatment' have been promoted for hepatitis and liver cancer prevention. As a result, it is expected that the elimination goal set by the WHO for hepatitis C virus (HCV) by 2030 will be achieved, and the HBV infection rate among children under 5 years old has also been reduced to less than 0.05%.

On the other hand, it is estimated that there are approximately 300 million people worldwide with chronic HBV infections (carriers), and about 820,000 people die from HBV-related liver diseases each year (as of 2019). Asian and African countries have been high-endemic areas for HBV. At our center, in addition to conducting epidemiological research on viral hepatitis domestically, we also conduct epidemiological research in Cambodia, Vietnam, and Burkina Faso, aiming for international cooperation towards the elimination of hepatitis viruses.

In 2017, a nationwide survey on the hepatitis virus infection status was conducted in Cambodia, covering the entire country (with collaboration from the Cambodian Ministry of Health, the University of Health Sciences in Cambodia, WHO, and the U.S. CDC). This effort demonstrated that Cambodia had achieved the WHO goal of reducing the HBV positivity rate among 5-year-old children to below 1%.

However, it was revealed that the infection rate among the maternal population in the same country was high at 4.4%. Therefore, starting in 2019, in collaboration with the Cambodian Ministry of Health and WHO Cambodia, epidemiological surveys were conducted at three healthcare facilities in the northwestern region of Cambodia, specifically in Siem Reap Province.

As a result of collecting and analyzing serum samples from 1,565 pregnant women and their newborns, it was found that the infection rate among pregnant women remained high at 4.3%. Among them, it became evident that 30% were high-risk pregnant women for HBV mother-to-child transmission, characterized by high viral loads.

Vaccination was administered to all 35 newborns born to HBV-infected mothers as a preventive measure against HBV mother-to-child transmission. However, one of these infants was confirmed to be infected, raising suspicion of intrauterine transmission. Based on these results, it was recommended that Cambodia's HBV mother-to-child transmission prevention strategy should include the introduction of HBV screening for pregnant women and the administration of antiviral drugs to high-risk pregnant women (those with high viral loads).

Since 2018, in Burkina Faso, located in West Africa south of the Sahara Desert, we have been collaborating with the Clinical Research Unit of Nanoro (CRUN) to generate evidence-based research through epidemiological studies. This collaboration has contributed to proposing effective strategies for preventing HBV mother-to-child transmission tailored to the specific conditions of the region.

The results of the epidemiological surveys conducted thus far reveal that 6.5% of pregnant women in the country are infected with HBV, and among them, 20% have been identified as high-risk pregnant women for HBV mother-to-child transmission (high viral load). Furthermore, considering that the predominant strain in the country is HBV genotype E, it has been revealed for the first time that the use of the commonly used surrogate marker, HBe antigen, for identifying pregnant women in need of antiviral therapy results in many false judgments. Based on the insights obtained, it has been strongly recommended that the introduction of HBV screening for pregnant women in the country is urgently needed, and there is a demand for the implementation of a simple viral load assessment method as an alternative to HBe antigen. An analysis to determine whether the prevention of mother-to-child transmission has been achieved through antiviral treatment for pregnant women and vaccination for newborns is currently underway.

We will continue to work towards developing strategies to effectively prevent mother-to-child transmission of hepatitis B virus in the Asia and Africa regions, taking into account the diverse challenges that each region faces, including healthcare systems, economic conditions, and cultural backgrounds. We aim to have a clear understanding of these challenges and build comprehensive approaches.



At the cooperating medical institutions in Cambodia



Blood collection at the cooperating medical institutions in Cambodia



Questionnaire and fingerstick blood collection at the cooperating medical institutions in Burkina Faso

# Creating a Society Where People can Listen to the “Voices” of the Poor

Graduate School of Humanities and Social Sciences

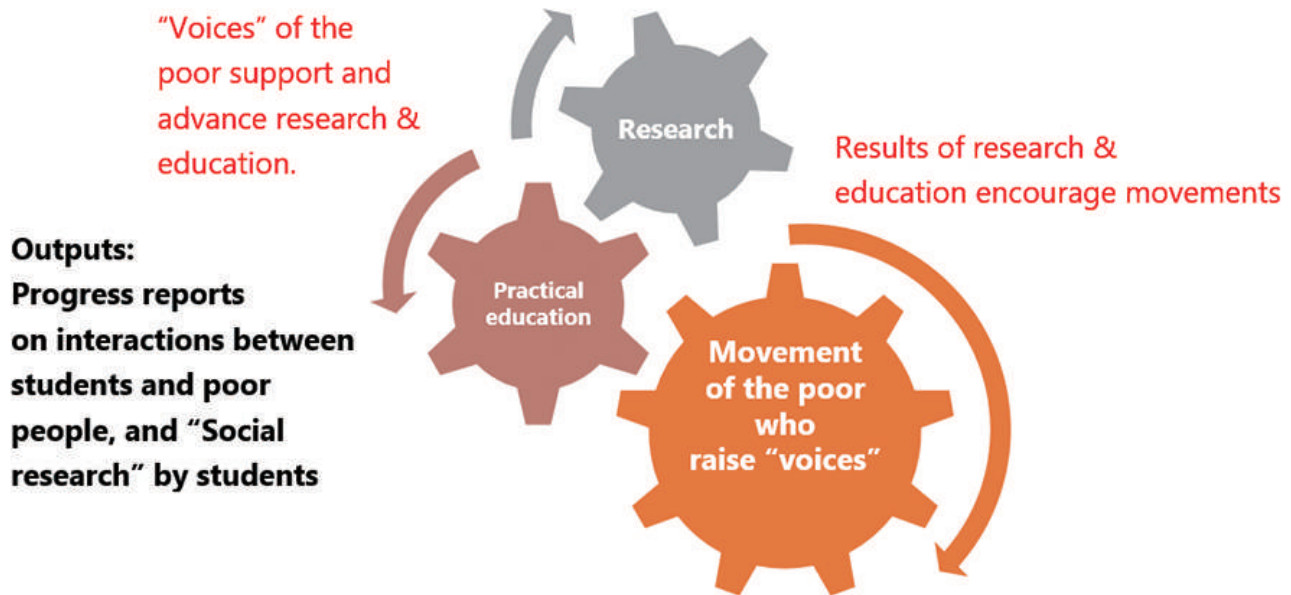
Associate Professor **Hiroshi Sasaki**



In poverty research, the difficulty of poor people expressing their opinions – that is, raising their “voices” to society – has been pointed out. This is because not only economic hardship is making it difficult, but also society tends to ignore and sometimes suppress their “voices.” We can recall events that took place in Japan in recent years, such as the rise in the 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 made clear 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 chronology of the movement of

the SKM along with several researchers. The chronology shows us that the society in postwar Japan listened to a part of the “voices” of the poor and responded to it in the form of reforms in the relevant system. The chronicle also shows us that the society in postwar Japan did not readily accept requests made by the poor, which were fundamentally related to the guarantee of the right to existence, and occasionally suppressed such requests. 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 each of the following three activities: research, higher education, and the movement of organizations concerned with poor people.

## Outputs: Grants-in-aid for Scientific Research, academic papers



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



Zero Hunger

# End hunger, achieve food security and improved nutrition and promote sustainable agriculture.

## Providing Learning of Food and Agriculture from the Perspective of SDGs: Hiroshima University Affiliated Farm of the Faculty of Bioresource Sciences

Department of Applied Biological Science

Affiliated Farm Director and Professor Toshihisa Sugino



The Affiliated Farm of the Department of Applied Biological Science breeds dairy cows, beef cattle, Burmese sheep, and goats for the purpose of education and research. Leveraging the farm and affiliated facilities, three training programs are conducted through collaboration between faculty members and farm technical staff.

### Food and Agriculture Field Science Exercise to Cultivate the Dignity of Life

This training program targets students from our university and other non-agricultural faculties. Through lectures, practical training, and discussions, students learn about the production of food sources within the cycles of grass, livestock, and soil. The aim is to provide an opportunity to contemplate the existence of humans, sustained by the lives of other creatures, from the perspectives of food, agriculture, the environment, animal welfare, SDGs, and more.



### Dairy Farm Field Science Exercise

Targeting students from our university and agricultural faculties of national universities in the Chugoku-Shikoku region, this program utilizes the farm's facilities to teach the process of milk production and food processing within the cycles of grass, livestock (especially dairy cows), and soil. Students are provided with an opportunity to consider challenges and new technologies (such as smart dairy farming) contributing to the development of dairy farming for a better society, from the perspectives of food, agriculture, environment, animal welfare, and SDGs.



### Food Education Field and Science Exercise for Childcare Major Students

Primarily targeting childcare major students in the Chugoku-Shikoku region, this program allows students to learn about the production and processing of food sources within the cycles of grass, livestock, and soil through lectures and practical training. The goal is to apply this knowledge to the practice of food education for children in kindergartens and daycare centers.



## Sustainable Food Production and Environmental Issue Resolution through Interdisciplinary Research on Plants

Graduate School of Integrated Sciences for Life

Professor Jun Wasaki The Research Core for Plant Science Innovation, Hiroshima University



### The Research Core for Plant Science Innovation at Hiroshima University

Addressing challenges such as global warming, resource depletion, low environmental impact, and insufficient arable land is essential to achieve sustainable food production supporting the growing global population. Improving the self-sufficiency rate of food in our country is also crucial. To address these issues, we conceptualized the "The Research Core for Plant Science Innovation at Hiroshima University."

The research center aims to conduct interdisciplinary research leveraging the strengths of plant-related research at Hiroshima University. The goal is to achieve sustainable food production and solve environmental problems, bringing about the "Next Generation Green Revolution." This involves not only traditional agricultural perspectives but also the integration of knowledge from various fields, including plant physiology, ecology, microbiology, symbiosis, soil science, and organic chemistry. Researchers at Hiroshima University, who were previously working individually or in small groups, aim to activate interdisciplinary collaborative research by connecting organically around this research center. The center focuses on practical challenges such as malnutrition resistance, stress resistance, and functional enhancement. These areas are expected to advance through mutual understanding and support from foundational research. As a means to an end, the center has established the "Nutrition Team" to address

malnutrition resistance, the "Stress Team" to solve cultivation issues in unsuitable areas, the "Functional Development Team" aiming for increased yield and enhanced functionality, and the "Foundational Research Team" to support these studies on a research basis. This structure promotes individual research while facilitating collaborative efforts.



▲P-deficient Plot Nutrient Sufficient Plot▲ Examination at Long-term Experimental Field (Nutrition Team)

### Green Field Project through Collaborative Research with Corporations

JFE Steel Corporation and Hiroshima University have opened the "Collaborative Research Course (Phase 2)" with the aim of achieving SDGs and contributing to society. In this collaborative research, strategies are being explored to effectively utilize elements beneficial to plant growth, such as phosphorus and silicon, found in untapped resources in steel by-products. Additionally, since the fiscal year 2021, the collaborative research course has been hosting annual seminars for the public with SDGs as the theme.





Good Health and Well-being

# Ensure healthy lives and promote well-being for all at all ages.

## Health Projects in Bangladesh

Graduate School of Biomedical and Health Sciences

Professor Michiko Moriyama

### ▲ A Project of Preventing Recurrence of Stroke in Bangladesh

In low-income countries with inadequate healthcare infrastructure, long-term care for non-communicable diseases (NCDs) after acute care is almost non-existent. Bangladesh, with stroke being one of the leading causes of death, lacks medical insurance and healthcare delivery systems to support people with NCDs and disabilities. As a result, many patients suffer recurrence of strokes and die without health education from any medical personnel.

We have collaborated with the NeuroScience Hospital in Bangladesh to provide health education with educational materials by trained nurses to the patients who were discharged from the hospital both in person and over the telephone for a one-year period. By supporting people who have never measured their own blood pressure by themselves, take their medications, and self-manage their blood pressure, the number of people who die from recurrent stroke is greatly reduced compared to those who do not receive education from nurses. This study is also important in building evidence because there were no statistics in Bangladesh on stroke patients followed after discharge from the hospital.



