English ver.

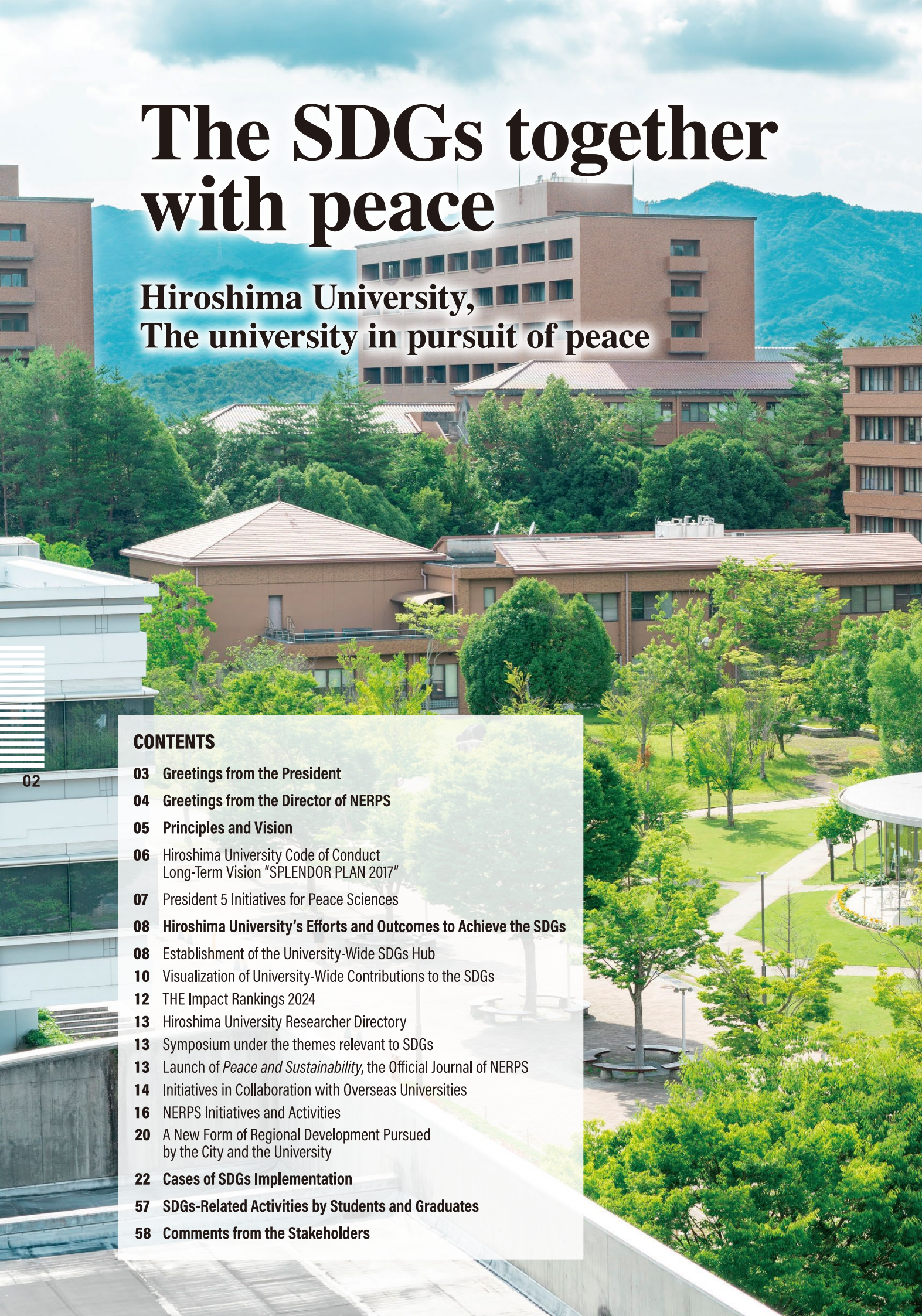
Network for Education
and Research on Peace
and Sustainability

SDGs REPORT 2024
HIROSHIMA UNIVERSITY

HIROSHIMA UNIVERSITY

The SDGs together with peace

Hiroshima University, The university in pursuit of peace



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President's Message

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 to achieve 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 Security)' in May 2023. From the many challenges facing the world, the university has identified 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.

On August 6, 2024, the inaugural University Presidents for Peace Conference was held on the Higashi-Senda Campus. Approximately 30 participants, including presidents and vice presidents, from 10 universities in 7 countries/regions, attended the conference: the University of Idaho (USA), Columbia University (USA), and the University of Pavia (Italy), University for Foreigners of Perugia (Italy), National Cheng Kung University (Taiwan), National Central University (Taiwan), Hasanuddin University (Indonesia), Indian Institute of Technology, Bombay (India), World Maritime University (Sweden) and Hiroshima University (Japan). These university leaders actively discussed the important role that universities play in promoting sustainable world peace and cultivating the next generation of peacemakers who can contribute to the well-being of humanity.

In my opening remarks, I stated, "The role we universities should play now is very important. I believe that if students from all over the world, with different backgrounds, learn and discuss together through international exchange, it will be possible to overcome different cultures and values and realize peace throughout the world. I strongly hope that university leaders and young people from around the world will visit Hiroshima, experience the reality of the atomic bombing, and have opportunities to think and act on peace and sustainability."

The conference was inspired by the G7 Hiroshima Summit held last year. During the summit, the leaders of the G7 countries visited the Hiroshima Peace Memorial Museum and witnessed the devastating consequences of war and the terrifying power of nuclear weapons. Given that our university was founded in Hiroshima, where the first atomic bomb was dropped, it is appropriate that Hiroshima University takes the initiative in addressing these issues.

The meeting was highly productive due to the diverse perspectives of the participants, leading to the adoption of the University Presidents for Peace Declaration. This declaration emphasizes the commitment of the universities involved to 'promote international exchange and foster people-to-people connections through our programing and educational offerings.' Additionally, it was agreed that partnerships between universities will be pursued to provide peace and exchange opportunities for students and young researchers. The attendees also agreed to explore fundraising strategies to support these initiatives. Moving forward, I hope to share the conference results with as many countries as possible to encourage more universities to participate and make it a regular event.

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 support in promoting our initiatives into the future.

President, Hiroshima University
Mitsuo Ochi

Message from the Director of NERPS

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

The British higher education journal Times Higher Education (THE) released its Impact Rankings 2024 – a list that assesses universities against the United Nation's Sustainable Development Goals (SDGs) – in June 2024. "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 2024, among 74 universities in Japan, Hiroshima University was placed in the global top 100 in seven SDG categories, more than any other university in Japan. In the overall ranking, Hiroshima University secured 101-200th place among 1,963 universities worldwide, tying with three other universities (Kyushu University, Osaka University, and Tohoku University) for third place in Japan. This marks the third consecutive year that HU has ranked third in Japan. This consistent ranking reflects the university's ongoing efforts in education, research, and social contributions, which have created a synergistic effect between leading university reforms and university-wide efforts to achieve the SDGs.

Among the three items that ranked in the global top 100 and first place in Japan, SDG 17 (Partnerships for the Goals) is mandatory. Hiroshima University ranked 45th in the world and first in Japan out of 2,031 universities worldwide and 77 universities in Japan. This was due to Hiroshima University's strong relationships with the government and NGOs, and the university's proactive dissemination of information to achieve the SDGs. Hiroshima University received high praise for its efforts in promoting international joint research between Japan and developing countries to solve global issues, in collaboration with the Japan Science and Technology Agency (JST) and the Japan International Cooperation Agency (JICA), through initiatives like the SATREPS program.

For SDG 11 (Sustainable Cities and Communities), Hiroshima University ranked 51st in the world and first in Japan out of 1,026 universities worldwide and 56 universities in Japan. Hiroshima University's collaboration with Higashihiroshima City and Kure City, along with partner companies under the Town & Gown concept, was recognized for its efforts to "drive sustainable regional development and the evolution of the university together."

Regarding SDG 13 (Climate Action), Hiroshima University ranked 54th in the world and first in Japan out of 924 universities worldwide and 42 universities in Japan. Hiroshima University was recognized for steadily implementing initiatives such as increasing the use of low-carbon energy based on an action plan to achieve carbon neutrality; contributing to disaster prevention and environmental education through the Resilience Research Center to promote early warning of the risks of climate change; and hosting international conferences organized by the Network for Education and Research on Peace and Sustainability (NERPS) at Hiroshima University. Hiroshima University was the only Japanese university to be ranked in the top 100 in the world for this category.

Hiroshima University submitted data for all 17 SDGs and is working to achieve the SDGs in a wide range of fields.

The university's international efforts to achieve the SDGs have been recognized not only in the THE Impact Rankings but also in the THE Awards Asia. Now in its sixth year, THE Awards Asia, which began in 2019, aims to recognize outstanding reform efforts by Asian universities. 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. In 2024, Hiroshima University has been a finalist in the International Strategy of the Year category for three consecutive years and was nominated for the Outstanding Contribution to Regional Development category for the first time.

Having set a long-term vision of leading "Science for Sustainable Development," Hiroshima University has been actively working on establishing solid systems that supports the achievement of the SDGs throughout the university. Examples of such initiatives are: 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, launching a new graduate degree program, the Graduate School of Innovation and Practice for Smart Society, and establishing the Institute for Diversity and Inclusion.

Furthermore, the SDGs contribution by Hiroshima University 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.

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, and "The NERPS Conference 2023 (NERPS 2023)", which we partnered with the Asian Institute of Technology (AIT) in hosting in March 2023 in Thailand, we hosted an international conference on peace, sustainability and peace-sustainability nexus titled "The NERPS 2024 Conference" in March 2024 at Higashi-Hiroshima campus of Hiroshima University as one of the events commemorating the 75+75th anniversary of the founding of Hiroshima University. There were 175 researchers, practitioners, and students from 100 universities, research institutes and NGOs from 29 countries who participated in the conference. This includes 12 eligible students from developing countries who received conference scholarships. The conference was organized in collaboration with the three universities and one research institute that have been cooperating with NERPS 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 parallel sessions. NERPS will hold the international conference on peace, sustainability and peace-sustainability 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 Manila Campus of De La Salle University in the Philippines in March 2025.

Hiroshima University 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 NERPS website, so please visit our website and learn about Hiroshima University's wide range of SDGs initiatives.

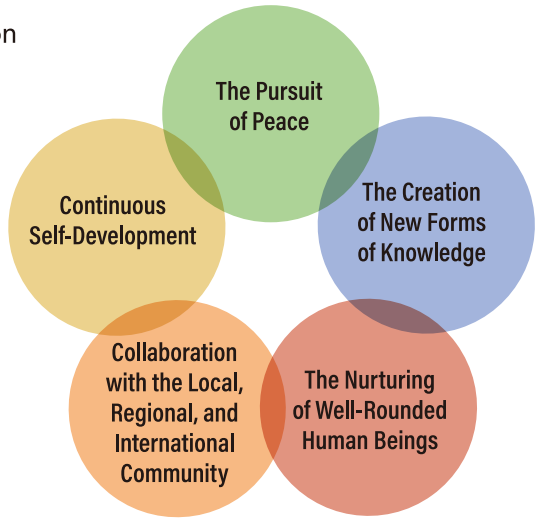
Hiroshima University will continue and further develop these efforts to contribute to the achievement of the SDGs in 2030 and the realization of a peaceful and sustainable world beyond 2030. We are also committed to making these contributions visible from anywhere around the world.

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

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.

Concept

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-New Peace Science（Creating Peace for 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.

Initiatieve Leader
TERAMOTO Akinobu
Director
Research Institute for Semiconductor Engineering

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.

Initiatieve Leader
TANAKA Junko
Executive Vice President (Kasumi Campus, Faculty Personnel and Public Relations)

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.

Initiatieve Leader
HIGASHI Yukihito
Director
Research Institute for Radiation Biology and Medicine

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.

Initiatieve Leader
KANEKO Shinji
Executive Vice President (Global Initiatives)

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.

Initiatieve Leader
SHIMADA Masayuki
Dean, School of Applied Biological Science

President 5 Initiatives for Peace Sciences Overall Structure Chart

Hiroshima University's Efforts and Outcomes 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 challenge.
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."

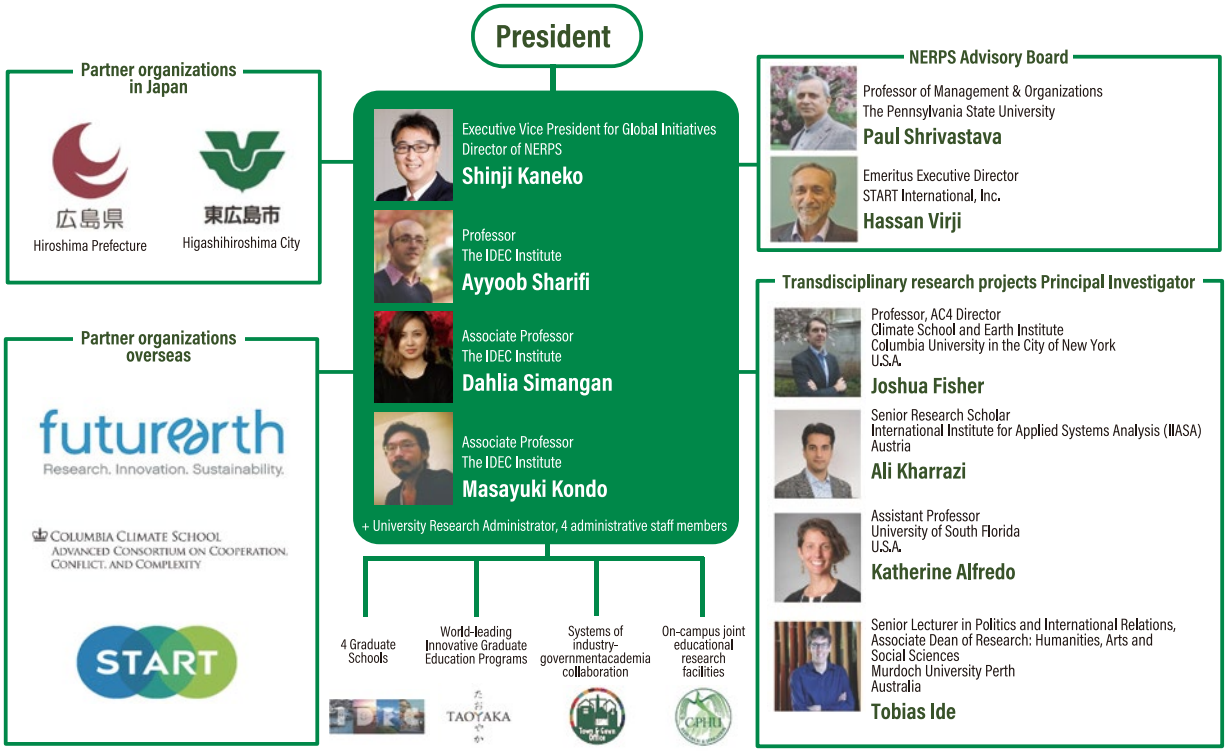
Purpose

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

NERPS

NERPS

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 and Outcomes 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 Indicator) 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

❶ 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".