### ▲ A Project to Improve Maternal Health and Antenatal care in Bangladesh

To achieve SDG, the target is to reduce maternal mortality rate (MMR) less than 70/100,000 live births (WHO, 2019). In Bangladesh, MMR was about 173/100,000 live births in 2017. WHO recommended pregnant women to have antenatal care (ANC) visits 8 times, however, in Bangladesh, ANC 4 visits or more is only 47%, and 8% did not receive any ANC in 2017. Caesarean section (C/S) is still high in Bangladesh and creates surgical-related complications and decreases mothers' quality of delivery. Therefore, we conducted a collaborative research with the Obstetrical and Gynaecological Society of Bangladesh (OGSB) and Department of Public Health, North South University, Bangladesh to



One of the field hospitals



reduce unnecessary C/S by providing health education, increasing ANC visits to 8 times, and adding ultrasonography examination. Our main hypothesis was that pregnant women who received intervention could have a reduced rate of unnecessary C/S. After 1-year trial (RCT), normal delivery increased, C/S decreased, and ANC visit increased.

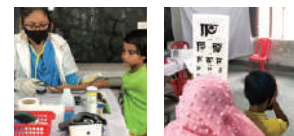


Education by midwife



### ▲ School Health Project with Pilot Placement of School Nurses

Children's health (school health) is the foundation for improving national health indicators. In Bangladesh, there are no school nurse placements and regular health checkups. At present day, the main health issues for school-aged children are communicable diseases such as pneumonia, diarrhea, and malnutrition. This project collaborated with Grameen Caledonian College of Nursing, then experimentally placed school nurses in primary and secondary schools to improve children's overall health status including nutritional status, infectious diseases, and health literacy. In the primary



Health checkup by school nurses

schools, a survey was conducted regarding health-related hygiene and dietary behavior, and health checkups of those children were conducted. During the health education program, the health checkup findings were shared with the children's parents as study feedback. As a result, the children's knowledge, food/lifestyle habits, and nutritional status improved. In secondary school, similar health education is provided. The secondary school students are assigned as health champions and they attempt to improve the health status of the community. This project trains the nurses for the placement of skilled and qualified school nurses in the school setting in the future.



Health education by school nurses

[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 in a developing country



Good Health and Well-being

# Ensure healthy lives and promote well-being for all at all ages.

## Project on Creating VR Games for Children with Long-Term Hospitalization due to Pediatric Cancer as a Mental Health Care Measure

Hiroshima University Hospital, Department of Pediatric Surgery

Lecturer **Isamu Saeki**



Hiroshima University Hospital, serving as the sole pediatric cancer center in the Chugoku-Shikoku region, has been providing treatment for numerous pediatric cancer patients. The treatment of pediatric cancer is challenging, requiring prolonged hospitalization for children who may not fully comprehend their condition, undergoing intense and prolonged treatments with side effects. Mental care for such children is crucial. Therefore, the Pediatric Department (Pediatric Surgery and Pediatrics) at Hiroshima University Hospital has initiated a project to create VR (Virtual

Reality) games as a means of mental health care for children with long-term hospitalization due to pediatric cancer. Recent reports have highlighted the effectiveness of VR-based therapy for children, and by creating VR games specifically for pediatric cancer patients, there is the potential to significantly contribute to their treatment. Collaborating with Kodansha to deepen children's understanding, VR games that would alleviate stress during long hospitalizations and foster a positive attitude towards treatment are being developed.



## Early Detection of 3 Congenital Diseases through Newborn Mass Screening in Collaboration with Hiroshima University Graduate School, Hiroshima Prefecture, Hiroshima City, and Hiroshima City Medical Association Clinical Laboratory

Graduate School of Biomedical and Health Sciences, Department of Pediatrics

Professor **Satoshi Okada**



In collaboration with Hiroshima Prefecture, Hiroshima City, and Hiroshima City Medical Association Clinical Laboratory, Hiroshima University has initiated newborn mass screening for SCID (Severe Combined Immunodeficiency) / BCD (B Cell Deficiency) / SMA (Spinal Muscular Atrophy) since 2022. Diagnosing SCID before severe infections occur allows for the safe implementation of hematopoietic stem cell transplantation, a curative therapy. Early initiation of immunoglobulin replacement therapy for BCD prevents infections. Early diagnosis of SMA allows for therapeutic intervention before muscle weakness progresses, resulting in a dramatic improvement in the quality of life for affected children.



## Development of Specialized Technical Simulator using Virtual Reality

Hiroshima University Hospital, Department of Radiology

Professor Kazuo Awai   Associate Professor Yukiko Honda   Assistant Professor Hidenori Mitani



Virtual Reality (VR) has been increasingly used in various fields, including medicine, serving as an educational and preoperative simulation tool. Specializing in endovascular treatments, we collaborated with a company to develop an educational VR simulator. Equipped with VR goggles and controllers, users can manipulate catheters and administer drugs in a virtual world of an angiography room. Currently, interventions such as dynamic chemotherapy for liver cancer and embolization of pelvic bleeding trauma are possible. This simulator is already being used in student training, promoting active learning through hands-on experience. The development aligns with the Ministry of Education, Culture, Sports, Science and Technology's initiative for the "Advanced Plan for University and College Education Utilizing Digital Technology." The interactive simulation is expected to be effective as preparatory education before actual procedures, with the aim of shaping a new form of medical education.



## Supporting Swallowing Dysfunction Patients and Contributing to Patient Return to Home and Society: A Dysphagia Support Team

Graduate School of Biomedical and Health Sciences, Department of Neurology

Assistant Professor Masahiro Nakamori



Hiroshima University Hospital has formed a Dysphagia Support Team, providing follow-up and ward support for swallowing dysfunction patients on all wards. Regardless of the illness, adequate nutrition is crucial for recovery. However, many patients, such as those with head and neck cancer, stroke, or neurological disorders, face difficulties in eating orally. Aging, dementia, and postoperative weakness can also lead to decreased muscle strength, making it challenging for patients to eat. Particularly

during meals, there is a need to be cautious about choking and aspiration. While efforts have been made at the ward level, the newly formed "Dysphagia Support Team" brings together various specialists to implement comprehensive measures contributing to the organic and continuous return of patients to home and society. Weekly regular mealtime consultations and conferences are conducted, along with team-based awareness, educational, and research activities.







Quality Education

# Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

## 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 Training Colleges (TECs) in Cambodia

Educational Vision Research Institute (EVRI) collaborated with the Hiroshima Peace Contribution Network Council in implementing a JICA Partnership Program (JPP) "Support for social studies curriculum and textbook development for building a sustainable society in Cambodia" commissioned by the 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 on 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 program, 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 Nippon)." 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 year 2017, EVRI has cooperated with PADECO Co., Ltd. in "Project to Establish Foundations for a Teacher Education College" commissioned by JICA. Through this project, we have provided (1) Technical assistance for establishing a university management system, which included training for the senior staff of two Teacher Education Colleges (TECs) to be established in Cambodia, (2) Technical assistance for carrying out action research with the aim of improving research capability of teacher educators and making improvements in teacher training classes. Even after the completion of the project, EVRI has joint research activities with the Teacher Education Colleges such as online joint seminars.



### Research and Development of Inclusive Education and Peace Education

Professor Norimune Kawai, a member of EVRI, carried out "Development Research on Inclusive Education System at the Secondary Education level", which was supported by "FY 2020 Practical Research Grant for Healthy Development of Children and Teenagers" provided by Nippon Life Insurance Company Foundation. With an awareness of diversity in a classroom, this project focused on students who have foreign roots or disabilities and students who have difficulty in learning and in their living, we develop lesson plans and methods for school subjects, which will lead up to their satisfaction and self-confidence in learning.

As research and development of peace education, EVRI carries out the following three sets of activities:

- 1) 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."
- 2) EVRI has videotaped interviews with peace educators who have promoted peace education in Hiroshima and archived them to contribute to passing on their efforts. Ten interview videos and six commentary videos are available on the website of EVRI.
- 3) 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 in their respective local contexts.



### Support for Problem-Solving Learning to Address Regional Issues, by Making Use of ICT

Since the fiscal year 2021, EVRI, in collaboration with Higashihiroshima City Board of Education, has carried out the wide-area exchange-type online regional learning, connecting multiple elementary schools in the city, once a month. The project provides schools and classes that vary in their sizes and their surrounding environment with opportunities to think about how to address regional issues, at which participating students interact with each other and with those who are faced with the issues in the field. It also provides teachers with opportunities for their professional development for effective use of ICT.





## Nurturing Children's Smiles Through Education Tailored to Their Individuality

Graduate School of Humanities and Social Sciences

Professor Yoshinori Eto



I am a researcher of Waldorf educational theory. I established the NPO Steiner & Montessori Academy (child development support and after-school day service) in response to the requests of parents of children with developmental disorders and other hardship and challenges. There are two main pillars of the treatment provided in this facility. One is the method developed on the basis of respect for individuality; the other is the activities, such as artistic learning, pottery, natural farming, beekeeping, etc. by focusing on the use of hands and the whole body. In fact, through these activities, children who have not attended schools because they have not been understood due to their disorders, regain their zest for life and cheerfulness, and can successfully return to school. Our activities have been highly evaluated by the Boards of Education, schools, and families (we are the only facility in the city in which the attendance of this facility is recognized as the attendance at school).

For more information on the changes in children before and after participating in these activities, please take a look at the "Voices from parents" on our homepage. This support program was adopted by Hiroshima University's crowdfunding project, and even today, Hiroshima University alumni and current students are also participating in supporting children's education.



## Providing High-Quality Education Internationally as a Marine Biology Education Hub

Graduate School of Integrated Sciences for Life, Marine Biological Laboratory



Our laboratory has been recognized as an educational collaborative utilization base by the Ministry of Education, Culture, Sports, Science and Technology since September 2018. Engaging in a wide range of educational and research activities, such as promoting the use of facilities by other universities and organizing international summer schools, we aim to provide inclusive, equitable, and high-quality education as the "Hiroshima University, a well-regarded institution known for its education" to all people, fostering opportunities for lifelong learning. Specifically, we offer marine practical training for elementary, middle, and high school students, implement the Global Science Campus program for nurturing the next generation of talent in which Hiroshima University is involved, provide credit transferable subjects to students from national, public, and private universities across the country, and conduct advanced scientific education for university and graduate students worldwide using the JST (Japan Science and Technology Agency) Sakura Science Program.

Despite the impact of the COVID-19 pandemic, we were selected for the JST "Sakura Hosting Program" in the 2022 academic year and conducted an online "International Marine Biology Course" instead. From January 17 to 19, 2023, a total of 8 universities, 7 from Indonesia and 1 from Taiwan, participated. In addition to lectures, we demonstrated experiments collecting data using next-generation sequencers by extracting DNA from marine organisms. As part of promoting lifelong education opportunities, we have conducted interview classes at the Hiroshima Learning Center of the Open University of Japan. From elementary to secondary education, higher education, and lifelong education, we are internationally providing high-quality education.



Experiments using next-generation sequencers



Gender Equality

# Achieve gender equality and empower all women and girls.

## Implementing STEM Education Programs for Fostering Women in Science and Engineering

Graduate School of Humanities and Social Sciences

Professor Kazuo Kawada

Associate Professor Hiroyuki Suzuki



Hiroshima University is collaborating with the Girl Scouts of Japan to create educational materials for fostering women in STEM (Science, Technology, Engineering, and Mathematics). Additionally, a joint research agreement has been established to develop and validate the effectiveness of the curriculum. As part of the Girl Scouts of Japan's mission to 'maximize the potential of all girls and women,' the university is actively contributing to the implementation of STEM programs. In 2023, two programs were conducted in March and July, organized by the Girl Scouts of Japan, sponsored by the Micron Foundation, and with the collaboration of Hiroshima University:

1. STEM Education Program 'Chip Camp' (March 31 to April 2, 2023)
2. Girls Going Tech 'Explore the World of Computers!' (July 9, 2023)



### STEM Education Program 'Chip Camp'

From March 31 (Friday) to April 2 (Sunday), a three-day STEM education program called 'Chip Camp' was held at the National Etajima Youth Exchange Center, Micron Memory Japan (Hiroshima) Factory/Hiroshima Development Center. The program targeted elementary and middle school students, specifically focusing on 2nd-year junior high school girls whose career paths were not yet clear. A total of 58 students from around the country, including 6th graders and 1st to 3rd-year junior high school students, participated and learned about STEM-related programs. They had the opportunity to hear from female leaders and engineers. Students learned that instead of giving up because they are girls, they can expand their possibilities by challenging what they want to do. During the event, Associate Professor Hiroyuki Suzuki led a session titled 'Ideathon Time: What is Needed for the Ideal School.' Professor Kazuo Kawada was the instructor for sessions titled 'The World of Computers' and 'Let's Move a Doodle Bot with Raspberry Pi.' Students from the Faculty of Education and graduate students from the School of Human Sciences served as facilitators in these sessions.



### Girls Going Tech 'Explore the World of Computers!'

On July 9, 2023 (Sunday), 'Girls Going Tech: Let's Explore the World of Computers!' was held at Hiroshima University Higashi-Senda Campus. With the increasing development of technology in society, the event aimed to encourage girls to take on challenges in what they want to do. Special sessions, 'Become a Computer! (About Binary Numbers and Their Calculations)' and 'Creating Robots Using Vibration (Let's Make a Doodle Bot),' featured original content developed specifically for this event.



## Conduct Hands-on Science Course for Female High School Students to Increase the Number of Female Students Entering Science and Engineering Departments

Gender Equality Promotion Office

Vice President (Equity, Diversity and Inclusion) Yoko Ishida



In order to increase the number of female students entering science and engineering departments, the Gender Equality Promotion Office holds an annual hands-on science course where female high school students can experience experiments and practical training. Female science and engineering researchers at Hiroshima University serve as key instructors, and emphasis is placed on providing opportunities for interaction between female high school students and female researchers and university students. In FY2017, 48 female high school students participated in the event at the School of Engineering, and in FY2018, 39 similar students participated in the event at the School of Integrated Arts and Sciences. In FY2019, the event was postponed due to the spread of COVID-19 pandemic. In FY2020, the program resumed and was held at the School of Informatics and Data Science with 30 participants. There were 22 participants at the School of Education in FY2021, and 43 participants at the School of Science in FY2022. About 10% of the participants have enrolled in Hiroshima University.



## Development of a Program for the Empowerment of Women to Participate in Disaster Risk Reduction Activities

Graduate School of Biomedical and Health Sciences

Associate Professor Mayumi Kako



In Japan, which is a disaster-prone country, it is of the general views that there is a large gender gap even in ordinary times when no disaster occurs. To make women's disaster risk reduction activities more visible and promote collaboration between women and those who have been involved in disaster risk reduction activities, we support regional and community-based disaster risk reduction activities in Hiroshima at the community and other levels. Through the development of a program for empowering women to participate in disaster risk reduction activities, which was launched in 2020, we support the community activities and networking by local practitioners including community practitioners (Bosai-shi) who are active in the region.

One such activity is a seminar we organize every February. On Sunday, February 12, 2023, a seminar entitled "Disaster risk reduction from gender equality perspective – regional disaster reduction activities without gender gap –" was organized as an in-person event. The seminar featured reports on relevant cases presented by community practitioners and group works, leading to active discussion among participants. It was emphasized that it is important to keep communication channels open on a routine basis. It was also pointed out that practitioners should carry out disaster risk reduction activities, while nurturing a sense of ethics and without judging people by their attributes.





Clean Water and Sanitation

# Ensure availability and sustainable management of water and sanitation for all.

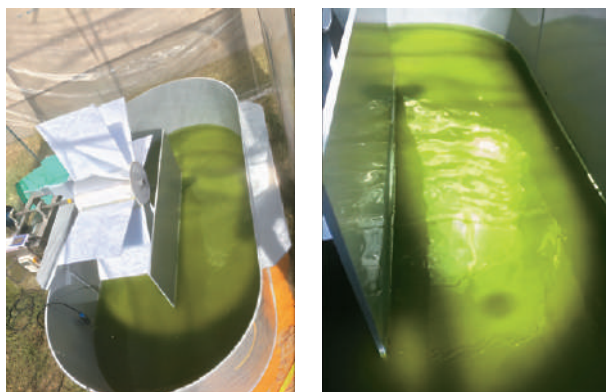
## Production of Algal Biomass, Utilizing Unused Wastewater and Nutrients in Waste Liquid (Chemical Engineering Program, Graduate School of Advanced Science and Engineering)

Graduate School of Advanced Science and Engineering

Professor Satoshi Nakai



Algal biomass is a source of biofuel that could play a useful role in carbon-neutral societies. At the Green Process Engineering Laboratory, we research on producing algal biomass, by utilizing unused wastewater and nutrients in liquid waste. We have produced algal biomass, by utilizing treated wastewater discharged from a sewage treatment plant and an effluent from a methane digestion process. We plan to expand the scope of the research to include other types of waste-water and liquid waste discharged from automobile factories in Hiroshima Prefecture.



## “Satoyama activities to nurture groundwater in Saijo, Sake City” selected as a “Model Project for Promoting Activities to Create a Good Water Circulation and Water Environment in FY Reiwa 5 (2023)” by the Ministry of the Environment

Graduate School of Advanced Science and Engineering

Professor Shinichi Onodera



We are promoting the “Satoyama Activities to Nurture Groundwater in Saijo, Sake City” (Saijo Environmental Association for Preserving Mountains and Water), which was selected as a “Model Project for Promoting Activities to Create a Good Water Circulation and Water Environment in FY Reiwa 5 (2023)”. In the groundwater recharge area (Ryuuyama basin) that supports the sake brewing industry in

Saijo, Hiroshima, we will develop the “mountain and water ground-work”, which has been implemented with the fund of the Saijo Sake Brewers Association, into a regional virtuous cycle system for water, and consider policies for groundwater conservation and management.

### 令和5年度良好な水循環・水環境創出活動推進モデル事業

- 良好な水循環・水環境を創出するとともに、水環境を活用した生物多様性の保全や地域活性化の活動を推進するモデル事業を実施
- 令和5年度は49件の応募から3件を選定し、地域に根ざした総合的な水環境管理を目指す

#### やんばる水環境創出プロジェクト

沖繩の休日と体感する持続可能な流域マネジメント

団体：大宜味村観光協会

**事業概要**  
(沖縄県大宜味村)  
沖縄県やんばる地域の重要な水源であり、自然観光資源「ター滝」で来訪者からも注目される平南川流域において、流域マネジメントの仕組みを活用し、地元住民と来訪者が一体となった持続可能なやんばる水環境保全活動を推進する。

**実施内容**  
・流域水循環計画策定に向けた環境調査と利用実態調査の実施  
・遊水地や川の自然環境と水辺のライフラインの設計と体感活動の場としての管理水準の検討  
・水辺の体感活動の開催と指導者育成、普及啓発ツールの作成



(平南川流域「ター滝」)

#### 酒都・西条の地下水を育む里山活動

団体：西条・山と水の環境機構

**事業概要**  
(広島県東広島市)  
「日本三大銘醸地」広島・西条の酒造業を支える地下水の循環域（龍王山流域）において、西条酒造協会の基金により実施してきた「山と水のグラウンドワーク」を発展させ、地域好循環システムを構築し、地下水保全・管理のための政策を検討する。

**実施内容**  
・学校、地域の団体、企業など多様なステークホルダーとのワークショップの開催、「山」「水」「水」「酒づくり」の地域好循環システムづくり  
・広島大学と連携し、龍王山流域の地下水環境の現状把握（ボーリング調査・観測井戸設置）、行政とともに地下水保全・管理政策の検討



(山のグラウンドワーク後の交流会の様子)

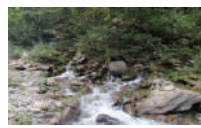
#### 「水が生まれる償還おまわり」

サステナブル・タウン推進事業

団体：長野県大町市

**事業概要**  
(長野県大町市)  
信濃川水系の最上流部に位置する大町市において、発電、灌漑、生活用水に利用されてきた水の歴史や水利体系、人や地域の関わりといった情報を保存・活用するとともに、企業等と連携して環境教育の場や学習旅行等の誘致を図る。

**実施内容**  
・水資源情報のデジタルアーカイブ化、水利施設等の撮影、学習旅行のコンテンツ開発、案内人養成、観光アプリ開発、水スナック「水」の活用  
・「大町「水」の学校」SDGs 探究学習」プログラムのガイド養成と学習旅行用ガイドブック作成、企業と連携した学習旅行等の誘致



(大町市最大の水源「矢沢源流」)





Affordable and Clean Energy

# Ensure access to affordable, reliable, sustainable and modern energy for all.

## Lecture: Sustainability Materials Sciences

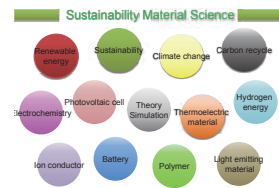
Transdisciplinary Science and Engineering Program, Graduate School of Advanced Science and Engineering

Professor Takayuki Ichikawa

Associate Professor Hiroki Miyaoka



Science and technology enrich people's daily lives. At the same time, science and technology have caused environmental degradation. It is henceforth essential that development of science and technology have environmental protection taken into consideration. Solar cells and fuel cells are drawing attention as environmentally-friendly sources of energy. Catalysts that can capture harmful substances and have a decomposition function can contribute to resolving problems of environmental pollution. The lecture on sustainability materials science aims at helping graduate students to gain knowledge in a broad range of fields such as chemistry, condensed matter physics, and device development, all of which are related to sustainability materials.



## Development of Carbon Recycling Technology

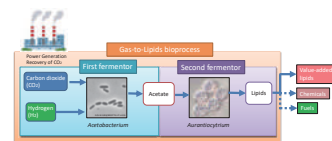
Graduate School of Integrated Sciences for Life

Professor Tsunehiro Aki

Professor Yutaka Nakashimada



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 as a contribution to 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 on the construction of the related manufacturing processes.



## Toward the Use of Electric Energy Without Loss

Graduate School of Advanced Science and Engineering

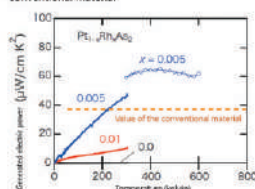
Professor Minoru Nohara



### Increase in 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 pyrite-type crystal structure reached 1.5 times that of conventional materials. In the future, we plan to develop thermoelectric materials using less expensive

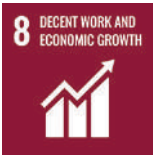
Developed a thermoelectric conversion material with generated electric power 1.5 times that of conventional material



elements by utilizing theoretical methods based on first-principles 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 equivalent to that 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 superconductivity is very low. We are working on the development of a new material that realizes a 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, preferably at room temperature.



Decent Work and Economic Growth

# Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.

## Career Support Activities for Women at Hiroshima University

Vice President (Equity, Diversity and Inclusion) **Yoko Ishida**



Hiroshima University is promoting various activities to create a better working environment throughout the workplace, with the goal of enabling women to fully demonstrate their individuality and ability.



\* CAPWR (Career Advancement Project for Women Researchers)

### Utilization of Research Support Staff System

With the aim of promoting a balance between research and life events, a system was launched in FY2017 to assign research support staff to work as research assistant under the direction of researchers affiliated with Hiroshima University when pregnancy, childcare, or nursing care make it difficult for them to secure research time. In FY2017, 13 participants (12 women and 1 man) took advantage of the program in the second semester only. In FY2018 and FY2019, the program was implemented in two terms. A total of 93 people (86 women and 7 men) used the program from FY2018 to FY2022.

### Introduction of the Career Advancement Project (CAP) Researcher System

To support women with doctoral degrees who have their careers interrupted to resume their careers, and to support spouses of researchers affiliated with Hiroshima University to continue or resume their research and live together, the CAP Researcher System was introduced in FY2018. One full-time and two part-time CAP researchers were hired in FY2019, followed by one full-time in FY2020, one full-time and two part-time in FY2021, and one full-time and one part-time in FY2022.