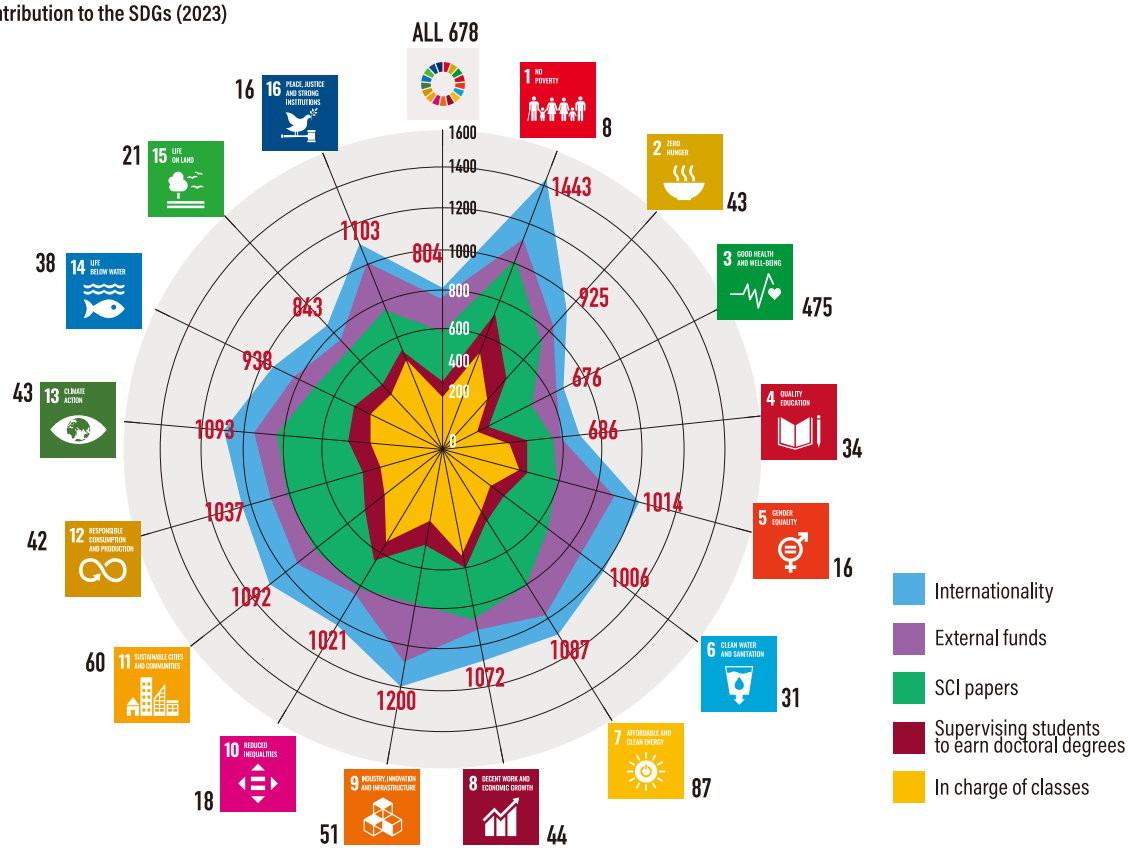
❷ The Scopus papers published from 2014 to 2023 that include Hiroshima University faculty members (who are affiliated with the university as of May 1 of each year) as authors and the related SDG information (Elsevier 2023 SDG mapping*1) for each paper are extracted using the research analysis tool SciVal (Elsevier). After clarifying the relationship to the SDGs for each paper, we identify which authors are involved in which SDG items through which papers.

❸ The data on involvement in the SDG items for each faculty member from ❷ are linked to the AKPI® points for each fiscal year, and we accumulate the AKPI® points of the faculty members involved in the 16 SDG items.(*2) 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 2023 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 (475 people), SDG_7 (87 people), SDG_11 (60 people), SDG_9 (51 people,), and SDG_8 (44 people).
- SDG with high AKPI® values are in the order of SDG_1 (1443P), SDG_9 (1200P), SDG_16 (1103P), SDG_13 (1093P), and SDG_11 (1092P) .

Figure A: Contribution to the SDGs (2023)

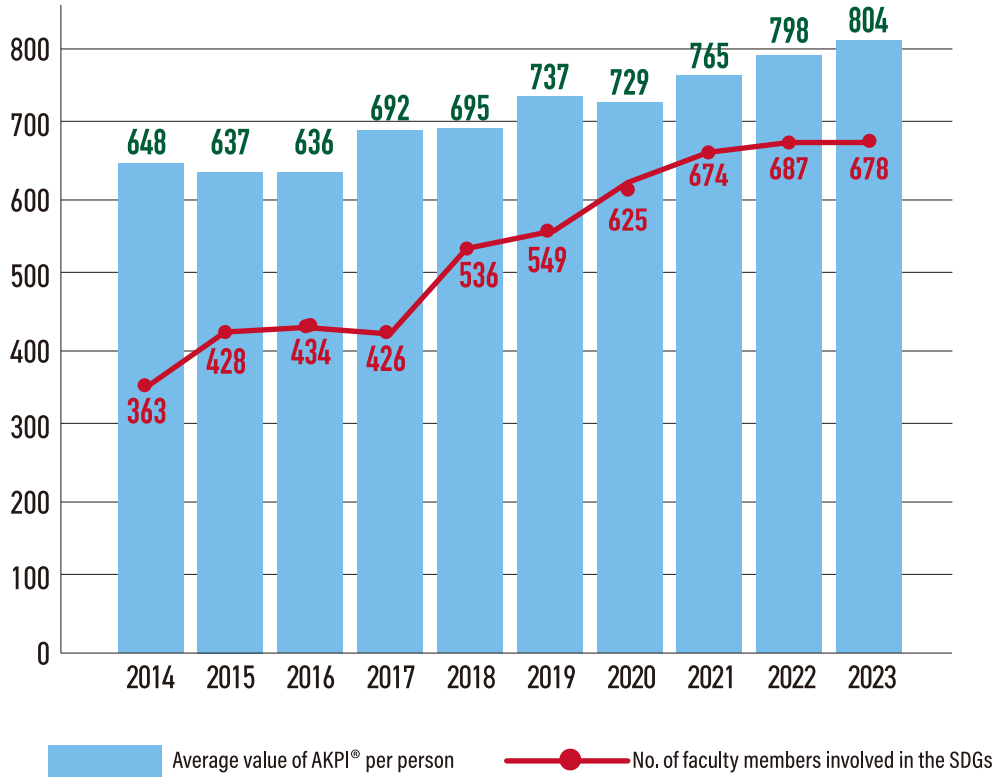


The numbers next to the logo indicate the number of faculty members involved in each SDG item, and the numbers in red indicate the average AKPI® points per faculty member.

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 (2014 ~ 2023)



What is AKPI® ?

AKPI=Achievement-motivated Key Performance Indicator

AKPI® is a key performance indicator to be set as a target value for the next 10 years for one of the world's top 100 universities. AKPI® is composed of five elements ((1) In charge of classes [300 points], (2) 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/sgu/page02_02

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

*2 In the research analysis tool SciVal (Elsevier), SDG_17 was excluded from the extraction, so the analysis was conducted using information on 16 items excluding SDG_17.

Hiroshima University's Efforts and Outcomes to Achieve the SDGs

THE Impact Rankings 2024

Graphic from Times Higher Education honoring Hiroshima University for ranking first in Japan in six of the 17 SDGs

Times Higher Education (THE), a British higher education magazine, publishes "THE Impact Rankings" annually. This ranking highlights universities' contributions to society based on the framework of the United Nations Sustainable Development Goals (SDGs).
In the recently announced "THE Impact Rankings 2024" on 12 June 2024, Hiroshima University achieved 3rd place in the overall ranking in Japan (101-200th globally) for the third consecutive year. The university also ranked in the top 100 in seven SDG categories, the highest among Japanese universities.
THE commended Hiroshima University for being ranked first in Japan for 6 out of the 17 SDGs in its item-by-item evaluation, describing this as 'an excellent achievement and a very noteworthy accomplishment,' and awarded the university a graphic in recognition of this success.
This high evaluation reflects the synergy between leading university reforms and comprehensive efforts to achieve the SDGs, along with ongoing diverse initiatives in education, research, and social contribution.
Hiroshima University plans to continue promoting its efforts and contributions toward the SDGs through the publication of the SDGs Report and the NERPS website.

Graphic awarded by THE

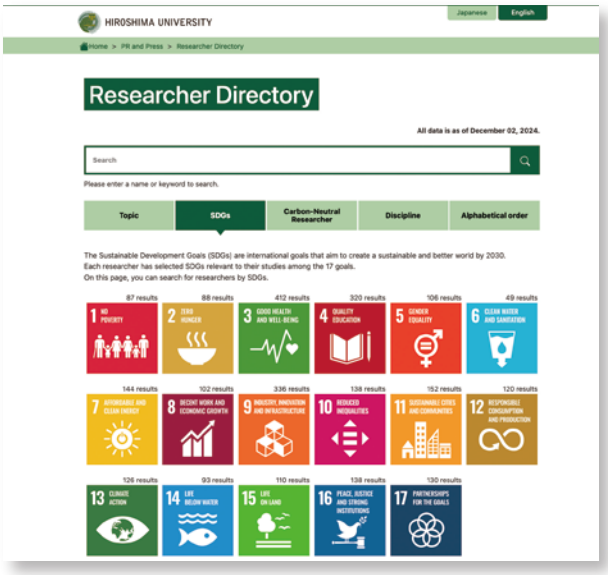
Hiroshima University ranks 3rd among Japanese universities in THE's Impact Rankings 2024

(Hiroshima University's official website)
https://www.hiroshima-u.ac.jp/en/news/83824

THE Impact Rankings (THE's official website)
https://www.timeshighereducation.com/impactrankings

The Network for Education and Research on Peace and Sustainability (NERPS)
https://nerps.org/

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 2,180 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

Symposium 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

2024 Symposium on Environmental Peacebuilding in Nepal

The 2024 Symposium on the Challenges and Opportunities for Environmental Peacebuilding in Nepal was jointly organized by the Network for Education and Research on Peace and Sustainability (NERPS), Hiroshima University, Hiroshima University Scholars Alumni Nepal (HiUSAN), Centre for Social Change (CSC), and Kathmandu University School of Education (KUSOED) on February 29, 2024, at Kathmandu University School of Management (KUSOM) in Lalitpur, Nepal. 65 participants from various academic institutions and organizations attended the symposium.

The symposium highlighted the growing need for environmental peacebuilding in Nepal amidst rising cases of natural resource conflicts, the challenges to peace and environmental sustainability in Nepal and the types of partnerships to help enhance environmental peacebuilding in Nepal.

In the afternoon, two sessions were held in parallel. A research workshop, led by Dr. Dahlia Simangan of Hiroshima University and Dr. Prakash Bhattarai of the Center for Social Change, set the expectations for a joint research paper. The workshop included feedback sessions for developing the case studies that will be included in the joint research agenda-setting paper. Meanwhile, a skills-building session for students and early-career researchers was facilitated by Dr. Joshua Fisher of Columbia University in the City at New York and Dr. John Lee Candelaria of Hiroshima University. They provided participants with relevant information about publishing in academic journals and academic productivity, respectively.

Launch of *Peace and Sustainability*, the Official Journal of NERPS

In August 2024, the launch of a new journal, *Peace and Sustainability*, was announced. This initiative is a collaborative effort between the Network for Education and Research on Peace and Sustainability (NERPS) at Hiroshima University and Elsevier. *Peace and Sustainability* is committed to fostering research and discourse on the nexus between peace and sustainability. The journal's goal is to promote systemic approaches that capture the complex and dynamic interrelations between human and ecological concerns and develop evidence-based and policy-relevant solutions toward more peaceful and sustainable futures.

The journal has a diverse editorial group, with Prof. Shinji Kaneko, Executive Vice President for Global Initiatives and the Director of NERPS at Hiroshima University, as the journal's Editor-in-Chief and Dr. Dahlia Simangan, Associate Professor and a NERPS core member, of Hiroshima University and Dr. Joshua Fisher of Columbia University in the City of New York, who is also one of the Specially Appointed Professors at NERPS, Hiroshima University, as Associate Editors.

Peace and Sustainability is a hybrid journal. Accepted authors do not have to pay an article publishing charge unless they choose the open-access format. It is envisaged that the first issue will be published in January 2025.

Hiroshima University's Efforts and Outcomes to Achieve the SDGs

Initiatives in Collaboration with Overseas Universities

University Presidents for Peace Conference 2024

On August 6, 2024, the inaugural University Presidents for Peace Conference was held on the Higashi-Senda Campus. Approximately 30 participants, including presidents and vice presidents, from 10 universities in 7 countries/regions, attended the conference. They endorsed the purpose of the "University Presidents for Peace Declaration".

After attending the Peace Memorial Ceremony at the Peace Memorial Park, the university presidents proceeded to the Higashi-Senda Campus to participate in the Hiroshima University Memorial Ceremony for the Atomic Bomb Victims and the Hiroshima University Annual Peace Project.

The Conference began with opening remarks by President Ochi, delivered in the presence of local media. In his speech, President Ochi stated, "The role we universities should play now is very important. I believe that if students from all over the world, with different backgrounds, learn and discuss together through international exchange, it will be possible to overcome different cultures and values and realize peace throughout the world. I strongly hope that university leaders and young people from around the world will visit Hiroshima, experience the reality of the atomic bombing, and have opportunities to think and act on peace and sustainability."

Hiroshima Mayor Kazumi Matsui, who arrived at the venue after the Peace Memorial Ceremony, then expressed his hope for the University Presidents for Peace Conference, saying, "Dialogue is a very important means of building peace. The city of Hiroshima would like to work with universities for world peace."

In the session that followed, the presidents of each university gave an introduction on peace and sustainability, and then Shinji Kaneko, Executive Vice President for Global Initiatives, proposed the future initiatives, which aim to create international exchange opportunities for students and young researchers to develop leaders who can contribute to building a peaceful and sustainable future.

Moderated by Lecturer Joshua Fisher (Director of AC4,Climate School, Columbia University/Specially Appointed Professor for NERPS, Hiroshima University) and Associate Professor Dahlia Simangan (The IDEC Institute, Hiroshima University), university presidents from around the world engaged in a lively discussion on the role of universities in promoting sustainable world peace. Participants expressed opinions including: "Provide opportunities for students to learn about peace in Hiroshima," "Invite more stakeholders (civil society, government, business) to participate," "Have a common vision and goals," "Start with actions at the local level with little funding," "Focus and concentrate efforts on specific areas," "Create a platform for knowledge sharing among faculty members," and "Create a forum for information exchange among university offices in charge of sustainability."