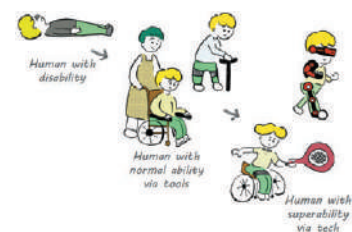
## Implementation of Human Augmentation Technologies

Graduate School of Advanced Science and Engineering/  
Director of Applied Human Augmentation Project Research Center

Professor **Yuichi Kurita**



The services expected from human-enhancing machines and applications are not limited to extending the motor, sensory, and cognitive abilities of individual people, or extending the skills and work performance of people using tools and machines, but also include communication, education, training, medical care, and nursing care based on a long-term understanding of the relationships between people and people, and between people and machines. The Applied Human Augmentation Project Research Center aims to develop not only 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, but also human augmentation technologies that cover social systems that foster richer connections between people. Our mission is to implement these technologies in society in cooperation with other universities, companies, and public institutions and to collaborate with other universities, businesses, local governments, and more to implement these technologies in society.





Industry,  
Innovation  
and  
Infrastructure

# Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.

## Development of a Composite Method for Carbon Fiber Reinforced Plastics (CFRP) and Cellulose Nanofibers without the Use of Chemicals

Graduate School of Advanced Science and Engineering

Professor **Kazuaki Katagiri**



Carbon Fiber Reinforced Plastics (CFRP), known for being lightweight and high-strength, are commonly used in applications such as aircraft and sports equipment. However, the manufacturing process for CFRP is associated with a significant amount of carbon dioxide emissions. Cellulose nanofibers, derived from plants, are environmentally friendly materials with high strength and lightweight properties. Research efforts are underway to reduce carbon dioxide emissions by utilizing the composite of cellulose nanofibers with CFRP, aiming to minimize the usage of the latter. Despite the advantages, cellulose nanofibers are hydrophilic, while the resin used as the matrix for CFRP is hydrophobic, necessitating the use of chemical treatments to make cellulose nanofibers hydrophobic and increasing the environmental load as well as the production cost. In contrast, this research has developed a composite method with water-based resin, eliminating the need for chemical hydrophobic treatment.



## Advanced Specialist Training Leading Digital Manufacturing

Graduate School of Advanced Science and Engineering, Smart Innovation Program/  
Digital Monozukuri (Manufacturing) Education and Research Center

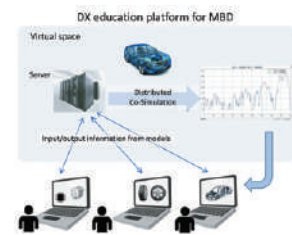
Associate Professor **Shin Wakitani**



In Japan, Digital Transformation (DX) is being promoted, demanding a transformation in work through the proactive application of digital technologies. In this context, the establishment of an environment for innovative "Digital Manufacturing" is progressing in the manufacturing industry. Model-Based Development (MBD) is a method that actively utilizes simulation models in product design and verification, allowing for the efficient realization of new product designs. Therefore, there is a need for advanced specialists who can accurately describe the elements required for product development as mathematical models and apply them in business.

Hiroshima University established the "Digital Manufacturing Education and Research Center" in 2019 with support from the Cabinet Office and Hiroshima Prefecture. The center has conducted "Model-Based Development

(MBD) Training" primarily for working professionals. In 2022, it was selected for the "Project to Cultivate Advanced Specialists Driving Industrial DX through the Integration of Digital and Specialized Fields" by the Ministry of Education, Culture, Sports, Science and Technology. Based on the know-how acquired from MBD training, the center is developing a specialized training curriculum for undergraduate and Master's programs to contribute to the cultivation of talents leading the future of digital manufacturing.



## Research on Air Conditioning Systems and Utilization of Unused Energy

Graduate School of Advanced Science and Engineering

Associate Professor **Sayaka Kindaichi**



To reduce CO<sub>2</sub> emissions, improving resource utilization efficiency and implementing clean technologies are essential. Research is conducted on energy-efficient building systems, particularly in the areas of air conditioning systems and the utilization of unused energy. Recent efforts focus on the development of new systems on the demand side (building side) towards carbon neutrality such as storing surplus electricity generated by solar panels during the day as high-efficiency air conditioning hot and cold water using a ground-source heat pump. We aim to develop such demand-supply adjustment methods applicable to existing buildings.

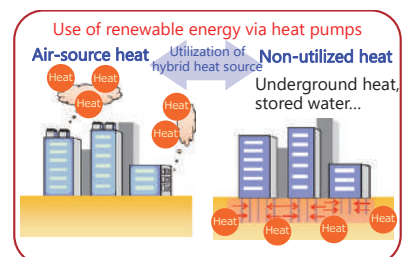


Image of the use of renewable energy via heat pumps





Reduced Inequalities

# Reduce inequality within and among countries.

## Dental Care Support Activities in Cambodia

Graduate School of Biomedical and Health Sciences, Department of Pediatric Dentistry

Assistant Professor **Yuko Iwamoto**



With the goal of preserving the teeth of Cambodian children and realizing a peaceful and healthy life, activities are conducted in Cambodia involving Japanese dentists, dental hygienists, dental students, and general citizens. Approximately 30 individuals travel to Cambodia each year to provide dental check-ups and treatments to around 13,000 children who have not experienced dental health examinations since 2009. Additionally, educational activities are carried out for future teachers studying at elementary schools and teacher training schools, using original picture books and puppets to teach methods of dental health guidance. These efforts aim to reduce cavities through the establishment of sustainable practices and have a broader impact on more children and future generations. Participation is also open to Cambodian exchange students studying in Hiroshima, as well as local dentists and dental students, fostering cultural exchange and developing a global perspective. The initiative also aims to eventually pass on the leadership of activities for the autonomy of dental care in Cambodia, contributing to the training of professionals.



## Support for Reading Environments for All Students

Graduate School of Humanities and Social Sciences

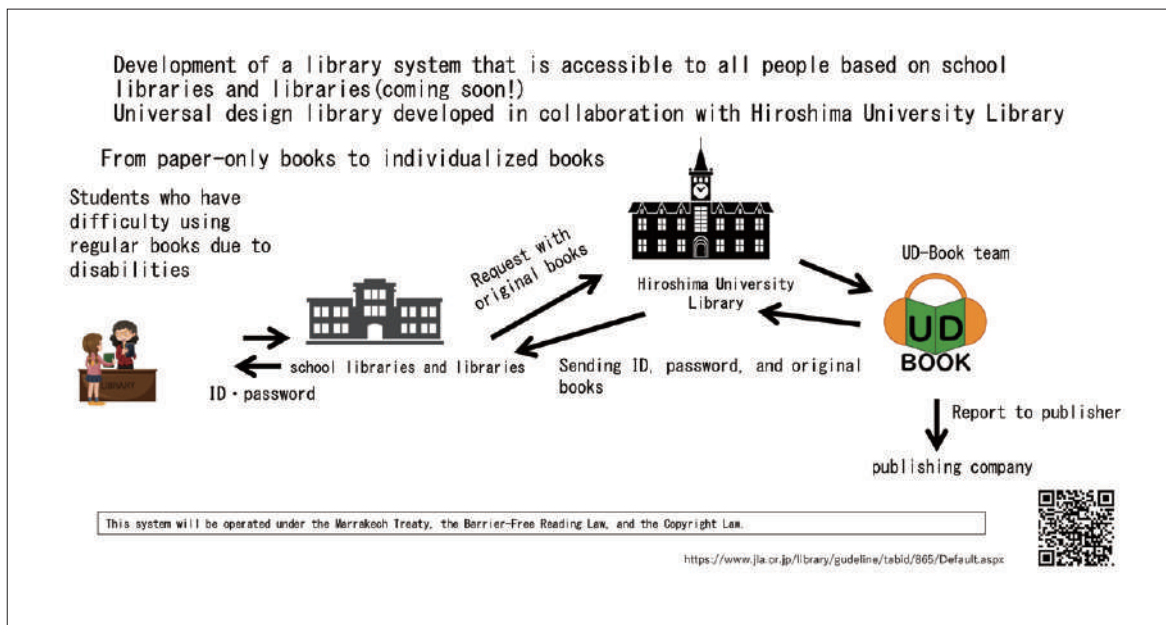
Associate Professor **Kazuhito Ujima**



### Developing Reading Environments for All Students with School Libraries being the Base Point

We aim to create a society where individuals facing difficulties in accessing paper-based books can access various textual information. To achieve this goal, we have developed and provided the UD-Book standard, a universal design book. We have already supplied UD-Book textbooks to elementary and middle school students nationwide through various initiatives. However, even if access is limited to textbooks, it represents only a small

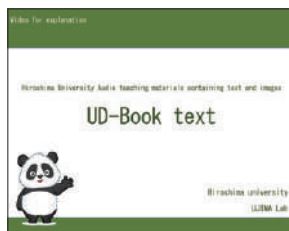
portion of the textual information available to students. Therefore, in collaboration with Hiroshima University Library, we are working on building a system for the production and provision of UD-Book materials. Citizens worldwide who find it challenging to access printed textual information due to conditions such as developmental disorders can request borrowing UD-Book materials from Hiroshima University Library through school and public libraries. This initiative aims to establish a system where these materials can be viewed online, facilitating access to UD-Book materials.





## UD-Book (Universal Design Book): Accessible to Everyone

We are producing textbooks that are accessible to everyone. In collaboration with Hiroshima University Library, we have undertaken a project commissioned by the Ministry of Education, Culture, Sports, Science, and Technology (MEXT) to create and provide audio materials. These audio materials are textbooks equipped with features like read-aloud functionality, designed for students facing difficulties using approved textbooks due to developmental disorders and similar conditions. The audio materials produced by Hiroshima University are based on the UD-Book standard, developed from our research achievements. In the fiscal year 2022, we delivered 656 items to 218 elementary and middle school students nationwide. The UD-Book standard has the potential for various applications beyond textbooks, contributing significantly to the realization of universal design in reading, as aimed by international agreements such as the Marrakesh Treaty and the Textbook Barrier-Free Law.



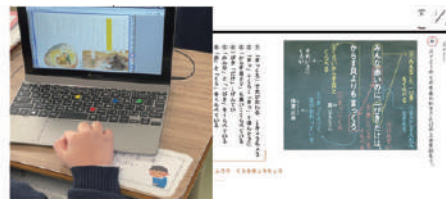
## Seeking Solutions for Individuals Facing Difficulty in Reading

We, along with undergraduate and graduate students, and researchers in our laboratory, aim to understand the causes of reading difficulties in individuals such as those with developmental or visual impairments. Our goal is to establish methods for assessing reading difficulties and propose solutions for individuals facing challenges in reading. Our research covers a broad spectrum, including (1) investigations into the fundamental characteristics of reading, (2) comparisons between reading in paper and digital textbooks, (3) verification of the effectiveness of commonly used aids such as audio and highlighting during reading support, (4) studies on the discomfort caused by discrepancies between the manipulation of reading content and the corresponding audio, and (5) research on Braille standards based on individual discrimination thresholds. To conduct these

studies, we incorporate various devices such as screen-type eye-tracking devices, glasses-type eye-tracking devices, NIRS (Near-Infrared Spectroscopy), 3D motion capture, refraction measurement devices, and devices for measuring field of view and contrast sensitivity.

## Practical School Support for “Reading and Writing in Learning ~ Town & Gown Initiatives to Achieve Satisfactory Reading for All Citizens ~

In the Ujima Laboratory, we are collaborating with schools to advance learning support using Information and Communication Technology (ICT). Since the year of 2000, we have been empirically researching the effectiveness of utilizing ICT, such as tablets, in supporting learning methods for students who find reading or writing challenging. Currently, rather than conducting these studies solely within the laboratory, we are working in partnership with local elementary and middle schools. Through this collaboration, we analyze case studies on the introduction of ICT as a support technology in schools. The aim is to develop practical research that can guide the implementation of similar initiatives in schools nationwide. Sachiyo Yamashita, a researcher and second-year doctoral student, is the central member of this research.



Assistive technology for students with reading difficulties



Assistive technology for students with writing difficulties

# Towards a Society of Diversity: Consultation Visit and Student Education at a Designated School for the Development of Inclusive Education System

Hiroshima University Hospital

Visiting Associate Professor **Aiko Kajiume**



Inclusive education involves initiatives where diverse children learn together in the same classroom. To promote a symbiotic society, it's crucial for children to gain experiences recognizing each other's diversity. I conducted periodic visits to schools, providing guidance on developmental disorders, addressing topics such as responding to children requiring special consideration. Additionally, I organized learning sessions on developmental disorders for education and medical students at Hiroshima University Hospital, fostering understanding and practical skills in dealing with developmental disorders before entering the field. For example, a workshop on “Physical Therapy for Children with Developmental Disorders” was conducted to explore approaches to address challenges faced by children with developmental disorders.



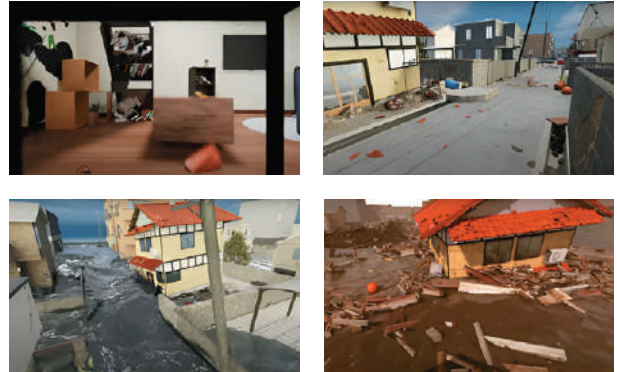
## Disaster Education and Disaster Reduction Research for Resilient and Sustainable Urban Development

Resilience Research Center



### Creation of Resilient and Sustainable Cities through Disaster Education and Disaster Reduction Research

We have been involved in the development and support of disaster experience-based VR content, “Hiroshima Natural Disaster Experience VR,” utilizing VR technology for disaster education in local communities and schools. We have also developed educational materials and methods for disaster education targeting elementary and middle schools. The first installment focused on the occurrence of disasters by debris-flows and/or slope failures depending on the residence location. It provided an experiential learning tool in a story format, illustrating the situation where the protagonist, despite recognizing the signs of an impending disaster (premonition), couldn’t make the decision to evacuate until receiving calls from family and neighbors, leading to evacuation actions. Subsequently, scenarios involving disasters by floodings were added.



VR visual image - earthquakes, tsunamis

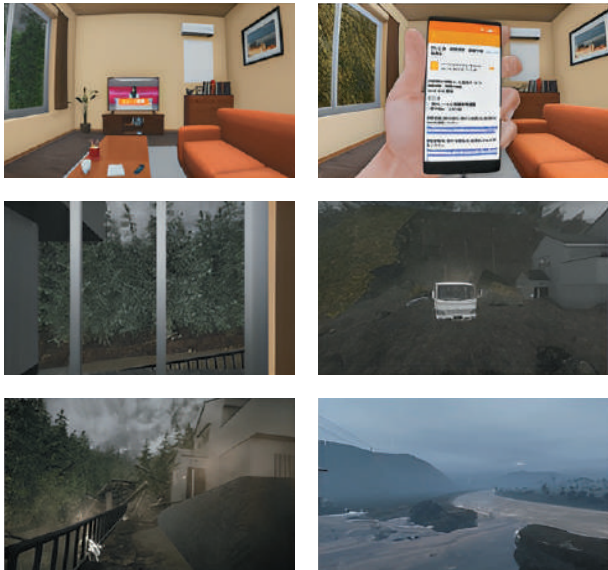
Additionally, we organize open discussions and public lectures annually, involving researchers, government officials, media personnel, local residents, and others, to exchange opinions on disaster prevention and evacuation. These events serve as opportunities to disseminate research findings on disaster reduction and resilience in an accessible manner.

### Strengthening Collaboration with the Chugoku Regional Development Bureau of the Ministry of Land, Infrastructure, Transport and Tourism, and Hiroshima Prefecture to Establish a System to Interlink Research Outcomes and Policies

Each year, we invite disaster and crisis management officials from local governments in Hiroshima Prefecture to introduce our research findings on disaster reduction and support their efforts by sharing case studies among municipalities. Additionally, we collaborate with the Chugoku Regional Development Bureau to enhance coordination and establish a mechanism to translate research outcomes into policies.



Meeting between Resilience Research Center and local governments (June 14, 2023)



VR visual image - debris-flows, slope failures, floodings

As part of the second installment, we created earthquake and tsunami scenarios to simulate a Nankai Trough earthquake, in addition to debris-flows, slope failures, and floodings scenarios. This material aims to help understand the importance of evacuation during earthquakes and tsunamis through pseudo-experiences of the entire process from earthquake occurrence to evacuation and scenes depicting the power of tsunamis and estimated damages from a Nankai Trough earthquake.



## Regional Revitalization Project in Ondo-cho, Kure City

Graduate School of Advanced Science and Engineering

Associate Professor Mitsuyo Saito

Student Naruhi Shioda

(a student in the Department of Integrated Arts and Sciences)



Ondo-cho, Kure City, located in the northern part of Kurahashi Island in the Seto Inland Sea, is home to 11,505 residents (as of the year 2019). However, the town is facing a population decline at a rate of 230 people per year, with a significant challenge being the outflow of young people. The only high school in the region, Hiroshima Prefectural Ondo High School, is on the brink of closure, emphasizing the critical situation facing Ondo-cho's decline.

The objective of this activity is to revitalize Ondo-cho through events. Specifically, we plan and organize stargazing events for local junior and high school students in Ondo-cho. Our goal is to promote the attractive characteristics of Ondo-cho, such as its rich natural environment, lifestyle, and local products like seafood and agricultural produce, and make the town known to a broader audience.

## Research on Building an Efficient and Sustainable Social Security System

Graduate School of Humanities and Social Sciences, Department of Law

Professor Takahiro Tezuka

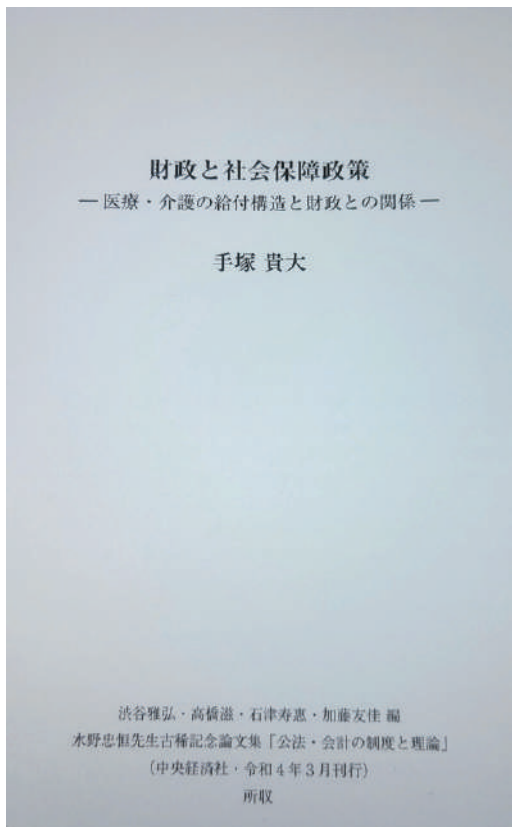


### Research on Constructing an Efficient and Sustainable Social Security System

We are conducting research on the structure of the social security system in the midst of a financial crisis. In particular, our research focuses on medical care, long-term care, and pensions, aiming to propose an efficient and sustainable social security system and policies that can provide peace of mind to future generations.

### Education on the Sustainability of Cities, Legal Interpretation, and Legal Policies

In the administrative law classes offered in the Faculty of Law, we teach administrative law related to cities. Within this context, we cover legal systems related to urban planning and land use planning, providing education on the sustainability of cities, legal interpretation, and legal policies.





Responsible Consumption and Production

# Ensure sustainable consumption and production patterns.

## Dissemination of SDGs Initiatives in the Fashion Industry and Challenges: Investigation of Initiatives and Current Situation in Denim Factories

Department of Integrated Arts and Sciences

Associate Professor **Izumi Matoba**



I am responsible for guiding an undergraduate student working her graduation thesis on “Fashion and SDGs.” A literature review revealed that while fashion-related companies in Japan disclose their initiatives toward SDGs to consumers, the content is limited. In August 2023, we conducted interviews at multiple denim factories (Sakamoto Denim, Shinohara Textile) in Fukuyama City, Hiroshima Prefecture, which has the highest denim production in Japan. We inquired about the significance and challenges of fashion-related companies actively disseminating their initiatives towards SDGs, obtaining insights from the field. Sakamoto Denim, engaged in denim yarn dyeing, developed a technology using electrolyzed water for cleaning, successfully reducing CO<sub>2</sub> emissions by 50%. The value of dyeing in Japan is evaluated based on color and technical expertise rather than price, and yarns utilizing eco-dyeing technology are sought after at overseas trade fairs. Shinohara Textile, engaged in denim fabric manufacturing, not only creates new products from remaining

threads and non-standard fabrics but also experiments with crushing hop cones discarded by beer factories and rose pruning waste in Fukuyama, turning them into yarn and denim fabric.

Various SDGs-related certifications exist in the fashion industry. Interviews at both factories explained the challenges of not receiving certification despite conscientious efforts.



Interview at Sakamoto Denim Co., Ltd.

## Research on Visualizing Marine Plastic Waste

Graduate School of Advanced Sciences of Engineering

Associate Professor **Yuji Sakuno**



With a growing global interest in ocean plastic, exemplified by the imposition of charges for convenience store plastic bags, understanding the actual situation of marine plastic waste is crucial. In our laboratory, we conduct foundational research using

remote sensing technology to explore and visualize marine plastic waste non-invasively. This involves studying the reflection characteristics of plastic on the coast and engaging local high school students in visualizing plastic research challenges.



Balloon experiment



Spectral reflectance measurement of plastic waste



Climate Action

# Take urgent action to combat climate change and its impacts.

## Development of Cattle Farming Techniques to Reduce Methane Gas Emission from Burps

Graduate School of Integrated Sciences for Life

Professor **Takeito Obitsu**



The methane gas produced in the stomachs of cattle is released into the atmosphere through burps, significantly impacting global warming. The Hiroshima University farm is conducting research aimed at developing cattle farming techniques to reduce methane gas emissions. For example, as part of a commissioned project by the Ministry of Agriculture, Forestry, and Fisheries titled "Development of the GHG Mitigation Technology in the Livestock Sector," the research measures methane gas emissions from cattle under rearing conditions. The study verified that providing a small amount of liquid derived from cashew nut shells (commercially available as feed to regulate the stomach condition of cattle) resulted in a reduction in methane emission rates.



## Investigation and Research on the Interaction between Aerosol Particles and the Marine Ecosystem

Graduate School of Integrated Sciences for Life

Associate Professor **Yoko Iwamoto**



Aerosol particles contain substances such as nitrogen, phosphorus, and iron. When these substances settle on the ocean surface, they can supply nutrients to plant plankton, contributing to the growth of plant plankton. The growth of plant plankton, in turn, influences the concentration of trace substances in seawater, affecting the generation and composition of aerosol particles of marine origin. Aerosol particles act as the Earth's "sunshade" by directly scattering sunlight or serving as nuclei for cloud particles. To refine future climate change predictions, it is essential to understand the physical and chemical characteristics of aerosol particles originating from the ocean, which covers about 70% of the Earth's surface. To achieve this, atmospheric observation devices have been installed on campus, coastal sites, and ships to measure aerosol particles in various marine areas.







Life Below Water

# Conserve and sustainably use the oceans, seas and marine resources for sustainable development.

## Social Contribution Cruise for Elementary, Junior High, and Senior High School Students and Adults

Training and Research Vessel TOYOSHIO MARU, School of Applied Biological Science



### Social Contribution Cruise by the Training and Research Vessel TOYOSHIO MARU in FY2022

The cruises were designed for high school students from Yasuda Girls' Senior High School, Hiroshima University Senior High School, Hiroshima Kokutaiji High School, elementary, junior high, and high school students from National Etajima Youth Friendship Center and Iwakuni City Micro-life Museum, and adults to learn about the current status of Hiroshima Bay and to experience a scientific approach to the aquatic environment. These cruises were led by faculty members of the School of Applied Biological Science (Drs. Kaori Wakabayashi, Toshiya Hashimoto, Shizuka Ohara, and Yoichi Sakai) and the staff of the Toyoshio Maru (Captain Kazumitsu Nakaguchi, Chief First Officer Shuhei Yamaguchi, and 10 other members). A total of 137 people were on board for six cruises (one in July, four in August, and one in December 2022), providing hands-on learning for "protect the richness of the sea".