At the end of the meeting, President Ochi read the "University Presidents for Peace Declaration," which incorporated the content of these discussions. When the declaration was adopted, the audience responded with a resounding round of applause. As the conference concluded, the leaders and officials from each university shook hands and pledged further cooperation.

Participating Universities in the University Presidents for Peace Conference 2024

Japan: Hiroshima University
U.S.A.: University of Idaho, Columbia University
Taiwan: National Cheng Kung University, National Central University
Italy: University of Pavia, University for Foreigners of Perugia
Indonesia: Hasanuddin University
India: Indian Institute of Technology, Bombay
Sweden: World Maritime University

Hiroshima University Peace Study Tour 2024
- 115 university students from 19 countries gathered in Hiroshima!

As part of its 75+75th Anniversary Project, Hiroshima University invited students from partner universities and other universities around the world to participate in the "Peace Study Tour 2024" on August 6, Peace Memorial Day.
One hundred and fifteen participants from 45 universities in 19 countries attended the tours, along with 77 HU students, who participated in five summer programs covering a diverse range of topics. The programs focused on solving global issues such as diversity and inclusion, world peace and political justice, positive peace and SDG-based natural resource management, higher education of the future, and the social role of artificial intelligence (AI), and ran for 8-10 days beginning in early August.
Participants with diverse backgrounds received lectures from experts and practitioners in the humanities, social sciences, and natural sciences, deepened their knowledge through field visits, and exchanged multifaceted views on given issues and peacebuilding through group work and discussions. All courses offered interdisciplinary learning by taking advantage of Hiroshima University's strengths in "comprehensive knowledge."
From August 4 to 6, students listened to lectures on the atomic bombing, visited Hiroshima Peace Memorial Museum, participated in the Peace Memorial Ceremony, and took part in the Hiroshima University Peace Planning Project.
One of the participating international students commented, "Peace is not a one-time achievement, but a continuous process. To achieve sustainable peace, a wide range of negotiations, a lot of time, and cooperation with many people are indispensable. The experience in Hiroshima was a great opportunity to deepen such understanding and to think about how to contribute to society in my own country." Other comments include, "The history of Hiroshima, a symbol of peace and reconstruction, has reinforced the importance of our mission to resolve conflicts and maintain harmony. I would like to use the knowledge I gained here to propose comprehensive and sustainable solutions to promote peace and reconciliation in my country," and, "Although the students came from diverse backgrounds, the common goal of realizing and promoting peace created a sense of unity among us, and we were able to learn from each other." The students also commented on how they learned the importance of unity in building peace.
We hope that the participants who completed the tour will become the next generation of peacemakers who can contribute to the well-being of humankind through their experiences, and we will continue to enhance the program in the coming year and beyond with the aim of fostering human resources who can contribute to world peace by exploring solutions to global issues through reason and dialogue.
We will continue to provide opportunities for students to think for themselves with the aim of "the creation of peace" while adhering to one of the five principles of Hiroshima University, "the pursuit of peace".

[Programs for FY 2024]

Program	Theme	Date	Number of participants
AIMS Summer Intensive Program	Future of Higher Learning from Students' Perspective	2024 8/1–8	**27** [Breakdown] Hiroshima University (6) AIMS Member Universities (Overseas: 20/Japan: 1)
HU&SPF&CU Summer Course on Peace and Sustainability 2024	Clinic on Conflict and Collaboration in Natural Resource Management - Advancing Positive Peace and the SDGs	2024 8/2–9	**38** [Breakdown] Hiroshima University (17) Columbia University (6) Sasakawa Peace Foundation (12) Hiroshima University Partner Universities (3)
INU Summer Intensive Program	World Peace and Political Justice	2024 8/2–10	**51** [Breakdown] Hiroshima University (25) 12 INU Member Universities (26)
INU Summer Intensive Program	The Role of Artificial Intelligence (AI) in the Future of Work and Society	2024 8/2–11	**47** [Breakdown] Hiroshima University (18) Arizona State University (12) Purdue University (10) University of Texas at Austin (7)
Campus Asia Plus Summer School	International Collaborative Human Resources Development Program in Asia to Foster Inclusive Mindsc	2024 8/20–28	**29** [Breakdown] Hiroshima University (11) Beijing Normal University (3) Changchun University (3) Hankuk University of Foreign Studies (6) Kasetsart University (3) Universitas Pendidikan Indonesia (3)

[Participants' Affiliated Universities]

Arizona State University [U.S.A.]	Hankuk University of Foreign Studies [Korea]	European University Viadrina [Germany]
Columbia University [U.S.A.]	Institute of Technology of Cambodia [Cambodia]	Universität Osnabrück [Germany]
James Madison University [U.S.A.]	Royal University of Agriculture [Cambodia]	Ateneo de Manila University [Philippines]
University of Texas at Austin [U.S.A.]	Royal University of Law and Economics [Cambodia]	UNIVERSITY OF ST. LA SALLE [Philippines]
Purdue University [U.S.A.]	National University of Management [Cambodia]	Central Luzon State University [Philippines]
Universidad Nacional del Litoral [Argentina]	Nanyang Technological University [Singapore]	De La Salle University [Philippines]
Kingston University [U.K.]	World Maritime University [Sweden]	University of Philippines Diliman [Philippines]
De Montfort University [U.K.]	Malmö University [Sweden]	Mindanao State University [Philippines]
School of International Relations of Foreign Ministry of I.R.I [Iran]	Rovira i Virgili University [Spain]	Lyceum of the Philippines University - Batangas [Philippines]
North Eastern Hill University [India]	Kasetsart University [Thailand]	Universiti Malaya [Malaysia]
Universitas Pendidikan Indonesia [Indonesia]	Prince of Songkhla University [Thailand]	Universiti Teknologi MARA [Malaysia]
SYARIF HIDAYATULLAH STATE ISLAMIC UNIVERSITY JAKARTA (UIN) [Indonesia]	Mahidol University [Thailand]	UNIVERSITY OF MALAYSIA SABAH [Malaysia]
Institut Teknologi Sepuluh Nopember [Indonesia]	Mae Fah Luang University [Thailand]	Stellenbosch University [South Africa]
Universitas Padjadjaran [Indonesia]	Chiang Mai University [Thailand]	Changchun University [China]
Parahyangan Catholic University [Indonesia]	University of Tsukuba [Japan]	Beijing Normal University [China]

Hiroshima University's Efforts and Outcomes to Achieve the SDGs

NERPS Initiatives and Activities

1 Planning and Organizing Webinar Series

Since September 2020, NERPS has been organizing and hosting a series of webinars intended to consider peace and sustainability from the perspectives of global environmental, sociopolitical, economic, and technological transformations.
This series is situated within the urgent need to deal with the implications of global change, including the COVID-19 pandemic, for peace and sustainability. The webinars serve as a platform for rethinking and updating the current discourse on peace and sustainability amidst these global challenges and transformations. Leading experts discuss the role of resources, digital technologies, migration, governance, and education in peacebuilding, conflict mitigation, humanitarian aid, and capacity-building, among other components that contribute to the achievement of the Sustainability Development Goals, particularly that of Goal 16 on Peace, Justice, and Strong Institutions.
The first webinar featured Professor Jeffrey D. Sachs of Columbia University in the City of New York in the United States, who was the awardee of the Blue Planet Award 2015 and a two-time consecutive nominee for TIME magazine's 100 most influential people in the world, speaking from New York. A total of 35 NERPS webinars have been held up to October 24, 2024.

YouTube
Hiroshima NERPS

RECORDS

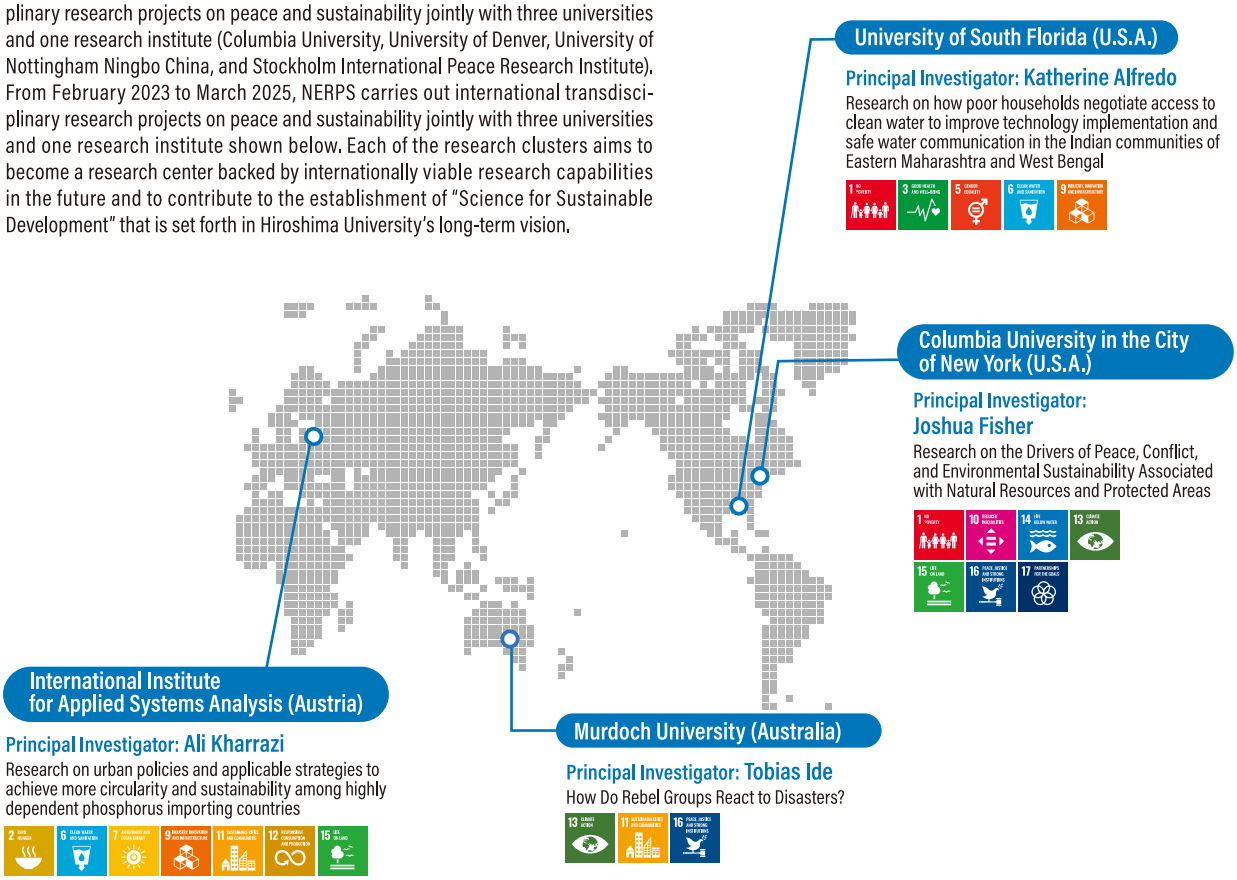
Date	Speaker	Title	Number of participants on the day	Number of Video views (As of 2024/12/20)
2020/9/23	Dr. Jeffrey D. Sachs	Sustainable development as a path to peace	180	422
2020/11/25	Prof. Cullen Hendrix	Promoting Peace through Shared Governance of the Seas	23	141
2020/12/16	Prof. Paul Heidebrecht	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 SDG	23	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

Date	Speaker	Title	Number of participants on the day	Number of Video views (As of 2024/12/20)
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
2023/11/24	Prof. Israr Qureshi	Digitally Enabled Social Intermediation: A Research Framework	89	3
2023/11/27	H.E. Mr. Korkut Güngen	TÜRKİYE: WEST OF ASIA – EAST OF EUROPE	66	Not Published
2023/12/5	Dr. Ali Kharrazi	Systems Thinking and Ecological Approaches for Evaluating Risk and Resilience	80	57
2024/1/19	Prof. Yie-Ru Chiu	Fostering Sustainable Communities: A Permaculture Approach at Tzu Chi University, Taiwan	60	51
2024/2/7	Dr. Tobias Ide	Disasters, Armed Conflicts, and Rebel Governance	63	95
2024/3/14	Prof. Teresa Eugénio	The challenges of sustainability and non-financial reporting	58	84
2024/3/14	Dr. Prakash Bhattarai	From the Peace Agreement to Constitution Making: Nepal's Journey to Peace, Justice and Strong Institutions	28	101
2024/6/26	Dr. Shailendra K. Mandal	Impact of Climate Change on Hydroclimatic and other Climatic Risks and Vulnerability: Strategies for Resource Constrained Smart City of India	58	31
2024/9/6	Dr.Nick Brown Dr. Spyros Schismenos	3+1 Questions about Humanitarian Engineering	25	66
2024/9/20	HH Princess Abeer Al Saud	Peace-based Approaches for Desertification: Revisiting UNCCD's Policies and Practices	34	39
2024/10/24	Dr. Dewan Ashraf	Warming in Major Asian Cities: Are We Prepared to Live with 50 °C?	42	47

2 Transdisciplinary Research Projects

Transdisciplinary Research Projects Aiming to Form Globally Recognized Research Clusters

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 below. 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 and Outcomes to Achieve the SDGs

3 A Brief Report on the NERPS 2024 Conference in Hiroshima

The Network for Education and Research on Peace and Sustainability (NERPS) hosted the NERPS 2024 Conference on March 6-9, 2024, in Higashi-Hiroshima campus of Hiroshima University. This was the third international conference organized by NERPS as one of the events commemorating the 75+75th anniversary of the founding of Hiroshima University.

The opening ceremony and keynote addresses held at Higashi Hiroshima Arts & Culture Hall Kurara on March 6th was organized as a public event for citizens in cooperation with Higashihiroshima City. The event began with the opening remarks by President Mitsuo Ochi of Hiroshima University, followed by Higashihiroshima Deputy Mayor, Mr. Kuniharu Maenobe. The first keynote speaker, Prof. Atsushi Sunami, President of the Sasakawa Peace Foundation and Special Advisor to the President for Strategic Partnership of The National Graduate Institute for Policy Studies talked about the initiatives of the Sasakawa Peace Foundation towards guaranteeing peace and sustainability. The second keynote speaker, Ms. Chisa Mikami, Head of Office, United Nations Institute for Training and Research (UNITAR), Hiroshima, then talked about the contributions of UNITAR to peace and sustainability. Afterwards, Prof. Shinji Kaneko, Executive Vice President for Global Initiatives and NERPS Director, Hiroshima University-Conference Chair, highlighted Hiroshima University's efforts toward peace and sustainability and the purpose of this international conference.
NERPS 2024 Conference was attended by 175 researchers, practitioners, and students from 100 universities, research institutes, and NGOs in 29 countries*1, and provided scholarships to 12 students from developing countries. A total of 48 sessions and 181 oral presentations were held, including the pre-conference workshops from March 4 to 5, 2024. The NERPS 2024 Conference was supported by its 16 conference partners.*2

The fourth NERPS Conference is scheduled to be held at De La Salle University (Philippines) on March 5-7, 2025.

Prof. Atsushi Sunami, President, Sasakawa Peace Foundation and Special Advisor to the President for Strategic Partnership of The National Graduate Institute for Policy Studies, Japan

Ms. Chisa Mikami, Head of Office, United Nations Institute for Training and Research (UNITAR), Hiroshima

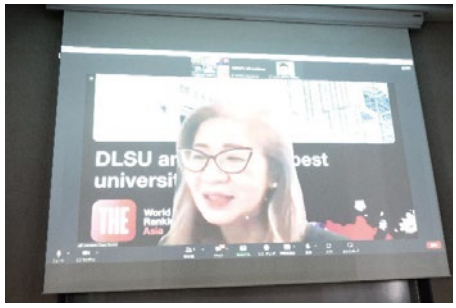
Oral presentation

Roundtable session

During the closing ceremony held on March 8th, the conference co-chairs, Prof. Ayyoob Sharifi and Dr. Dahlia Simangan of the IDEC Institute of Hiroshima University, presented the awards to three outstanding papers and three best oral presentations of the NERPS 2024 Conference.*3 Concluding the conference was Prof. Shinji Kaneko who gave a summary and announced that De La Salle University (DLSU) in Manila, Philippines, will be the co-host and venue for the NERPS 2025 Conference. DLSU Vice President for External Relations and Internationalization, Dr. Laurene Chua-Garcia, took the stage online to invite the international conference participants to next year's conference.

Winners of Best Papers and Best Presentations, together with the Conference Co-Chairs

Scene from the venue for the closing ceremony



Dr. Laurene Chua-Garcia, Vice President for External Relations and Internationalization, De La Salle University

Group photo after the closing ceremony

(Note 1)
East Asia: Japan, China, Taiwan
Southeast Asia: Brunei, Indonesia, Philippines, Thailand
South Asia: Bangladesh, India, Nepal, Pakistan, Sri Lanka
Oceania: Australia
Europe: Austria, France, Germany, Netherlands, Poland, Portugal, Spain, Sweden, Switzerland, United Kingdom
North America: Canada, United States
South America: Colombia
Middle East and North Africa: Morocco
Sub-Saharan Africa: Ghana, Kenya

(Note 2)
Universities and Institutions in Japan: The Urban Institute, Kyushu University, Nagasaki University Research Center for Nuclear Weapons Abolition, Remote Sensing Technology Center of Japan (RESTEC)
Overseas Universities/Institutions: Columbia University in the City of New York, University of Idaho, University of South Florida, Chongqing University, Davao del Norte State College (Philippines), Asian Institute of Technology (Thailand), Centre for Social Change (Nepal), Murdoch University (Australia), Faculty of Social Sciences, University of New South Wales (Australia), Grenoble Business School (France, UNESCO Chair on Economic Peace), Linköping University (Sweden), University of São Paulo (Institute of Earth Sciences, Center for Groundwater Research)
Publisher: Elsevier

(Note 3)
Winners of Best Paper Award
Mr. Subhojit Shaw (International Institute for Population Science, India)
Dr. Yao Chun Tsao (Cheng Shiu University, Taiwan)
Mr. Md. Nazmul Haque (Hiroshima University, Japan)
Winners of Best Presentation Award
Dr. Mumita Tanjeela (East West University, Bangladesh)
Mr. Mohammad Rayhan Miah (Hiroshima University, Japan)
Ms. Aleksandra Balinskaia (Kanazawa University, Japan)

Hiroshima University's Efforts and Outcomes 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

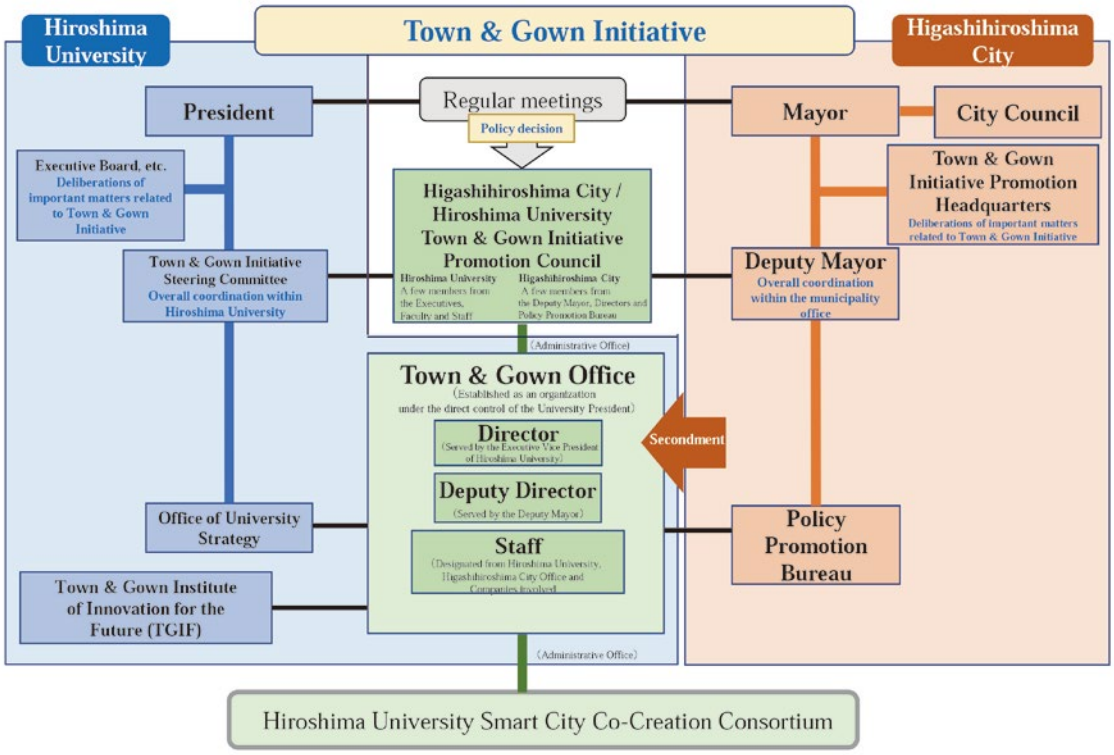
The Town & Gown Initiative is an effort to develop regional communities through social change and invigorate Japan from the local level, where "Town" (the local community) and "Gown" (the university, based on the ceremonial robes worn by professors and students) join hands to share a vision of a sustainable 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



Establishment of a foundation for research on the social implementation of smart cities

The Hiroshima University Smart City Co-Creation Consortium, which was established in March 2022, proposed projects related to research and development (R&D) that will lead to the formation of smart cities, as well as the development of a common infrastructure for research and development (demonstration field development on campus). The Consortium carries out research on social implementation of various initiatives that include TGO App, multilingual communication infrastructure, 360° campus views, 3D modeling of the entire campus, human flow analysis platform, and carbon neutrality/energy x mobility infrastructure.

●TGO App

By developing data-linkage infrastructure that enables utilization of open data from industry, academia, and government, TGO App is designed to build an environment (innovation platform) in which new digital services that contribute to improving the convenience of citizens will be created one after another.
Based on the architecture and app/environment developed in FY2021, in FY2022, assuming that Hiroshima University members use the app on a daily basis, a community function, an event function, and a My Page function that allows users to freely register their information, were added to TGO App. In April 2023, we started providing TGO App that can be installed on a smartphone. There are future plans to extend the app to include Higashihiroshima citizens and students at other universities.

●Multilingual communication platform

We are building a multilingual communication platform as a sub-platform for the TGO App based on LINE. It aims to improve the convenience of students and citizens in obtaining information and contributes to the realization of an inclusive society. Those students and citizens include international students and foreign residents, who are expected to further increase in number in the future. In September 2023, we launched the service as the "Multilingual Communication LINE Official Account," after having built the infrastructure necessary for multilingual communication, such as a "chatbot function" that can display text in multiple languages, and a "questionnaire push function" that can request surveys and provide information. In addition, we have developed a "symptom articulation function" that can explain health problems in multiple languages, and an "AI consultation service function" that provides multilingual information about daily life and formalities required by international students.

Carbon Neutral × Smart Campus 5.0 Declaration

In January 2021, Hiroshima University announced its "Carbon Neutral × Smart Campus 5.0 Declaration," declaring its intention to become a Smart Campus 5.0 and to pursue carbon neutrality and society 5.0 on the Higashi-Hiroshima Campus. In August 2022, we drew up "Toward 2030 Hiroshima University Carbon Neutrality —Road to 2030—: Action Plan (2022—2027)" (partially revised in April 2023). 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 6.6-megawatt solar energy power in total. The facilities will be installed in all possible buildings and some parking lots on the Higashi-Hiroshima Campus. The electricity generated by the facilities is equivalent to about 20% 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. Power supply started sequentially in November 2024. In time of the supply of the electric power generated by the project, electric vehicle (EV) sharing service is also expected to start. They are expected to contribute to the realization of Higashihiroshima City Next-Generation University Town Initiative.


Installation of solar energy power generation facilities (Higashi-Hiroshima Campus)

Action Plan (2023.4)

Carbon Neutral × Smart Campus 5.0 Declaration

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.

ここから世界の平和をつくる
広島大学
×
SDGs
NERPS

NERPSは持続可能な開発目標
「SDGs」を支援しています。

Human development / social issues

No Poverty

End poverty in all its forms everywhere.

Zero Hunger

End hunger, achieve foodsecurity 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.

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

Achievegender 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 Infrastructure

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.

Means of implementation

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

SDGs in general

All SDGs

Matters regarding SDGs in general

No Poverty

End poverty in all its forms everywhere.

Dental awareness activities at temporary shelters

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

Assistant Professor Yuria Asao / Assistant Professor Yuko Iwamoto

Child abuse has become a serious social problem in recent years, and there is an urgent need to prevent abuse and to detect and respond to it early. In 2009, Hiroshima Prefecture organized a Child Abuse Prevention Measures Council based on the Hiroshima Prefecture Dental Hygiene Liaison Council (composed of the government, universities, and the Prefectural Dental Association), which has been visiting three temporary shelters in Hiroshima Prefecture once a month to conduct oral examinations and provide oral health guidance to children in the shelters.
From 2022, the Hiroshima Prefectural Dental Association will continue to take the lead as a contractor for Hiroshima Prefecture and Hiroshima City. In 2024, the Hiroshima University Department of Pediatric Dentistry will continue to regularly dispatch pediatric dentists. In addition to the usual items included in the oral examination, we also check for discoloured teeth, fractured teeth, maxillofacial trauma, and other signs of physical abuse. If emergency treatment is required, we will support dental treatment during the temporary protection period.
We also prepare medical certificates, provide information to nearby medical institutions after the temporary protection period ends, and prepare medical certificates for civil lawsuits. Dental health guidance includes individual and group oral hygiene instruction for children and participatory lectures for children, and information is shared with facility staff on finishing brushing and oral habits that they should be careful of. Basic lifestyle habit surveys and questionnaire surveys are also conducted, and the results, along with the results of oral examinations, are collated, analyzed, and evaluated by Hiroshima University's Department of Pediatric Dentistry, and are continually reported at professional conferences and other events.

Presentation of this activity at related academic conferences

Temporal dynamics of payment choices: Unraveling the interplay between time preferences and credit card utilization in Japan

Graduate School of Humanities and Social Sciences: Economics Program

Distinguished Professor KADOYA YOSHIHIKO

This study investigates whether the present bias influences the payment behavior of credit card holders in Japan. We hypothesize that credit card holders with present bias prefer to delay bill payment, even at the cost of accepting interest charges. To test this hypothesis, we utilize a dataset comprising 128,032 observations from a leading securities company. Our analysis reveals that a significant number of respondents indeed delayed credit card bill payments, suggesting a potential association with present bias behavior. Specifically, impatience and impulsivity exhibit a positive association with credit card payments, indicating that impatient and impulsive credit card users are more likely to postpone payment, even when interest charges are incurred. The implications of this study extend to both credit card users and issuers, highlighting the influential role of impulsivity in the timely payment of bills. For users, understanding the role of impulsivity in payment behavior can lead to more informed financial decisions and strategies to avoid unnecessary interest charges. For issuers, recognizing the patterns of present bias can inform the development of products and policies aimed at encouraging timely payments, ultimately benefiting both parties. This study contributes to the literature by providing empirical evidence on the time-inconsistent behavior of Japanese credit card holders and underscores the need for tailored financial education and interventions to mitigate the effects of present bias in financial decision-making.

Table 2. Descriptive statistics.

Variable	Mean	Std. Dev	Min	Max
Dependent variable				
credit_no_interest	0.9769	0.1500	0	1
credit_interest	0.0444	0.2060	0	1
Independent variable				
Impatience	0.0143	0.9459	−0.6789	3.5745
Hyperbolic discounting (Impulsivity)	0.1248	0.3305	0	1
Men	0.6169	0.4861	0	1
Age	43.7929	11.7473	18	94
Age squared	2055.8260	1088.1690	324	8836
Education	15.2013	2.0406	9	21
Married	0.6602	0.4736	0	1
Number of children	1.0778	1.1012	0	12
Full-time employment	0.7709	0.4202	0	1
Household income	7519779	4125947	1000000	2.00E + 07
Log of household income	15.6722	0.6005	13.8155	16.8112
Household assets	1.89E + 07	2.34E + 07	2500000	1.00E + 08
Log of household assets	16.15227	1.0768	14.7318	18.42068
Risk aversion	0.5344	0.2284	0	1
Financial literacy	0.7492	0.2934	0	1
Observation		128,032		

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.

❶ Food and Agriculture Field Science Exercise to Cultivate the Dignity of Life This training program targets students from our university

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.

❷ 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 processof 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.

❸ 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 Wasakii 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 tolerance, stress tolerance 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 tolerance, 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.

Cultivation Experiment in the Long-term Experimental Field (Nutrition Team)

▲Phosphorus Deficient Plot ▲Nutrient Sufficient Plot

▲Corn Single Planting Plot ▲Corn-Lupine Mixed Planting Plot

Examination at Corn Field: The effect of root secretions that promote phosphorus absorption improves growth in corn, which is mix-planted with lupine. (Nutrition Team)

Good Health and Well-being

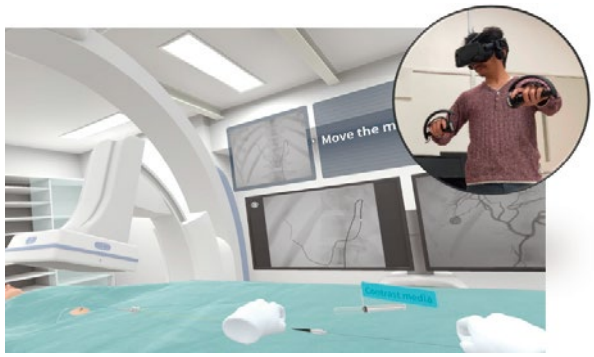
Ensure healthy lives and promote well-being for all at all ages.