### Social Contribution Cruise by the Training and Research Vessel TOYOSHIO MARU in FY2023

The seven social contribution voyages are planned for high school students at Yasuda Girls' Senior High School, Hiroshima University Senior High School, and Hiroshima Kokutaiji High School; elementary, junior high, and high school students and adults from Etajima Youth Exchange Center, Yamato Museum, and Iwakuni City Micro-life Museum; and elementary school students at Kidani Elementary School in Higashihiroshima City. These cruises are designed to provide students with an opportunity to learn about the current status of Hiroshima Bay and experience a scientific approach to the aquatic environment. Faculty members of the School of Applied Biological Science (Drs. Kaori Wakabayashi, Toshiya Hashimoto, Shizuka Ohara, Kazuhiko Koike, and Yoichi Sakai) and the Toyoshio Maru staff (Captain Kazumitsu Nakaguchi, Chief First Officer Shuhei Yamaguchi, and 10 others) provide guidance for these cruises. In fiscal 2023, we plan to welcome a total of 190 passengers (115 passengers for five cruises as of August 28, 2023), and we will continue our hands-on learning project for "protect the richness of the sea".



## Development of a Water-Lifting Device Using Solar Panels for Increased Oyster Production and Contribution to SDGs

Graduate School of Integrated Sciences for Life, Department of Applied Biological Sciences

Professor Kazuhiko Koike



We developed a device that combines solar panels with a simple water-lifting pump, capable of lifting 10 tons of seawater per hour from the seabed. By installing this device on oyster farming rafts and continuously lifting nutrient-rich seabed water containing plant plankton, which serves as nutrition and feed for oysters, we observed a 50% or more increase in the weight of shucked oysters after a few months. Oyster farming, conducted without feeding, has a purifying effect on the sea and is considered one of the most desirable methods of food production. Additionally, oyster production using this device is directly linked to various SDGs, as the shells (calcium carbonate) fix a significant amount of carbon dioxide.



## Halting "Coral Bleaching" with the Power of Ark Shells

Graduate School of Integrated Sciences for Life, Department of Applied Biological Sciences

Professor Kazuhiko Koike



"Coral bleaching," where corals lose symbiotic algae (brown algae) in their bodies, is a global issue. In this study, we utilize ark shells with brown algae, other than corals, and propose using undigested brown algae released as feces as a symbiotic source for corals. In collaboration with Miyako City, Okinawa, and the Diver's Association (Yabiji Coral Conservation Society), we conduct offshore mixed cultivation of corals and ark shells. Efficient supply of brown algae from ark shells is expected to revive coral reefs.





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.

## Deepening Understanding of Biodiversity through Research on Amphibians and Civic Education



### Amphibian Research Center

Associate Professor Takeshi Igawa

#### Comprehensive Understanding of Intraspecific Genetic Diversity of the Endangered *Echinotriton Andersoni*

I conducted an investigation on the Japanese giant salamander (i.e., *Echinotriton Andersoni*), a natural treasure in Okinawa and Kagoshima prefectures, and comprehensively clarified the intraspecific genetic diversity essential for the conservation planning of the specie (Igawa et al., 2020). The Japanese giant salamander is an endangered species inhabiting Tokunoshima, the northern part of Okinawa Island, and even Amami Oshima—one of the most well know World Natural Heritage sites in Japan. In addition to this research, the Amphibian Research Center breeds and reproduces various endangered and natural monument amphibians as part of an ex-situ conservation project, including the Japanese giant salamander. The center conducts live exhibitions with the aim of raising awareness about biodiversity.



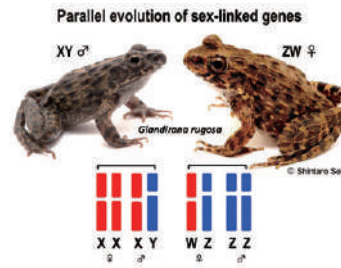
### Amphibian Research Center

Professor Ikuo Miura

#### Research on the Nature of Sex Using Wild Frog Species

Mechanisms determining the sexes of males and females are highly diverse. Genetically determined sex mechanisms include the XX-XY type found in mammals and the ZZ-ZW type found in birds. In the case of frogs, it has been found that the type of sex determination and even the sex chromosomes (sex-determining genes) differ by species or population. Especially in frogs inhabiting Japan, there is a remarkable characteristic of frequent changes in sex determination mechanisms. Among them, the Japanese wrinkled frog is a very rare frog that has both types in one species. In 2023, we revealed that under the two different sex determination mechanisms of the Japanese wrinkled frog, the genes on the sex chromosomes have evolved in parallel, overall evolving similarly, and conversely, have evolved significantly differently in some parts (Mawaribuchi et al., 2023). This study, directly comparing the evolution of sex linkage genes between the two sex determination mechanisms, is unprecedented worldwide, and for the first time, the differences between them have become clear. In addition to the Japanese wrinkled frog, there are many wild species in Japan that have characteristics related to sex determination and

the evolution of sex chromosomes, and even greater achievements are expected in the future (Miura et al., 2022; Katsumi et al., 2022).



### Amphibian Research Center, Project Office

Director Nobuaki Furuno

#### Outreach Activities at the Amphibian Research Center

The Amphibian Research Center provides introductions to its activities and explanations of the museum's branch sections to kindergarten through high school students and the general public. If requested, faculty members conduct simple experiments or demonstrations. Through these activities, the center aims to make many people aware of the latest research results using amphibians.



Open lecture / visiting lecture



Students visiting the Center



Students at an event carried out by the Center





Life on Land

# Protect, restore and promote sustainable forests, combat desertification, and halt

## Unraveling a 120-Year Mystery: Tracking the Flowering of 'Hachiku' for Wise Bamboo Stand Management

Graduate School of Integrated Sciences for Life

Professor Toshihiro Yamada



Our research team at the Graduate School of Integrated Sciences for Life at Hiroshima University has been conducting an environmental research of bamboo stand through multi-year field investigations, exploring the regeneration mechanism of bamboo stand. By delving into the mystery of the flowering of Hachiku, which occurred for the first time in 120 years in Higashihiroshima, we aim to contribute to proper land resource management, including bamboo stand management, bamboo shoot production, and the regeneration of dead bamboo stand.

Hachiku (*Phyllostachys bambusoides*) is one of Japan's major bamboo species, alongside Moso bamboo and Madake bamboo. In 2020, Hachiku flowered in Higashihiroshima, for the first time in 120 years. According to tradition, Hachiku blooms simultaneously over a wide area and then dies. However, due to the excessively long interval of 120 years between flowerings, the flowering ecology of Hachiku has never been observed and recorded. To clarify this unverified tradition, our team conducted several years of field surveys. Over the three years since the flowering of Hachiku was confirmed in 2020, our team extensively observed the Hachiku bamboo stand after flowering. While flowers bloomed in 80% of the surveyed Hachiku, all of them died immediately after flowering.

The remaining 20% also died by the summer of 2022. In other words, within three years after flowering, all Hachiku died, regardless of whether they flowered or not. Additionally, despite flowering, no seeds were produced, and bamboo shoot production ceased. Many small bamboo shoots that were not present before flowering appeared, but these were short-lived. This investigation revealed that Hachiku dies within three years after flowering, and there is no sign of regeneration. So, how does the regeneration of bamboo stand proceed? If Hachiku becomes extinct after flowering, it contradicts the fact that Hachiku continues to survive in Japan. Many unresolved mysteries remain, such as why seeds are not produced after flowering, how bamboo stand regeneration progresses, and how the environment of bamboo stand changes with flowering.

Although Hachiku flowering may seem irrational during the three-year investigation, looking at it from a longer perspective may provide reasonable explanations. Our team continues to investigate the enigmatic regeneration of Hachiku to contribute to bamboo stand management, bamboo shoot production management, and the management of dead bamboo stands after flowering.



A flowering bamboo shoot



A flowering bamboo stand



Canopies of a bamboo stand. The flowering part (right side) died after flowering and had no leaves. However, the non-flowering part (left side) was alive and had dense leaves.



Small bamboo shoots that appeared after flowering. There were no small bamboo shoots before flowering. They were short-lived and died soon after flowering.



# use of terrestrial ecosystems, sustainably manage and reverse land degradation and halt biodiversity loss.

## Effective Utilization of Chicken Manure Compost in Paddy Rice Cultivation

Program of Bioresource Science,  
Graduate School of Integrated Sciences for Life

Associate Professor Toshinori Nagaoka



In order to effectively utilize local unused valuable resources, we are verifying the effectiveness of chicken manure compost application in paddy rice cultivation, where compost has not been widely used. We investigate the effects of chicken manure compost application amount, timing, and cultivation management on the growth and yield of rice, aiming for sustainable rice cultivation.



## Towards the Comprehensive Understanding and Control of Chiral Substances and Phenomena in Nature

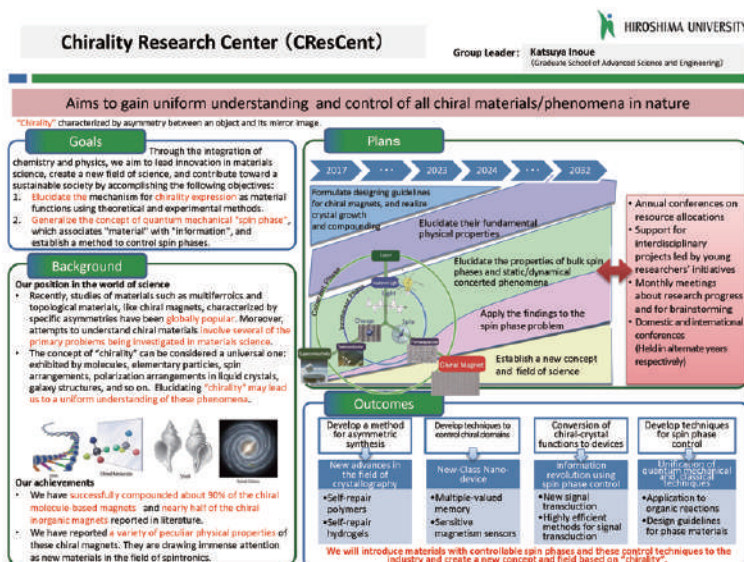
Graduate School of Advanced Sciences and Engineering

Professor Katsuya Inoue



Chirality refers to the property where a structure cannot be overlaid with its mirror image, much like the right and left hands. In recent years, research on substances exhibiting asymmetry has been globally promoted, with a particular emphasis on understanding chiral properties, making it one of the most important themes in the field of material science. The Chirality Research Center (CResCent) aims to

achieve an understanding of the mechanisms by which chirality is expressed as a material's function and the establishment of phase control methods. The center strives to contribute to the realization of a sustainable society by applying these findings to industry, creating new fields and concepts in material science.





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.

## Developing Body Mapping as a Tool for Transferring Memories of A-Bomb Experiences

Research Center for Diversity and Inclusion, Institute for Diversity and Inclusion

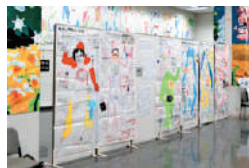
Professor **Machiko Oike**

The Center for Peace and the Graduate School of Humanities and Social Sciences

Associate Professor **Luli van der Does**



Body mapping is an art-based therapy and advocacy practice in which one draws one's life details in words and images in and around the life-sized figure of one's body traced onto a sheet of paper approximately 1 by 2 meters. The Research Center for Diversity and Inclusion (Machiko Oike) and the Center for Peace (Luli van der Does), supported by Grants-in-Aid for Scientific Research - KAKENHI – provided by Japan Society for the Promotion of Science (JSPS) and other contributions, applied body mapping to transfer memories of A-bomb survivors. We facilitated youth and survivors to co-create a map of the survivors while helping the youth to interview the survivors. In carrying out the project, we collaborated with an NGO, the Sekohei Art Exhibition Committee, and the Hiroshima High School Peace Study Group (*Kokosei Heiwa Zeminar*). The maps were exhibited at the *Sekohei Museum of Art*.