Development of Specialized Technical Simulator using Virtual Reality

Hiroshima University Hospital, Department of Radiology

Professor Kazuo Awa / 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.



Project on Creating VR (Virtual Reality) Games for Children as a Digital Medicine for Pediatric Cancer

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.
In recent years, it has been reported that VR (Virtual Reality) can be used to treat diseases, and VR is attracting attention as a digital medicine.
In fact, VR is already used overseas to treat panic disorder.
The Pediatric Department (Pediatric Surgery and Pediatrics) at Hiroshima University Hospital has initiated a project to create VR games as the world's first digital medicine development project for pediatric cancer. Collaborating with Kodansha in respect of characters used in the VR games, we will strive to create VR games that contribute to deepening children's understanding of pediatric cancer and making treatment more advanced.

Initiatives for Newborn Mass Screening (Tests for Congenital Errors of Metabolism, etc.)

Graduate School of Biomedical and Health Sciences, Department of Pediatrics

Professor Satoshi Okada

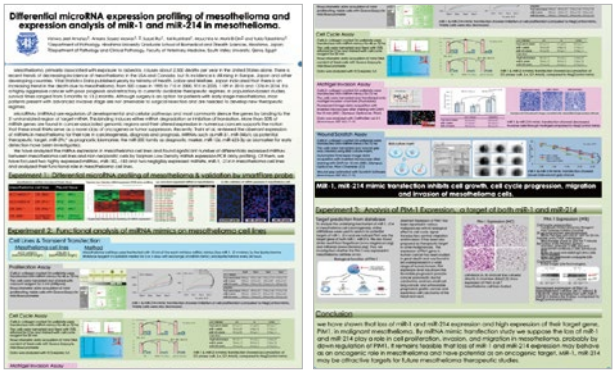
Approximately two years have passed since the start of the "Newborn Mass Screening Study" for three diseases – SCID (Severe Combined Immunodeficiency), BCD (B Cell Deficiency) and SMA (Spinal Muscular Atrophy). In Hiroshima Prefecture, a total of about 28,000 children participated in this study. In 2023, a case of an infant with SCID (Severe Combined Immunodeficiency) was discovered, and hematopoietic stem cell transplantation was performed at Hiroshima University Hospital to save the infant's life.
As an initiative of the Children and Family Agency, the "Demonstration Project on Newborn Mass Screening Testing" was launched in March 2024. Thirteen prefectures, including Hiroshima Prefecture, are cooperating in this demonstration project as model prefectures. We will make every effort to ensure that mass screening of newborns for three diseases is implemented as a national project.

Development of methods leading to rapid, accurate, and more precise pathological diagnosis

Department of Pathology Biomedical and Health Sciences

Professor Yukio Takeshima

By integrating morphology and molecular biology, we aim to develop methods that lead to rapid, accurate, and more detailed pathological diagnosis. In particular, we are focusing on the detection of markers that are useful for accurate pathological diagnosis of mesothelioma. Mesothelioma, closely related to asbestos exposure, is malignant tumor that develop from mesothelial cells lining the chest wall and the surface of the lungs (pleura), the inside of the abdominal cavity (peritoneum).



Provision of a comprehensive healthcare program for individuals with hemophilia

Graduate School of Biomedical and Health Sciences, Department of Pediatrics

Assistant Professor Yoko Mizoguchi

Hiroshima University Hospital is designated as the sole hemophilia treatment center in the Chugoku-Shikoku region. The department provides an annual comprehensive outpatient program for pediatric patients every summer to detect and prevent hemophilic arthropathy at an early stage. Approximately thirty patients with hemophilia from the Chugoku and Shikoku regions participate in this program annually.
Hemophilia is an inherited disorder, and although most patients are male, some female relatives may be carriers (i.e., individuals who carry a genetic mutation but do not exhibit symptoms). Carriers may also experience bleeding symptoms, such as heavy menstruation and postpartum hemorrhage, although this is not widely recognized. If a female carrier is pregnant with a male child, there is a 50% chance that the child may inherit hemophilia. In such cases, precautions should be taken during delivery to prevent intracranial bleeding, including avoiding procedures such as suction delivery, and ensuring the availability of coagulation factor products in case the infant is diagnosed with hemophilia.
In addition to educating hemophilia patients' families and obstetricians about the bleeding symptoms in carriers, as well as the risks and management during childbirth, we are committed to improving the quality of life and health for both patients with hemophilia and their families through early education for carriers, starting in childhood.

Good Health and Well-being

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

Type 1 Diabetes Summer Camp for Children

Graduate School of Biomedical and Health Sciences, Department of Pediatrics
Professor Satoshi Okada

Graduate School of Biomedical and Health Sciences, Department of Pediatric Dentistry
Assistant Professor Meiko Tachikake / Assistant Professor Yuko Iwamoto

We participated in the Diabetes Summer Camp, organized by the Japan Diabetes Association for elementary, junior high, and high school students with type 1 diabetes, in collaboration with Hiroshima's "Momiji no Kai," an association for children with type 1 diabetes and their families.
This camp was held for children with type 1 diabetes, primarily elementary and junior high school students, from both within and outside Hiroshima Prefecture. This year marked the 33rd edition of the camp.
The camp took place over a 5-day schedule at the Hiroshima Prefectural Fukuyama Youth Nature House, with 26 children with type 1 diabetes participating. It was organized primarily by high school and university students with type 1 diabetes, who are alumni of the camp, as well as university student volunteers from medical faculties within the prefecture.Through various recreational activities, the camp provided a valuable opportunity for children to deepen their interactions with peers who have the same condition while learning about diabetes. Medical staff from Hiroshima University, as well as various hospitals and clinics within the prefecture, supported the camp. We assisted with educating the participants on carbohydrate counting, confirming techniques for blood glucose measurement and insulin injections, and teaching appropriate snacks for managing hypoglycemia.
Through the camp, the children shared their daily struggles and challenges, supporting each other, which is expected to positively impact their ability to manage the disease. For us, it was also a valuable opportunity to deepen our understanding of type 1 diabetes.
Hiroshima University Department of Pediatric Dentistry also cooperates with this camp. At the 2024 Diabetes Summer Camp, an oral examination was conducted, including checking for plaque, gums, and periodontal pockets. A dental caries risk test was also conducted. At the end, brushing instructions were given by staining any remaining plaque red, providing an opportunity to learn through practice about oral care to "live well with diabetes," which is the purpose of the camp.
Hiroshima University Department of Pediatric Dentistry also cooperates with this camp. At the 2024 Diabetes Summer Camp, an oral examination was conducted, including checking for plaque, gums, and periodontal pockets. A dental caries risk test was also conducted. At the end, brushing instructions were given by staining any remaining plaque red, providing an opportunity to learn through practice about oral care to "live well with diabetes," which is the purpose of the camp.

Table: Characteristics of Type 1 and Type 2 Diabetes

(Source: Diabetes and Metabolism Information Center, National Center for Global Health and Medicine)

	Type 1 Diabetes	Type 2 Diabetes
Age of onset	Symptoms appear suddenly, often leading to diabetes	More common in middle-aged and older people
Symptoms	It is more common in young people (but it can occur at any age)	Symptoms may not appear, and the disease progresses without being noticed
Physique	There are many skinny types	There are many people who are obese, but there are also people who are thin
Cause	β cells that make insulin in the pancreas are destroyed, so insulin hardly comes out of the pancreas, and blood sugar levels rise	Due to lifestyle and genetic influences, insulin is not adequately produced, or insulin is not effective, resulting in high blood sugar levels
Therapy	Injections of insulin	Diet, exercise, oral medicine, and in some cases, injections such as insulin

The 42nd "Parent and Child Oral Health Class" (2024)

Graduate School of Biomedical and Health Sciences, Department of Pediatric Dentistry
Assistant Professor Tatsuya Akitomo / Assistant Professor Yuko Iwamoto

This is a public awareness event organized by the Department of Pediatric Dentistry every year in June to coincide with Dental Health Week. There was a section that included a dental caries risk test in which saliva was taken with a cotton swab to check the amount of bacteria in the mouth, a section that checked how many times children chew bread when eating it, and a section that introduced the amount of sugar in soft drinks.
Dental trainees, as well as students from the School of Dentistry also participated as part of their education.
This class has been held continuously since 1980, and after a period when it was not possible to hold it due to the spread of COVID-19, the 42nd class will be held in June 2024.

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.

Quality Education

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

Nurturing Children's Smiles Through Education Tailored to Their Individuality

Graduate School of Humanities and Social Sciences

Professor Yoshinori Eto

To test the educational thories obtained from research into Educational Thought of Rudorf Steiner and M.Montessori, 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

Seto Inland Sea Carbon-neutral Research Center

Blue Innovation Division, **Marine Biological Laboratory**

The Marine Biological Laboratory has been recognized as an educational collaborative utilization hub by the Ministry of Education, Culture, Sports, Science and Technology since September 2018. It is now in its second phase of the hub-development project from April 2023. 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.
In the 2023 academic year, we held an online lecture titled "Overcoming the Challenges of Science Education in the Post-Covid 19 Era" to students and faculty of PGRI University Delta Sidorajo, a private university in Indonesia. In addition, we visited Universitas Islam Negeri (UIN) Maulana Malik Ibrahim Malang and UIN Sunan Ampel Surabaya, which have international exchange agreements with Hiroshima University, and gave lectures on the current state of STEAM (Science, Technology, Engineering, Art and Mathematics) education in Japan, in addition to research and education at the Marine Biological Laboratory.
As part of promoting lifelong education opportunities, we have conducted interview classes at the Hiroshima Learning Center of the Open University of Japan. We are also involved in the development of school leaders, including students who want to become teachers and teachers in the field of education. From elementary to secondary education, higher education, and lifelong education, we are internationally providing high-quality education.

An experimental scene of NGS
(Next Generation Sequencer)

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 Tadamichi Nagata

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 Hiroshima 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 School of Education, Hiroshima University. In addition to building a network as a consortium, we are carrying out 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)

Cooperation with events that provide bioresources as educational materials

Amphibian Research Center

Associate Professor Atsushi Suzuki

On May 13, 2024, at the 27th Bazaar of Bioresources as Educational Materials held at Hiroshima Prefectural Education Center, we cooperated with the event by providing teaching staff of elementary, junior high, compulsory education schools and prefectural schools in Hiroshima Prefecture with samples of bioresources as educational materials with information on the utilization, breeding, and cultivation methods of those bioresources. In particular, we provided fixed embryo samples of the African clawed frog, *Xenopus laevis*, which is important for biomedical research.
A brief report on the 27th Bazaar of Bioresources as Educational Materials is posted on the website of the Hiroshima Prefectural Education Center.

Gender Equality

Achievegender equality and empower all women and girls.

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.

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 the first and second semesters. A total of 107 researchers (99 women and 8 men) used the program from FY2018 to FY2023.

CAPWR (Career Advancement Project for Women Researchers)

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 Career Advancement Project (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 researcher in FY2020, one full-time and two part-time researchers in FY2021, one full-time and one part-time researchers in FY2022, and one full-time and one part-time researchers in FY2023.

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, 43 participants at the School of Science in FY2022, 51 participants at the School of Applied Biological Science in FY2023, and 53 participants at the School of Engineering in FY2024. About 10% of the participants have enrolled in Hiroshima University.

How do smartphones connect?
Participants receive an explanation of an experiment in an anechoic chamber in the hands-on science course at the School of Engineering, Hiroshima University in FY2024

Implementing STEM (Science, Technology, Engineering and Mathematics)・STEAM (Science, Technology, Engineering, Art and Mathematics) 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 December 2023 and in April and July 2024, the following programs were conducted, organized by the Girl Scouts of Japan, sponsored by the Micron Foundation, and in collaboration with Hiroshima University and Tokyo Institute of Technology. (❶)

❶ STEM Education Program 'Chip Camp' (December 26 to December 28, 2023)
❷ STEM Education Program 'Chip Camp' (April 2 to April 4, 2023)
❸ STEAM Education Program 'Girls Going Tech' (July 28, 2024)

STEM Education Program 'Chip Camp' (December 26 to 28, 2023, April 2 to 4, 2024)

Organized by the Girl Scouts of Japan, sponsored by the Micron Foundation, and in collaboration with Hiroshima University and Tokyo Institute of Technology, a three-day STEM education program called 'Chip Camp' for junior high school girls was held at the National Olympics Memorial Youth Center in 2023, and at the National Etajima Youth Exchange Center and Micron Memory Japan (Hiroshima) Factory/Hiroshima Development Center in 2024. The program targeted junior high school girls whose career paths were not yet clear.
Forty-seven (2023) and 46 (2024) junior high school students from around Japan participated and learned about STEM-related and STEAM-related programs. They had the opportunity to hear from female leaders and engineers. At these events, Associate Professor Hiroyuki Suzuki led a session titled 'Ideathon Time: Thinking Flexibly about the Way to Reach the Goal,' and Professor Kazuo Kawada led sessions titled '0 and 1 – The World of Computers' and 'Let's Drive a Car, Which Doesn't Collide, with the Raspberry Pi,' respectively. (Students from the School of Education and the School of Dentistry, as well as graduate students from the Graduate School of Humanities and Social Sciences, served as facilitators in these sessions.)



STEAM Education Program 'Girls Going Tech' (July 28, 2024)

Organized by the Girl Scouts of Japan, sponsored by the Micron Foundation, and in collaboration with Hiroshima University, a STEAM education program called 'Girls Going Tech: Let's Explore the World of Computers!' was held at Hiroshima University's Higashi-Senda Campus. The program targeted female elementary school 4th–6th graders.
Twenty-three elementary school students from around Japan participated and had an opportunity to learn about a STEAM-related program. At this event, Professor Kazuo Kawada led sessions titled 'Let's Pretend to Be a Computer! – About Binary Numbers and Their Calculations – ' and 'Making Robots Using Vibration,' respectively. (Students from the School of Education served as facilitators.)