## 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 has designed and operated about 10-day field visits and training in Hiroshima, Nagasaki, and Tokyo as part of the training project "Peace 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. The training was carried out online in the fiscal year 2020. Until the fiscal year 2019, however, 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 carried out the program that included:

- 1) lectures and workshops at Hiroshima University;
- 2) opportunities to visit the Hiroshima Peace Memorial Museum and the Nagasaki Atomic Bomb Museum;
- 3) exchanges with junior high schools in Hiroshima and Tokyo; and
- 4) visits to parliamentarians and Ministry of Education, Culture, Sports, Science and Technology (MEXT).

In the fiscal year 2022, the training entitled "Peace and Resilience Building in Education from Educational Policies and Course Perspectives – The Experience from Japan" was carried out online in the form of 4 webinars with the participation of 34 trainees from 9 African countries.



## The Formation of a Digital Society and the Development of Modern Law

Law and Political Science Program,  
Graduate School of Humanities and Social Sciences

Professor **Nobuto Yoshinaka** Director, Hiroshima Center for Medical and Social Sciences



Under the theme of "The Formation of a Digital Society and the Development of Modern Law," we attempted to provide high-quality education to the general public on legal issues corresponding to the digital society. The content of the conference examined the development of the constitution, civil law, criminal law, commercial law, and tax law in the digital society, as well as the current situation in the United States and China. Through a digital society and law enforcement, we aim to reduce inequalities among people and countries and to increase accessibility of modern law to the general public.



## Support for Institution Building and Human Resources Development in Developing Countries

Center for the Study of International Cooperation in Education

Professor **Yoko Ishida**



### Support to Strengthen Environmental Education for Primary and Secondary Schools in Nepal

REED Nepal (Rural Education and Environment Development Center), a Nepalese NGO, has received a Japan Fund for Global Environment (JFGE) grant from the Environmental Restoration and Conservation Agency, Japan. In order to improve the current situation, REED Nepal has been conducting environmental and disaster prevention education for primary and secondary schools as well as activities to address garbage problem and promote afforestation in the area near the Everest basecamp in Solukhumbu District since FY2022. Prof. Ishida of CICE is in charge of the Japanese side of REED Nepal's operations, providing technical assistance and monitoring guidance to the Nepal side as well as to the local community.



### Support for Institutional Strengthening and Human Resources Development for Developing Country Governments

Prof. Ishida also serves as President of the Japan Evaluation Society and is involved in the development of evaluation systems and human resources development for developing country governments. The Ministry Foreign Affairs of Japan has been holding the ODA Evaluation Workshop every year since 2001 as a platform for exchanging information to improve the evaluation capacity of developing country governments to implement development plans and to contribute to the achievement of SDGs. At the 15th Workshop held in Colombo in FY2018, Prof. Ishida made a presentation about the international cooperation to strengthen SDGs monitoring and evaluation capacity in Indonesia. The 17th Workshop in FY2021 and the 18th Workshop in FY2022 were held online, and Prof. Ishida co-chaired the workshops with the Vice President of the Asia Pacific Evaluation Association (APEA).

# 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)



### Publication of the *Journal of International Cooperation in Education (JICE)* – A peer-reviewed, open-access journal

CICE had published 24 volumes of *The Journal of International Cooperation in Education (JICE)* since its official launch in 1998. In March 2022, open access to JICE started. The journal is now a peer-reviewed, open-access journal published by Emerald Publishing in the UK on behalf of CICE, who owns the title.

The journal engages with empirical, theoretical, and methodological discussions on educational policies, systems, and practices in the global South. The journal aims to become a more open academic platform that promotes international joint research and provides researchers in developing countries, who don't have venues for presenting their research results, and young researchers in and outside of Japan, with opportunities to have their high-quality papers published. With this aim in mind, CICE carries out activities in writing support such as regularly-held writers' workshops. As the international reputation of JICE increases, CICE will further promote its activities that contribute to disseminating the knowledge and expertise in educational development, which have been accumulated in Japan.



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

The "Africa-Asia University Dialogue for Educational Development" (AA Dialogue) Network has been established to promote international collaborative research, which is related to educational development in developing countries, between universities in Africa and Asia. In May 2010, the project joined UNESCO's University Twinning and Networking (UNITWIN) Programme. As the secretariat of AA Dialogue Network, CICE has provided a platform for collaborative research and has provided support for the strengthening of the ability to write English dissertations. Currently, 29 universities from South Africa, Kenya, Vietnam, Malaysia, and Indonesia, etc. which have participated in the AA Dialogue, have conducted joint research on the impacts of COVID-19 on educational sites and children in each country and measures to address the pandemic. The outcome of the joint research has been published in international journals. AA Dialogue also provides students at Hiroshima University with opportunities to engage in research on specific themes jointly with students from Malaysia and Indonesia and to interact with those students.



### 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 and co-creation of knowledge, CICE designs and operates around one and a half months of training for educational administrators and university researchers from developing countries.

The training aims at formulating educational development plans, and strengthening the capabilities to prepare, implement, monitor, and evaluate a project intended to promote access to education and improve the quality of education.

From 2018 to 2022, CICE provided JICA thematic training "Education policy formulation and analytical ability development for improving learning," to about 20 trainees every year from around a dozen countries in Africa and Asia such as South Africa, Kenya, Ethiopia, Ghana, Egypt, Cambodia, Thailand, and Afghanistan. Trainees, being aware of issues relevant to their own countries, could learn lessons from Japan's experience in education policy-making and implementation of policy measures. During the period when the COVID-19 pandemic was widespread, the training program included contents that were useful for addressing each country's needs such as the impacts of COVID-19 on each country and measures to address the pandemic.

In 2023, we have returned to in-person training with participation of educational administrators from Ukraine as additional trainees and the training has provided the trainees with earnest learning opportunities.



### 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, the Ministry of Foreign Affairs, Hiroshima University, and the University of Tsukuba. CICE serves as the secretariat of this forum and has been involved in planning and management.

The 17th Forum held online in 2021 on the theme of "Girls Education and Innovation", featured 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, and a panel session on girls' education and innovation, followed by a lively exchange of opinions. In July 2023, the 18th Forum was held online on the theme of "Quality of Education and Learning Outcomes for Vulnerable Populations" in support of the G7 Toyama-Kanazawa Education Ministers' Meeting held in May 2023. The Forum considered issues which faced countries where people were deprived of education opportunities for various reasons such as armed conflicts and COVID-19 pandemic, and possible approaches to support such countries.







Partnerships  
for  
the Goals

## Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development.

### As Part of the Ministry of Education, Culture, Sports, Science and Technology (MEXT)'s Program on Fostering Educators Who Practice ESD (Education for Sustainable Development), We Aim to Improve the Skills of Teachers Who can Achieve Global Competencies

Graduate School of Humanities and Social Sciences/Hiroshima SDGs Consortium

Professor **Yoshimichi Yui**



In order to achieve the goals set forth in the SDGs (Sustainable Development Goals), we need to train and develop teachers who can develop competencies that enable students to tackle and solve a wide range of economic, social, and environmental issues. We believe that it is important to provide continuous teacher training to constantly improve skills.

In this project, with the aim of improving the skills of teachers so that they can develop the global competencies necessary to achieve the SDGs, the Board of Education, teacher training colleges in the prefecture, companies, ESD activity support centers, and various organizations collaborate with current teachers and students who want to become teachers who will practice SDGs in the future, while utilizing human resources centered on the Graduate School of Humanities and Social Sciences, Hiroshima University. In addition to building a network as a consortium, we will implement a teacher training program with a spiral structure that combines training sessions, lectures, workshops, etc.



Seminar on "Thinking about War and Peace from Ukraine" (cited from the Hiroshima SDGs Consortium website)

### Promotion of International Education in Cooperation with the Administration in the Republic of Maldives

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

Professor **Tatuya Kusakabe**



In May 2022, CICE invited H.E. Mr. Abdullah Rashid Ahmed, Minister of State for Education, Republic of Maldives, to Japan. Minister Rashid visited Higashihiroshima City, schools in the city, Hiroshima Peace Memorial Museum, Hiroshima University, etc. At Hiroshima University, there was an exchange of views on the state of education in the two countries and future exchanges between universities, as well as a public seminar and a lecture delivered by Minister Rashid.

As a result of this visit, it was decided that online exchange classes would be held between elementary and junior high schools in the Republic of Maldives and those schools in Higashihiroshima City, through the intermediation of Hiroshima University. These classes were held with the aim of increasing the interest and understanding of each other's different cultures and languages. When they were held in May and September 2023, they drew considerable attention in both countries through the mass media.



# “Fostering the World’s Highest Level Radiation Therapy Team and Deploying it to the Region and Neighboring Asian Countries” Project at the Department of Radiation Therapy, Hiroshima University Hospital

Department of Radiation Oncology, Graduate School of Biomedical and Health Sciences

Associate Professor **Yuji Murakami**



## International Medical Training Program on Advanced Radiotherapy in Collaboration with HICARE and the IAEA

Since 2015, we have been conducting the HICARE/IAEA International Training Course of Advanced Radiation Therapy every other year with the aim of providing cutting-edge radiation therapy knowledge to radiation therapy staff in low-middle-income countries and fostering human resources to provide effective and safe radiation therapy to cancer patients. The 2021 training course was canceled due to the COVID-19 pandemic, but the 4th training course was held from November 11-15, 2022.

\*HICARE: Hiroshima International Council for Health Care of the Radiation-exposed

\*IAEA: International Atomic Energy Agency



## Training Project for High-Precision Radiotherapy Systems for Trainees in Low- and Middle-Income Countries

This project is an advanced radiotherapy training program conducted by the International Atomic Energy Agency (IAEA) Technical Cooperation Trainee Program. The project, which began in 2019, has so far accepted 5 radiation oncologists and 3 radiological technologists from the National Cancer Center of Mongolia, and 1 radiation oncologist from Hanoi Cancer Oncology Hospital in Vietnam as trainees. We provide training on

## Hiroshima Radiotherapy Team Medical Study Group for Radiation Therapy Staff Throughout Japan

The Hiroshima Radiotherapy Team Medical Study Group is a study group on multidisciplinary collaborative team medical care in radiotherapy that has been held annually since 2017. Initially, the program was held for radiotherapy staff at hospitals affiliated with Hiroshima University, but due to the COVID-19 pandemic, it was held online. Taking the opportunity of holding the event online, we invited radiotherapy facilities in Japan to participate, and the 6th workshop was attended by 250 radiotherapy staff. The next 7th meeting is scheduled to be held in February 2024, and preparations are underway.

## Holding an Annual Public Lecture on Radiation Therapy for Prefectural Residents

This project is an open lecture for the citizens of Hiroshima Prefecture sponsored by the Hiroshima Cancer High Precision Radiation Therapy Center (HIPRAC), and we participate as speakers every year. We are striving to convey to the citizens of the prefecture about radiation therapy, which preserves organs and leads to a cure for cancer, in an easy-to-understand manner.

state-of-the-art high-precision radiotherapy technology, mainly intensity-modulated radiotherapy, as well as quality assurance and quality control for this treatment. In May 2023, we accepted trainees from the National Cancer Center of Mongolia for a three-month period. In addition, from September 2023, Dr. Undrak, a medical physicist at the Department of Radiation Therapy at the National Cancer Center of Mongolia, began training for six months.

### “Fostering the World’s Highest Level Radiation Therapy Team and Deploying it to the Region and Neighboring Asian Countries”



● Technological Innovation and Team Development  
 High-Quality Education: Dispatching talent, including experts from the MD Anderson Cancer Center at the University of Texas, to impart expertise and state-of-the-art technology in team medicine, with the aim of enhancing treatment techniques at Hiroshima University and in Japan.  
 Development of Treatment Teams: Practical staff training with the purpose of implementing team medicine, sharing knowledge acquired through education.

● Infrastructure Development  
 Establishment of a Regional Medical Collaboration Network and Community Expansion:  
 Building a network and community medical collaboration system for the Hiroshima Cancer Precision Radiotherapy Center project, in order to extend its reach to the community.