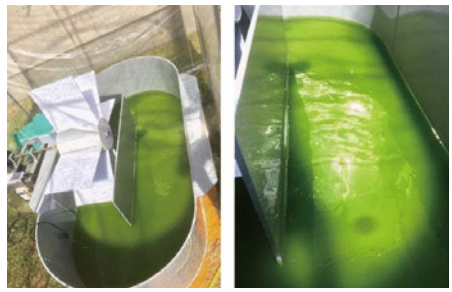

Clean Water and Sanitation

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

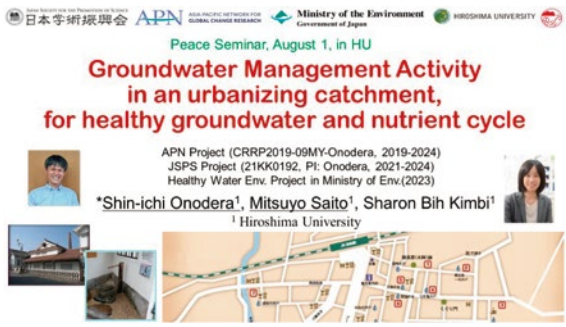
Algal biomass is a source of biofuel that could play a useful role in carbon-neutral societies. At the Green Process Engineering Laboratory, we research on producing algal biomass, by utilizing unused wastewater and nutrients in liquid waste. We have produced algal biomass, by utilizing treated wastewater 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.



Activities to Create a Good Water Circulation and Water Environment, and Verification of Their Effects
(Research Center for Healthy Watershed Environment Project)

Graduate School of Advanced Science and Engineering
Professor Shin-ichi Onodera

Based on 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)" by the Ministry of the Environment, we are promoting conservation activities for healthy groundwater recharge in Saijo, Hiroshima and verifying their effects. We are also considering the construction of a regional virtuous circulation system and contribution to satoumi in a progressive manner.



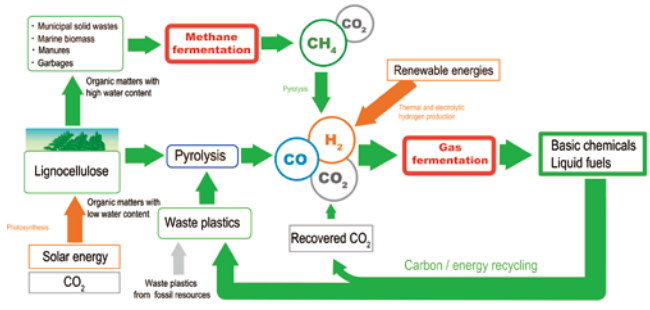
Affordable and Clean Energy

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

Gas fermentation technology contributes to the realization of a carbon/energy recycling society

Graduate School of Integrated Sciences for Life
Professor Yutaka Nakashimada

Modern civilization is based on the supply of fossil fuels. In addition to being used as energy, fossil fuels are also used as synthetic raw materials for various carbon-based products such as plastics, paints, and clothing. In a society where fossil fuels can no longer be used, carbon should be a valuable resource. We are developing methane fermentation technology to recover carbon/energy as methane from high-moisture biomass with the help of microorganisms. Furthermore, we are challenging to develop thermophilic gas fermentation process to produce basic chemicals and liquid fuels from synthetic gas (a mixture of CO and H_2) that can be produced from various organic materials such as methane recovered by methane fermentation, low-moisture biomass such as lignocellulosic biomass, and combustible organic waste such as plastics made from fossil fuels.



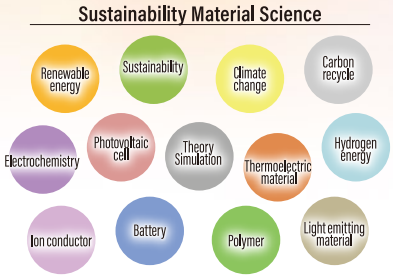
With these technologies, we can recycle all organic materials currently available as carbon resources to produce various products necessary for a sustainable and comfortable life using renewable energy.

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 devise development, all of which are related to sustainability materials.



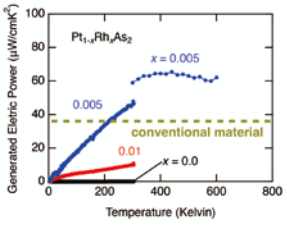
Toward the Use of Electric Energy Without Loss

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 elements by utilizing theoretical methods based on first-principles calculations.



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

Toward Zero Electric Supply Loss: Search for Superconducting Materials at Room Temperature

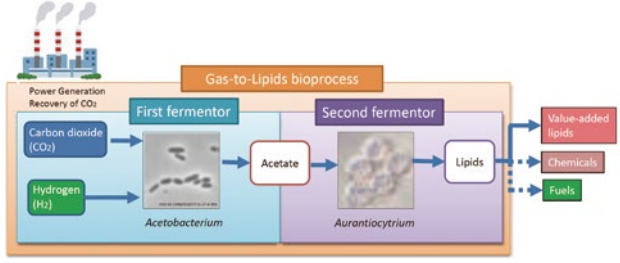
When electricity is sent from a power plant to a home or a factory, the electrical resistance of the power cables causes transmission loss. That volume has reached about 5% of the total power generated, and the power equivalent to that of several nuclear power plants is lost in Japan as a whole. This 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.

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_2 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_2 that has been separated and recovered at the plant as feed, and on the construction of the related manufacturing processes.



Decent Work and Economic Growth

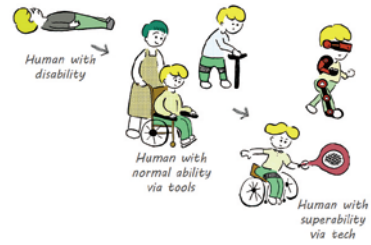
Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.

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 ResearchCenter 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.



New COVID-19-related Research -Work Style Reform with the coronavirus disease commonplace in today's society-

Graduate School of Humanities and Social Sciences: Economics Program

Distinguished Professor KADOYA YOSHIHIKO

Emotional Status and Productivity: Evidence from the Special Economic Zone in Laos

Currently, the improvement in the workplace environment (working environment) for employees in various countries has become a major social issue - such as the "Work Style Reform" in Japan. What kind of improvement in the working environment will be beneficial to the company is not clearly defined, which is said to be a factor that hinders good progress in improving working environment. There is insufficient research on how emotions (happiness, anger, relaxation, sadness) of employees at work relates to labor productivity. As part of research activities at the Kadoya Laboratory, with the cooperation of TDK Corporation, NEC, and KP Beau Lao Co. Ltd., an experiment was carried out at a factory in the Lao People's Democratic Republic.

A unique dataset that tracks both employees' emotional states during working hours within the factory and their quantifiable output on a real-time basis were used in the study. The workers in the study were focused on a specific, unskilled task that could be easily quantified. This was intended to reduce the role of skill level in productivity to adequately compare work output as a function of emotionality. The results revealed that happiness, and no other emotional state, was significantly and positively related to increase in labor productivity.

This study examined the relationship between workers' emotional states and labor productivity by assessing on-the-job emotionality recorded using a specially designed wearable biometric device. Unskilled line workers from KP Beau Lao Co. Ltd. participated in this study. They had to answer a questionnaire, providing information on sex, age, education, work experience, living arrangement, and commute time to work, and wear a wristband biometric sensor that could capture physiological responses. The device, SilmeeTMW20, is produced by the TDK Corporation Tokyo, Japan. The device has built-in sensors to detect acceleration, pulse wave, environmental ultraviolet light, temperature, and sound through which it continuously records physical activity, beat-to-beat pulse intervals, skin temperature, and sleep. Emotional states were measured through a complex process of considering beat-to-beat pulse intervals via custom software developed by NEC Corporation Tokyo, Japan. The software uses a specific algorithm pattern of the subject's heartbeat variability to differentiate among emotional states.

Mental status, daily output, and other issues were recorded for three consecutive working days. The study examined how workers' emotional states (i.e., happiness, anger, relaxation, and sadness) were related to productivity after controlling for various biometric and demographic features. Using random effects panel regression models, we examined how productivity, operationalized as the log of daily output, was related to workers' emotional states, including the amount of time workers reported being happy, angry, relaxed, and sad. The random-effects panel regression results revealed that being happy in the workplace was significantly and positively related to increase in labor productivity.

These results have significant implications for organizational management in terms of designing work schedules and managing human resources. The changes in workers' emotional state during working hours is likely to have an important influence on labor productivity. Thus, management could improve productivity by maximizing workers' positive emotional experiences in the organizational environment. Furthermore, happy workers are not only high performers but also tend to be loyal to the organization. As a result, organizations could reduce the cost of staff turnover as well as ensuring higher productivity by maintaining an environment that makes workers happy. The study has opened up the field of employee emotions in the research on workplace management.

Figure 1. The wristband biometric device that was used in the experiment

Figure 2 Emotional status of a worker on a working day
The green (happy), red (angry), yellow (relaxed), and gray (neutral) colors represent the distribution of workers' in-the-moment emotional states during a day. The blue bar underneath the emotion graph indicates the amount of conversation. The horizontal line shows the time span during a day, and the vertical line shows workers' emotional status and conversation during that time.

A few study limitations should be noted. It was possible that the evidence of a positive relationship between happiness and productivity was influenced by the biased gender distribution of our study. In our sample, 14 out of 15 workers were female, which implied that the evidence of the relationship between happiness and productivity applies mainly to women. Thus, the results of this study should be generalized cautiously. Despite these limitations, the study provided prima facie evidence of how on-the-job emotional states might influence productivity. Future research needs to be directed towards finding a more generalized impact of emotional states on workers' productivity. Since the scope of the current study was limited to the line workers where technical skills were mostly required to conduct the job, it would be interesting to observe whether emotional conditions play different roles in other functional areas where sophisticated knowledge is required. Furthermore, the research could be extended to other sectors where employees work in a stressful environment, such as transportation and healthcare services.

[Glossary] Silmee W20: TDK Corporation's wearable biometric sensor
https://product.tdk.com/info/ja/products/biosensor/biosensor/silmee_w20/index.html
NEC Emotion Analysis Solution – custom software developed by NEC Corporation
https://jpn.nec.com/embedded/products/emotion/index.html

KENKO Investment for Health (Office Work: Financial Industry)

KENKO investment for health* related to office work is important. The Kadoya Laboratory, with the cooperation of Aioi Nissay Dowa Insurance Co., Ltd. (Tokyo, Japan), and using the software developed by NEC Corporation in Tokyo, Japan, carried out a randomized controlled trial of office workers to explore whether real-time feedback on emotional states can effectively steer subsequent health-related behavior such as breaks in the desired direction in the Japanese workplace. We compared the emotions of employees who had been randomly assigned into two groups: a treatment group with access to their objective emotional status via a smartphone and a control group without such access. As a result of the two-week trial, we found that the treatment group were more inclined to feel increase in the psychological load. The result implies that the introduction of a device that is designed to help in taking care of one's well-being including emotional health into the workplace requires a careful explanation at the time of introduction, and that, after its introduction, it is necessary to consider the "getting used to" of the user and take a somewhat long observation period.

* Note:
"KENKO investment for health" – the terminology used by the Ministry of Economy, Trade and Industry (METI) – means thinking about employee health and productivity as a management issue and implementing it as part of strategy, based on the belief that efforts to maintain and promote the health of employees and others are an investment that will have benefits such as increasing profitability in the future.

Affordable and Clean Energy

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

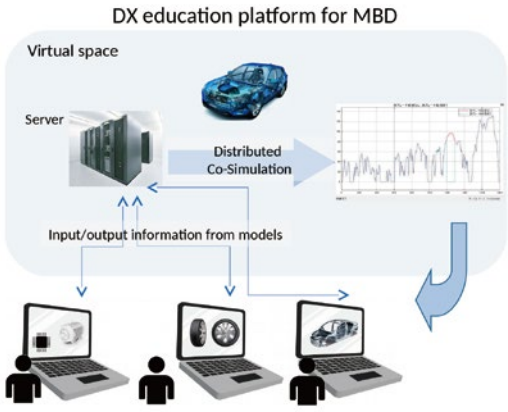
Carbon Fiber Reinforced Plastics (CFRP), known for being lightweight and high-strength, are commonly used in applications such as aircraft and sports equipment. However, the manufacturing process for CFRP is associated with a significant amount of carbon dioxide emissions. Cellulose nanofibers, derived 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.



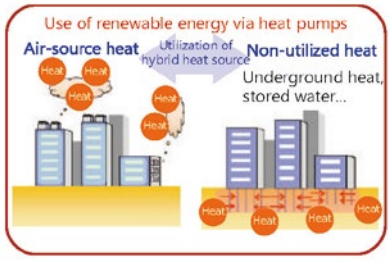
Research on Air Conditioning Systems and Utilization of Unused Energy

Graduate School of Advanced Science and Engineering

Associate Professor Sayaka Kindaichi

To reduce CO_2 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



10 REDUCED INEQUALITIES

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

In Cambodia, the civil war led to massacres of teachers, doctors, and dentists, and the education and medical systems collapsed in the late 1970s. As a result, the supply of dental treatment, education on oral health, and training of dentists remain inadequate.
Hiroshima University School of Dentistry and the NPO "NGO Hiroshima" have been working together to provide dental care support since 2009. 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 14,000 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.
In March 2024, we were able to visit with undergraduate students for the first time in a long time since the COVID-19 pandemic.
We held workshops for teachers, as well as providing oral health education and dental checkups at multiple primary schools. Cambodian dentists and dental students were also welcomed into the program, and together they carried out activities for about a week.

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.


2022 広島大学

11 デジタル社会形成と現代法の展開

会場: 広島大学東千田キャンパス

時間: ①13:30-14:45 ②15:00-16:15

定員: 30名

対象: どなたでも

受講料: 4,000円　申込方法: 郵送・Web

第1回 9/3（土） ①13:30~14:45　デジタル社会形成と憲法

第2回 9/3（土） ②15:00~16:15　デジタル取引と民事法

第3回 9/10（土） ①13:30~14:45　デジタル社会形成と商法


2022 広島大学

第4回 9/10（土） ②15:00~16:15　デジタル社会形成と民事訴訟改革

第5回 9/17（土） ①13:30~14:45　デジタル社会形成と租税法

第6回 9/17（土） ②15:00~16:15　デジタル社会形成とアメリカ法の状況

第7回 9/24（土） ①13:30~14:45　デジタル社会形成と中国法の状況

第8回 9/24（土） ②15:00~16:15　デジタル社会形成と刑事法の課題

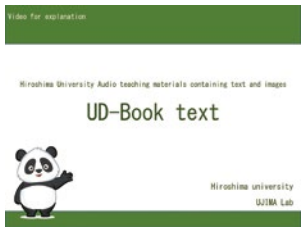
Support for Reading Environments for All Students

Graduate School of Humanities and Social Sciences

Professor Kazuhito Ujima

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

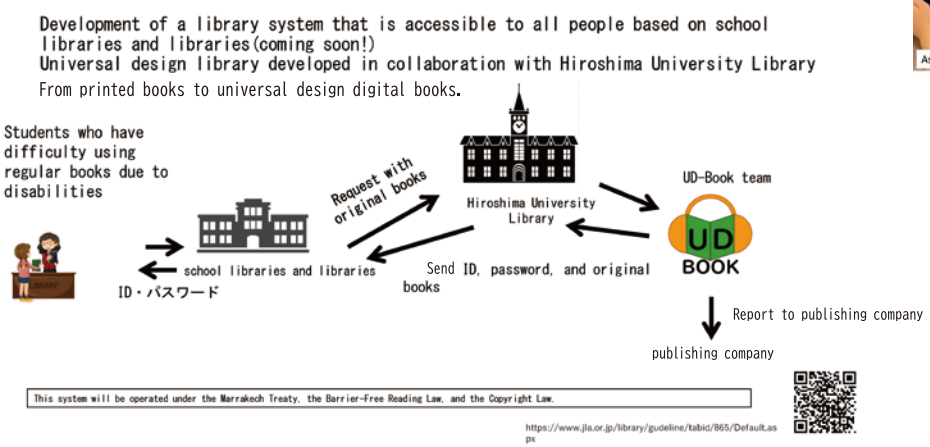
We aim to create a society where individuals facing difficulties in accessing paper-based books can access various textual information. To achieve this goal, we have developed and provided the UD-Book standard, a universal design book. We have already supplied UD-Book textbooks to elementary and middle 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. In response to such requests, we are providing online UD-Book book lending service.