● Information Dissemination  
 Promoting Equitable Access in the Region Contributing to the improvement of treatment techniques in the region by dispatching personnel and sharing technology with local universities and regional medical facilities.  
 Exporting Technology Overseas Exporting radiotherapy technology as a team approach to Asia, with a focus on Vietnam where there is already a track record.  
 Talent Development and Information Dissemination Utilizing Leading Graduate Schools Establishing an educational system for physicians, radiation technologists, nurses, and medical physicists, and expanding it to a training system.

# SDGs-Related Activities by Students and Graduates

## Students' Activities

### Student Independent Project 2022

#### Mutual Disaster Risk Reduction Activities in a Campus City Focused on Regional Natural Disaster Risk

**Ms. Masami Inomata**  
(3rd year PhD student at the Graduate School of Integrated Arts and Sciences)

In this project, students from Hiroshima University interacted with elementary and junior high school students from Higashihiroshima City and neighboring areas to learn together about creating sustainable and safe cities. University students conducted outreach lectures on disaster risk reduction at elementary and junior high schools, while the younger students deepened their understanding of disaster risk reduction in the context of the region's historical background, geology, and natural disasters during their classes. After the classes, the elementary and junior high school students created disaster risk reduction awareness posters, taking into account the characteristics of their local area. These posters were presented and exhibited at the university festival held at Hiroshima University. University students who attended the festival learned about disaster risk reduction from the posters, and comments from the university students were provided as feedback to the younger students. This activity facilitated mutual interaction between university students and younger students, enhancing disaster risk reduction awareness. Given the escalating impact of recent natural disasters due to climate change, it is crucial to address disaster risk reduction while understanding the unique characteristics of the region. Consequently, the results of these exchange activities aimed at improving disaster risk reduction awareness will be disseminated through awareness campaigns, such as the Higashihiroshima City Lifelong Learning Festival, to contribute back to the local community.



#### Connecting Foreign Residents and Local Residents to Create a Disaster-Resilient City HBM Project (Higashihiroshima Disaster Prevention x Community Development Project)

**Ms. Sayoko Matsuzawa**  
(Junior in the Department of Education)

We develop activities that encourages effective communication between foreign residents and local residents in emergency situations like natural disasters. The aim is to create connections where phrases like "Are you okay?" or "Let's evacuate together!" can be exchanged without hesitation in case of emergency. Our initiatives are supported by Higashihiroshima City's community development support grant.

During the heavy rainfall in July of 2018, significant damage occurred in the western area of Japan, including Higashihiroshima. At that time, some foreign residents, unsure of where to go, crowded into a small apartment and spent an anxious night. Much of the information during natural disasters tends to be disseminated in Japanese language, making it challenging for foreign residents to gather relevant information. Therefore, it is crucial to establish connections with local residents before disasters occur, not only relying on municipal assistance, so that local residents and foreign residents support each other.

So far, we have developed various activities such as Disaster Art (contemplating disaster preparedness while enjoying different forms of art and creating original calendars), Disaster Olympics (engaging in physical activities while cooperatively participating in evacuation competitions), and building an ideal shelter with LEGO® bricks. Additionally, we organize events that everyone, regardless of nationality and age, can participate in—from children to adults.



#### Using Waste Food to Contribute to SDGs Kitchen Worcar

**Ms. Ayane Sato**  
(Junior in the Department of Chemistry)

"Kitchen Worcar" is a student organization at Hiroshima University that promotes the cuisine of Higashihiroshima, connecting producers and consumers. We engage with farmers, who are the producers, by assisting with their work and visiting their fields. On the other hand, we connect with consumers through events and social media. In events, they use vegetables and fruits purchased from farmers to provide dishes and conduct workshops. As part of Kitchen Worcar's efforts towards Sustainable Development Goals (SDGs), we undertake activities using ingredients that are scheduled for disposal. We also purchase non-standard items that farmers cannot sell due to their imperfect appearance and primarily utilize them in workshops. This spring, we used lemons from a farm called "Kai Farm," which were scheduled for disposal, to decorate and conducted a workshop to make aroma wax bars. Recently, we implemented a project for children's summer activities, decorating Uchiwa (i.e., hand-fans) using non-standard vegetables from three farms: "Hanaafu," "Unity

Natural Farm," and "Yoshikawa Region." Through these events, we reduced food loss, provided opportunities for children to touch and become interested in fruits and vegetables, and expanded activities that involve interaction between nature and people. We aim to continue these activities in the future.





## Graduates' Activities

### Field Trial in Collaboration with Hiroshima University CO-OP Operation of a Website for Selling Unsold Dishes

CEO of WEAVE, **Mr. Naoki Kubo**  
(Graduated from the Department of Education in March 2023)

We launched the company WEAVE as a venture from Hiroshima University while we were still students, and collaborated with the Hiroshima University Consumer Cooperative (HU CO-OP) to conduct a field trial of business. We created "makanai bento," which involves packing leftover dishes from restaurants after closing hours into bento boxes and publishing the contents and photos on a web application. Users can reserve the desired bento based on this web information. For restaurant operators, this contributes to the reduction of food waste, and for users, it provides access to affordable meals.

In June 2022 and a time period from October 2022 to February 2023, we implemented this initiative, and as a result, more than 500 students registered. This contributed to a reduction of 360 meals (69% based on the amount) in food waste. One-third of the users were international students facing difficulties in food expenses due to restrictions on part-time work, which addresses the issue of student poverty. This initiative successfully connected individuals with a sense of involvement in social issues with businesses, utilizing the expertise of the businesses and the insights of the individuals involved. We are convinced that even with a small effort, we can engage in initiatives for solving social issues with new and innovative ideas. Please refer to the report on this demonstration experiment for more details. ([https://www.hucoop.jp/eco/pdf/bento2022\\_result.pdf](https://www.hucoop.jp/eco/pdf/bento2022_result.pdf))



### Practice of SDGs by a Graduate

United Nations Environment Programme, Asia Pacific Regional Office, Thailand  
**Mushtaq Ahmed Memon, Ph.D.**

Dr. Mushtaq Memon, a regional coordinator for the Chemicals and Pollution Action Subprogramme at the United Nations in Thailand, has been engaging with the practice of SDGs overseas ever since he graduated from Hiroshima University. With an intent of building a sustainable economy in Asia and the Pacific, he has been striving to facilitate a circular economy that entails green skills needed for all stakeholders, including policymakers, businesses, and civil society.

A circular economy entails gradually decoupling economic activity from the consumption of finite resources and is based on three principles: design out waste and pollution, keep products and materials at their highest value and in use, and regenerate natural systems.

Current global consumption and production of materials is one of the root causes of the triple planetary crises, climate change, biodiversity loss, and pollution. The triple planetary crisis has significant impacts on work, where 40% of all jobs depend on ecosystem services, and climate change-induced heat stress threatens to lose 80 million full-time jobs. A systemic transition to a circular economy, where materials remain used at their highest possible value for as long as possible, can address the triple planetary crises while providing opportunities for green jobs. The development and adoption of circular models across value chains will change the world of work, impacting employment and skills needed. It is estimated that the circular economy will create a shift in almost 80 million jobs, providing an opportunity to Asia and the Pacific, home to more than 600 million youth.

UNEP is leading on SDG 12 (responsible consumption and production), which provides the perfect mixture of downstream and upstream indicators for a circular economy to close the loop as locally as possible in the most environmentally and economically efficient manner with social benefits. As SDG 12 supports all the other SDGs, a circular economy is one of the key tools to support the implementation of most of the SDGs. High impact sectors for Circular Economy includes: Electronics and ICT, Plastic and packaging, Transport, food systems, textiles, energy, industry, and cities, construction, and infrastructure.



For details,  
please refer to:



Japanese: @NERPS\_jp  
English : @NERPS\_hiroshima

Instagram



Japanese: nerps\_jp  
English : nerps\_hiroshima

Facebook



<https://www.facebook.com/nerpshiroshima>

# Comments from the Stakeholders

## Peace Promotion Project Team, Hiroshima Prefecture



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

### Mariko Nishizawa

Hiroshima Prefecture / the Hiroshima Organization for Global Peace (HOPE) is working to include the abolition of nuclear weapons in the next United Nations Development Goals, which are expected to be formulated in 2030, from the perspective of “a sustainable future for the earth and humankind.”

The crises facing humanity, such as climate change, food security, global health, and the nuclear weapons issue, which are directly linked to these challenges, cannot be solved by one country alone, but are global issues that need to be tackled now before it is too late by mobilizing the wisdom and resources of all countries.

In the New Agenda for Peace launched by the United Nations in July 2023, based on the recognition of the inter-linked nature of many of these challenges, the UN Secretary-General stated his commitment to link actions for peace with the Sustainable Development Goals.

The United Nations Development Programme (UNDP) is also boldly tackling this issue. In its 2022 special report, “New threats to human security in the Anthropocene ~Demanding greater solidarity~,” it explores what the global threats are that will strike humanity in the new era of the Anthropocene, and what kind of changing forms of human security will be in the background of such times.

In this regard, we are very encouraged by the fact that the Hiroshima University Network for Education and Research on Peace and Sustainability (NERPS) continues to pursue the nexus between peace and sustainability. I believe that by elaborating these interrelationships in an academic manner as a first step, more people will understand the major threats that surround us and how dangerous the current situation is due to their complex intertwining, and that addressing these issues will be a major step toward a peaceful and sustainable future.

## Columbia University in the City of New York



Director of the Center for Sustainable Development and University Professor at Columbia University in the City of New York

### Jeffrey D. Sachs

The Network for Education and Research on Peace and Sustainability (NERPS) is a very inspiring and noble initiative as the Hiroshima University’s most important efforts to contribute to the SDGs. I am absolutely honored to be the keynote speaker of its first conference in March 2022 and its webinar series that started in September 2020, when we commemorated the 75th anniversary of the Hiroshima and Nagasaki bombings. Currently, we are witnessing the failure of global cooperation in addressing the Russia-Ukraine war, the COVID-19 pandemic, and climate change, among other pressing issues. These are the most critical challenges on the planet, and how fitting that Hiroshima University leads this global effort on the peace-sustainability nexus. I am very inspired by your undertaking of this effort, and I commit to continue working with you to find pathways to peace and sustainability.

## Higashihiroshima City



Mayor of Higashihiroshima City

### Hironori Takagaki

#### 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”.

I believe that the accomplishment of this future vision entails the realization of a “smart city,” where social problems indicated in the SDGs are solved using technology advocated in Society 5.0 and cutting-edge technology.

To realize this “smart city,” our city and Hiroshima University established the Town & Gown Office in October 2021, created the Hiroshima University Smart City Co-Creation Consortium, which is based on an industry-academia-government partnership, in March 2022, and initiated a variety of initiatives.

We will continue to take measures and actions that contribute to the realization of a “smart city”, integrating private companies’ know-how and resources on one hand and our city’s responsibilities as a local government on the other, and making good use of Hiroshima University’s main campus – Higashi-Hiroshima campus, and to promote social implementation of the fruits resulted from such measures and actions in our city and surrounding areas, with the view to contributing to the achievement of SDGs.

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

## Sumitomo Corporation



General Manager,  
Chugoku (Hiroshima) Office,  
Sumitomo Corporation

### Masahiko Morito

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 are in the third year of this collaboration, which started in January 2021. We would like to express our appreciation for this collaboration.

We would like to continue our collaboration 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 collaboration between universities and local governments. To do so, we will generate ideas for, for example, introducing renewable energy, taking energy management initiatives using the introduction of electric vehicles and charging and discharging facilities, and building a data linkage infrastructure that will lead to the standardization of platforms for private and administrative services, and discuss how to refine such ideas. While doing so, we would like to collaborate 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. In addition, we intend to contribute to the accumulation of industries, which will be boosted by large-scale investment in the semiconductor industry, which has drawn increasing attention in the wake of the G7 Hiroshima Summit, in the Higashihiroshima region and to the development of semiconductor-related human resources led by Hiroshima University.

## Indonesia



Head, National Research and Innovation Agency (BRIN)  
Indonesia  
Hiroshima University Alumni Association Indonesia (HUAA Indonesia) Co-President

### Laksana Tri Handoko

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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