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 text-to-speech 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 2023, we delivered 703 items to 155 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

I 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

Ujima Laboratory, collaborates with schools to advance learning support using Information and Communication Technology (ICT). Since the year 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 assistive 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 core member of this research.

Assistive technology for students with reading difficulties

Assistive technology for students with writing difficulties

Sustainable Cities and Communities

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

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

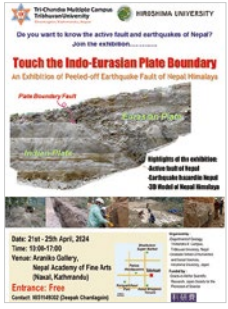
Resilience Research Center

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

From April 21 to 25, 2024, Professor Yasuhiro Kumahara, a researcher in the field of human and social resilience research, information dissemination, information management, and disaster archive at the Resilience Research Center, held a five-day exhibition titled "Touch the Indo-Eurasian Plate Boundary: An Exhibition of Peeled-off Earthquake Fault of Nepal Himalaya." The exhibition was held at the exhibition hall of the Nepal Academy of Fine Arts in the center of Kathmandu, Nepal in collaboration with the Department of Geology, Trichandra Campus, Tribhuvan University. Exhibited at this exhibition were: actual sample of seismic faults stripped of the plate boundary, posters with a width of 6 meters × a height of 3 meters of earthquake faults, 3D models of the Nepalese Himalayas, explanatory panels on earthquakes and faults, etc. The exhibition aimed at raising awareness of future large earthquakes and fostering understanding of the relationship between active faults and the formation of the Himalayan Mountains based on scientific knowledge.
The exhibition was visited by more than 800 visitors over the course of five days. In the questionnaire, many people commented that they could deepen their understanding of active faults and massive earthquakes. The exhibition materials created this time have been created so that they can be used repeatedly, and we are thinking of exhibiting them on other occasions in the future. This exhibition benefited from Grants-in-Aid for Scientific Research (18KK0027).

Explaining a 3D model of the Nepalese Himalayas

Explaining stripped earthquake fault sample



Poster for the exhibition

Posters of fault outcrops and members preparing for exhibition

FY2024 "Resilience Research Center Meeting with Collaborating Local Governments"

On June 3, 2024, the Hiroshima University Resilience Research Center held the "FY2024 Resilience Research Center Meeting with Collaborating Local Governments" at Hiroshima University, with the participation of representatives from the crisis management department of Hiroshima Prefecture, 19 municipalities in the prefecture, and Iwakuni City, Yamaguchi Prefecture.
From the local governments' side, 21 people attended the meeting in person, and 15 municipalities and 5 fire departments attended online. In addition, eight people from Hiroshima University, including President Mitsuo Ochi and Director of the Resilience Research Center Masahiro Kaibori, attended the meeting.
First, Director Masahiro Kaibori reported recent work of the Hiroshima University Resilience Research Center, such as "releasing archives created in cooperation with local governments, raising awareness of disaster prevention knowledge in cooperation with the media, human resource development for Hiroshima Prefecture municipal officials, participation in "Bosai Kokutai", and finally the status of research for the prevention and mitigation of landslides (Joint research with Higashihiroshima City: Elucidation of the relationship between heavy rainfall and changes in groundwater level and water pressure for prediction of the occurrence of debris flows, etc., and spatial grasp of the relationship)".
Next, Professor Hideaki Goto of the Graduate School of Humanities and Social Sciences gave a report on "The terrestrial upheaval that took place during the 2024 Noto Peninsula Earthquake and Active Faults in Hiroshima Prefecture" as an introduction to Hiroshima University's research, stating that "we continue to discover active faults that have not been evaluated by deciphering three-dimensional topography in 3D in an analog and artisanal manner, and by expressing and analyzing digital big data for interpretable materials from a bird's-eye view."
Next, Mr. Masahiko Tachikawa, Counsellor at the Crisis Management Division, Hiroshima Prefectural Government, and Mr. Katsutoshi Honda, Assistant Director, Disaster Prevention Division, Hiroshima City Crisis Management Office, reported on Hiroshima Prefecture's and Hiroshima City's disaster prevention measures, respectively.
Lastly, Mr. Takayuki Tokuhiro, Director of the Hiroshima Local Meteorological Office, reported on Japan Meteorological Agency's efforts to improve the accuracy of forecasts of linear precipitation zone (improvement in accuracy of information).
During the meeting, opinions were expressed on the need to develop disaster prevention human resources in order to deepen understanding of disasters not only among public administrators but also among residents. Overall, it was a fruitful meeting with collaborating local governments, which was helpful for deepening understanding of disaster prevention and mitigation in the season when disasters are more likely to occur.

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.

Multiculturalism And Disaster Resilience –Communication Workshop with LEGO–

Graduate School of Biomedical and Health Sciences

Associate Professor Mayumi Kako

The number of foreign residents in Japan is increasing year by year. Hiroshima Prefecture is no exception, with the number of foreign residents exceeding 50,000 in FY2021. Hiroshima is a major tourist destination, with many visitors from abroad, and many local cities and towns have a large number of foreign workers. Therefore, we created an opportunity to understand the diversity of people with different cultural backgrounds and to respect each other by using LEGO bricks to think of an ideal evacuation center for everyone. About 40 people, including families and non-Japanese, participated in the workshop. (The workshop was held in collaboration with the Hiroshima University Resilience Research Center's Open Discussion 2023).

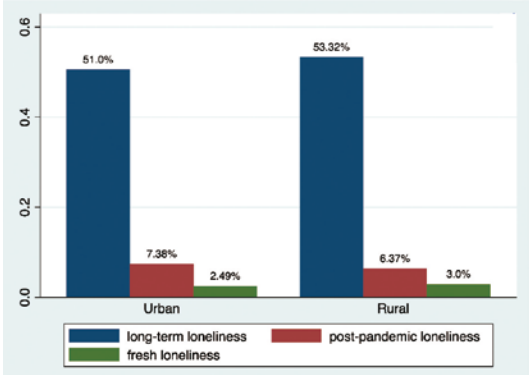
Loneliness during the COVID-19 Pandemic: A Comparison of Urban and Rural Areas

Graduate School of Humanities and Social Sciences: Economics Program

Distinguished Professor KADOYA YOSHIHIKO

Kadoya Laboratory has explored how loneliness varies between rural and urban areas during the COVID-19 pandemic. We analyzed a longitudinal dataset from Hiroshima University's Household Behavior and Finance Survey, which collected demographic, socioeconomic, and psychological characteristics of Japanese adults in 2020, 2021, and 2022, thus reflecting the COVID-19 pandemic timeline. The results show that approximately 50% of those surveyed experienced long-term loneliness, while about 6.5% developed loneliness during the pandemic. Although our weighted logit regression models showed few differences in loneliness during the pandemic between urban and rural areas, socioeconomic changes, such as beginning to live alone, leaving full-time employment, and decreased financial satisfaction, were identified as high-risk factors for loneliness, and their impact varied between rural and urban areas. This knowledge can aid governments and healthcare providers in identifying those most at risk of loneliness within urban–rural regional boundaries.

Figure 1. Different loneliness conditions by region.



Responsible Consumption and Production

Ensure sustainable consumption and production patterns.

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 of plastic on the coast and engaging local high school students in visualizing plastic research challenges.

Balloon experiment

Spectral reflectance measurement of plastic waste

Validation of effects of livestock grazing in oil palm plantation toward sustainable plantation management

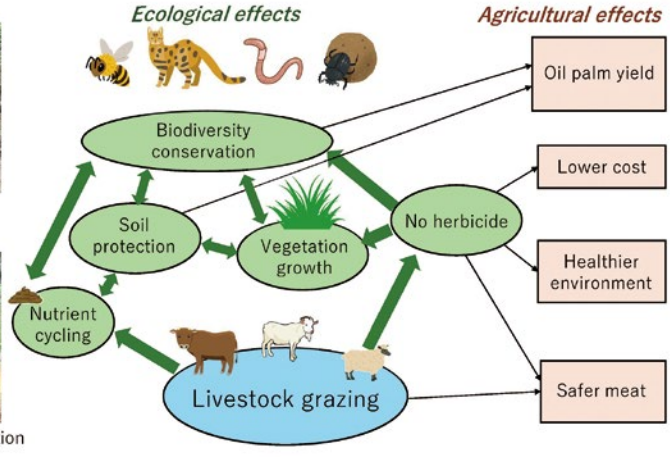
Graduate School of Advanced Science and Engineering

Professor Tetsuro Hosaka

Palm oil is currently the most widely produced edible oil in the world, with more than 80% of its production taking place in Malaysia and Indonesia. However, most of the plantations producing the oil palm (*Elaeis guineensis*) are large monoculture farms established on cleared land, where large quantities of herbicides and chemical fertilizers are used. This has led to severe issues such as the loss of biodiversity and soil degradation, making the development of sustainable plantation management practices an urgent challenge. To address this, we propose a method of herbicide-free weed control through livestock grazing in oil palm plantations. This approach could help maintain undergrowth and soil conditions in the plantations, potentially allowing for the conservation of biodiversity while also ensuring high palm oil yields. The project aims to demonstrate this possibility by conducting a large-scale comparative experiment in Malaysia, where areas with livestock grazing will be compared to areas using herbicides. This study will help identify the effectiveness of livestock grazing, optimal stocking density, and the best combinations of livestock. This is a collaborative project between Hiroshima University and Universiti Putra Malaysia.

Plantation after herbicide spraying

Livestock grazing in plantation



Toward more sustainable oil palm management!

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 Taketo 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 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 FY 2023

In fiscal 2023, we welcomed a total of 221 people on board for nine social contribution cruises. The cruises were designed for 1) high school students from Yasuda Girls' Senior High School, Hiroshima University Senior High School, Hiroshima Kokutaiji High School, 2) elementary, junior high, and high school students from National Etajima Youth Friendship Center and Iwakuni City Micro-life Museum, and adults, and 3) elementary school students at Kidani Elementary School in Higashihiroshima City. We provided a nautical learning program to learn about the current status of Seto Inland Sea and to experience a scientific approach to the aquatic environment, and we continued our hands-on learning project for "protect the richness of the sea". These cruises were led by 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 led by Captain Kazumitsu Nakaguchi provide guidance for these cruises.

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 phytoplankton, which serves as nutrition and feed for oysters, we observed a 50% or more increase in the weight of edible part of oysters after a few months. Oyster farming, a typical non-feeding fish culture method , 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 Giant Clams

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

Professor Kazuhiko Koike

“Coral bleaching,” where corals lose symbiotic algae (dinoflagellates) in their bodies, is a global issue. In this study, we utilize giant clams possessing similar symbiotic algae, other than corals, and propose using undigested symbiotic algae released as feces as a symbiotic source for corals. In collaboration with Miyakojima City, Okinawa, and the Diver’s Association (Yabiji Coral Conservation Society), we conduct offshore mixed cultivation of corals and giant clams. Efficient supply of symbiotic algae from giant clams is expected to revive coral reefs.

International CO2 Natural Analogues Network (ICONA)

Seto Inland Sea Carbon-neutral Research Center

Professor Shigeki Wada

International CO2 Natural Analogues Network (ICONA) is an international network that connects researchers who are projecting the future of marine ecosystems under the progress of climate change by utilizing areas with locally high CO2 environments. It is a project that contributes to the prediction of the future of the ocean and the formulation of adaptation measures to climate change. It is certified as a Decade Action of the United Nations Decade of Ocean Science for Sustainable Development (UN Ocean Decade).
The network aims to build resources to understand the ecosystem-level effects of ocean acidification using natural high-CO2 ecosystems and is supported by the Japan Society for the Promotion of Science (JSPS) as core-to-core funding (Advanced Research Network) for 2021-2026.
In this project, we are mainly conducting research in volcanic CO2 seeps, and we are predicting the future of ecosystems that will change in the future (due to the influence of CO2 emitted by humans) in an environment with high CO2.
This network was launched in April 2021, and the partner institutions in Japan are as follows.

- University of Tsukuba
- National Institute of Advanced Industrial Science and Technology (AIST)
- Kochi University
- Nara Women's University
- Okinawa Institute of Science and Technology Graduate University
- University of the Ryukyus
- Hiroshima University

Surveying in volcanic CO2 seeps

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

After observing a forest for half a century, we have characterized the population dynamics of a canopy tree *Castanopsis cuspidata* (Thunb.)

Graduate School of Integrated Sciences for Life

Professor Toshihiro Yamada

[Key points of the study results]

- By observing the forest for half a century, we have characterized the population dynamics of a canopy tree *Castanopsis cuspidata* (Thunb.)*.
- We have found that the growth trajectories of *C. cuspidata* is at the mercy of a highly serendipitous event such as a typhoon. For *C. cuspidata*, typhoons signify the risk of falling down by windstorms, an opportunity for growth, and an opportunity to renew the next generation.
- The arrival of the typhoon may have been a coincidence, but the size of the tree before the typhoon was important in determining whether *C. cuspidata* could take advantage of the opportunity.

**Castanopsis cuspidate* (Kojii or Tsuburajii in Japanese) is a species of *Castanopsis* native to southern Japan and southern Korea. It bears the fruit of an acorn (Photo 1). *Castanopsis cuspidata* is a medium-sized evergreen tree growing to over 1 meter in diameter at breast height (Photo 2).

Photo 1 *Castanopsis cuspidata* hard fruit and shell (from Hiroshima Prefecture) "From the Hiroshima University Digital Museum"

Summary

From the human perspective, it appears that time in the forest goes by slowly. Even if you visit the same forest two days in a row, you probably will not notice the difference between yesterday's forest and today's forest. But what if you observe the same forest for much longer? Today's forest must be very different from what it was one year ago, 10 years ago, or 50 years ago. It is only when you observe the forest for a long time that you can notice the changes that take place in the forest.

Our research team has been observing a forest for half a century. And we have made it clear that typhoons – highly serendipitous events – are important to *C. cuspidata*. Typhoons signify the risk of falling down and death by windstorms, an opportunity for growth, and an opportunity to renew the next generation. The results of this study have revealed the growth trajectories of *C. cuspidata*, which was hit by a typhoon. This achievement was made possible by patient observation of the forest for about half a century – 25 years before the typhoon and 24 years after the typhoon.

The results of this research were published online in "Ecosphere" on May 9, 2024. (Details are posted on the official website of Hiroshima University: (https://www.hiroshima-u.ac.jp/news/83563)

Background

Traditionally, in biology, observation has been emphasized. However, it takes 50 years to observe the behavior of a forest for 50 years. We patiently continued direct observations for about 50 years and succeeded in clarifying the way of life of long-lived trees. There are very few studies in the world that have observed forests for such a long period of time, other than this study. This study was performed in a warm-temperate evergreen forest in Minamata, Kyushu, Japan. In this study, we observed a forest in Minamata City, Kumamoto Prefecture for 49 years from 1966 to 2015, and examined the growth and survival of 194 *C. cuspidata* trees, the most dominant species in this forest, for 49 years.

Because of strong winds caused by Typhoon No. 19 in 1991 #1, many trees in the forest were uprooted or snapped, which resulted in high mortality. #2 On the other hand, the trees that survived the typhoon were able to take away the space occupied by the trees that were uprooted by the typhoon; they showed rapid growth after the typhoon. In addition, after the typhoon, many trees sprouted. This is something that was not observed before the typhoon. In other words, the typhoon was an opportunity for growth and an opportunity for the next generation to be renewed.

Photo 2 *Castanopsis cuspidata* growing in the survey site *Castanopsis cuspidata* is a member of the acorn-growing tree. The Shii (*the Castanopsis tree*), which grows large and grows on the ruins of a temple in Kyoto Prefecture, has a trunk diameter of 255 cm. It is commonly found in the evergreen forests of southwestern Japan.

Details of research results

The arrival of the typhoon may have been a coincidence, but the size of the tree before the typhoon was important in determining whether trees could take advantage of the opportunity. Only trees that had already reached or almost reached the forest canopy (the leaf group layer at the top of the forest) before the typhoon were able to achieve rapid growth after the typhoon. If we consider a large canopy tree (a tree that forms forest canopies) to be the top runner in growth, it can be understood that only trees that were able to form the top growth group before the typhoon had chance of reaching the canopy after the typhoon.

With global warming, Japan was projected to experience more numbers of more intense typhoons in future. Our research suggests that global warming will have a significant impact on *C. cuspidata* (Kojii) and, by extension, forest ecosystem. This means that our research results are also important for considering adaptation to climate change associated with typhoons.

Photo 3 *Castanopsis cuspidata* were uprooted by the 1991 typhoon. Courtesy of Hisayuki Maenaka (Green Earth Network).

#1 No other typhoons have caused such serious damage to the forest during our observation period.

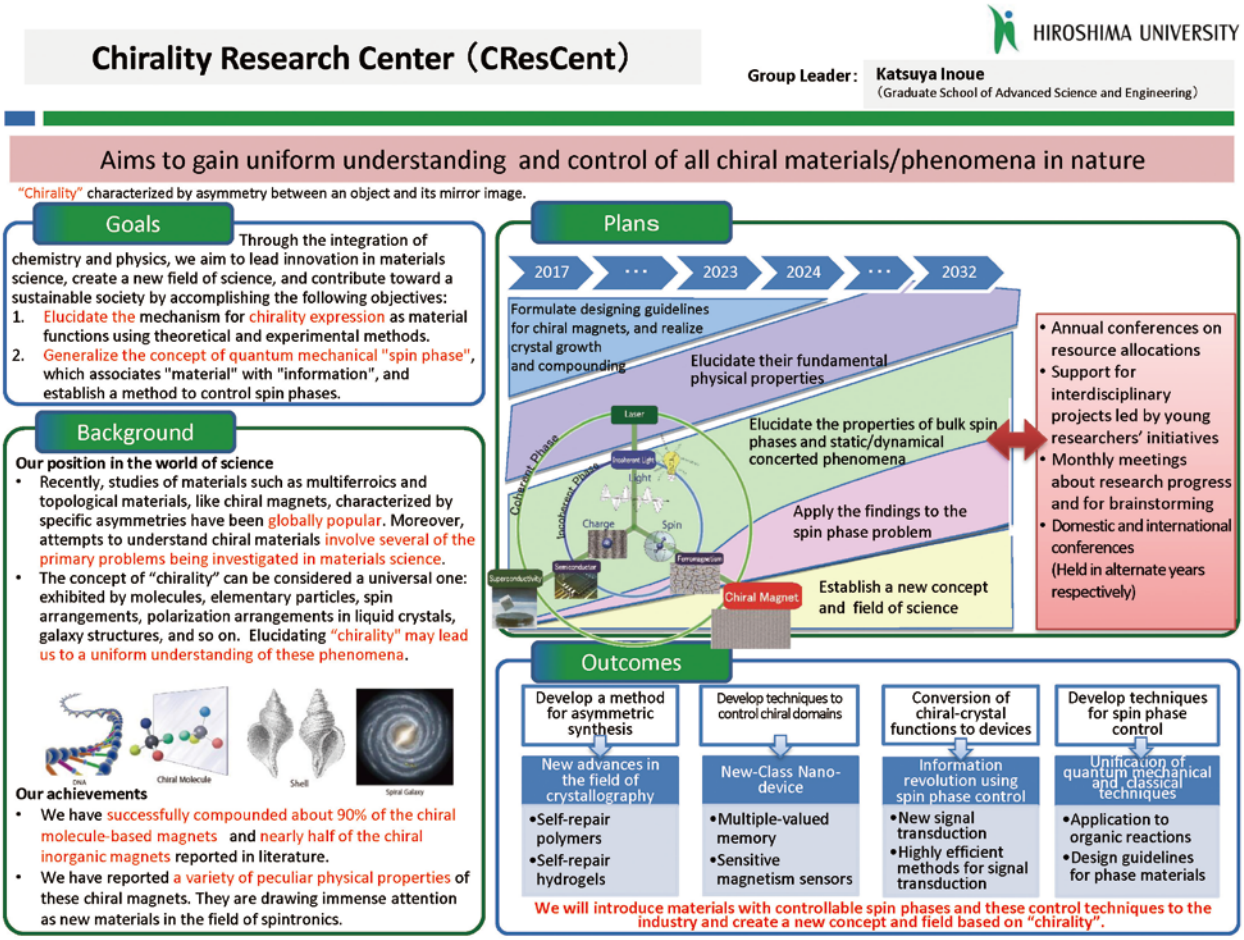
#2 A large number of falling down and death by windstorms were observed, but no sediment debris was generated.

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.



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

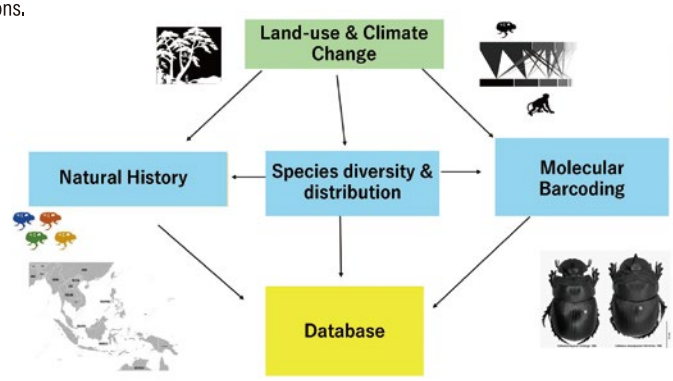
Development of dung beetle database as a tool for supporting biodiversity monitoring by non-experts in Southeast Asia

Graduate School of Advanced Science and Engineering

Professor Tetsuro Hosaka

The reduction and degradation of tropical forests, along with the loss of biodiversity, are major environmental and social issues in tropical regions. Furthermore, recent studies have reported a global decline in insect populations and the subsequent impacts on ecosystem functions. However, understanding where and how insects are declining and how these declines are affecting ecosystems depends on accurate identification and distribution information of insects. Unfortunately, such information is not yet available for many insect groups in Southeast Asia.
Dung beetles, which feed on the feces of mammals and other animals, are an important group in this context. They are relatively easy to collect and are sensitive to changes in forest environments. Their diversity reflects the diversity of other animal groups, such as large mammals, making them well-known as excellent environmental indicator species for tropical forests. In addition, dung beetles play vital ecological roles, such as nutrient cycling by rapidly burying large quantities of feces in the soil, secondary seed dispersal of seeds mixed in the feces, and the mitigation of greenhouse gas emissions.

Despite their importance, there is currently no comprehensive guide or database for dung beetles, and species identification still heavily relies on a small number of taxonomic experts. Therefore, it is necessary to organize and cross-check existing data, such as literature, museum specimens, and undocumented expert knowledge, and translate this knowledge into a user-friendly format for local non-specialists. If achieved, this would become a powerful tool for enabling independent and sustainable biodiversity monitoring in tropical regions.
This project aims to create a dung beetle database for Southeast Asia, which will be accessible and usable by non-experts. The database will be built based on numerous specimens collected by researchers from Singapore and Japan, who lead dung beetle research in Southeast Asia. Furthermore, the project will investigate factors influencing dung beetle diversity at large scales, including land-use changes and climate change. The project is a collaborative effort between Hiroshima University and Nanyang Technological University, Singapore.




First workshop with Nanyang Technology University at Kyoto (30-31 August, 2024)

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

Our country depends on imports for much of our livestock feed. It also means that we are also importing nutrients for our crops. Composting the discharged livestock manure and making effective use of the nutrients it contains can result in reduced use of chemical fertilizers, and contribute to promoting sustainable food production and curbing global warming. In addition, due to the recent depreciation of the yen and the international situation, there are concerns about securing chemical fertilizers, which depend on imports for most of the raw materials, and soaring fertilizer prices, and the need to make effective use of compost is rapidly increasing.

In joint research with JA ZEN-NOH Hiroshima, we are verifying the effectiveness of applying chicken manure compost in paddy rice cultivation, where mainly chemical fertilizers have been used and compost has not been used much in the past, in order to make effective use of unused useful resources in the region. We are investigating the effects of chicken manure application amount, fertilization timing, cultivation management, etc. on the growth and yield of paddy rice, with the aim of promoting sustainable rice production.

Educational Activities at the Amphibian Research Center

Amphibian Research Center

Assistant Professor Ichiro Tazawa

Educational activities that lead to the protection of the environment centered on the satoyama where giant salamanders live were carried out in collaboration with Associate Professor Norio Shimizu of Hiroshima University Museum, who is famous in Hiroshima Prefecture for his activities related to conservation of giant salamanders. Specifically, lectures were held at the same time as he Educational Network in Chugoku Area's High School-University Collaborative Open Lecture and the Hiroshima University Open Lecture, providing lectures and discussions to a wide range of age groups. The lectures' unique feature is a part that explains what kind of creature the giant salamander is from biological perspective.

Unveiling diversity of insect seed predators in tropical rainforests

Graduate School of Advanced Science and Engineering

Professor Tetsuro Hosaka

Conservation of biodiversity is one of the most urgent global challenges, but we still do not know how many species of organisms exist on Earth. In particular, the majority of insects inhabiting tropical rainforests remain undiscovered, and their species count is thought to have a significant impact on the estimated total number of species on Earth. Among these, seed-feeding insects that parasitize plant seeds are a particularly poorly studied group due to their high host specificity (i.e., different insect species depend on different plant species). Southeast Asian lowland tropical rainforests, in particular, are known for having many tree species that flower only once every few years, making information on seed-feeding insects in these forests extremely scarce. The aim of this project is to conduct a comprehensive survey and study of seed-feeding insects on tree species growing in the lowland tropical rainforests of Malaysia. This project is a collaborative research between Hiroshima University and the Forest Research Institute Malaysia (FRIM).

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 withthe participation of 34 trainees from 9 African countries.

Establishment of "Hiroshima Platform for Peace Studies and Education" for a Nuclear Weapons-Free World

Financial and General Affairs Office, Department of General Affairs and Public Relations, General Affairs G

On January 15, 2024, the City of Hiroshima, Hiroshima University, Hiroshima City University, and the Hiroshima Peace Culture Foundation established "Hiroshima Platform for Peace Studies and Education" as a general incorporated association.The platform promotes cooperation in peace-related research and education among universities and between universities and local governments or peace-related organizations, and was accredited by the Minister of Education, Culture, Sports, Science and Technology on March 28, 2024. It aims for a nuclear-free world and is working on research and other projects on peace with the purpose to cultivate a shared vision for a nuclear-free world and to drive substantial progress toward global peace.

Partnerships for the Goals

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

Global Partnership in the Field of International Educational Cooperation

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

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 main focus of this journal is on educational policies and institutions, and educational development practices in the Global South, as well as theoretical and methodological considerations and empirical research on them. With the aim of having contributions from diverse research presenters and paper contributors and providing researchers and educational development practitioners in developing countries as well as young researchers in and outside of Japan with a platform where they can have their papers published, CICE carries out regularly-held writers' workshops and other activities in writing support.

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 and the Global South.

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 one-to-two months of training for educational administrators and university researchers from developing countries.

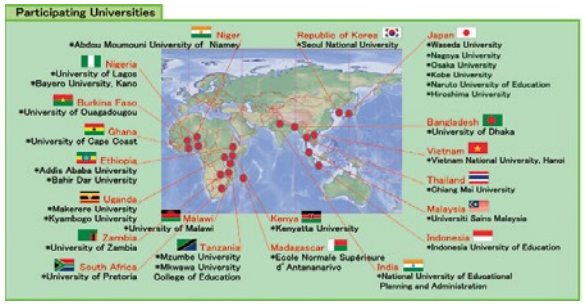
The training aims at building up their capacity to prepare, implement, monitor, and evaluate a project with a view to making improvements in formulating educational development plans and education policies, promoting access to education and improving the quality of education.

From 2018 to 2023, 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 2024, it is expected that supplementary training will be carried out in Cambodia based on the results of the training to deepen mutual learning.

"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. 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, 28 universities including South Africa, Kenya, Vietnam, Malaysia, and Indonesia participate in the AA Dialogue Network. It has 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 Malysia and Indonesia and to interact with those students.



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.

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

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

Executive Vice President/Specially Appointed Professor Junko Tanaka

Hepatitis Virus control is one of the SDGs (3.3) and is a crucial global issue. The World Health Organization(WHO) has set a goal to achieve elimination of Viral Hepatitis 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 achieving the 2030 viral hepatitis elimination goal adopted by 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 viral hepatitis.

In 2017, a nationwide survey on the hepatitis virus infection status was conducted in Cambodia, covering the entire country (in collaboration with 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.

Project Research Center for Epidemiology and Prevention of viral hepatitis and hepatocellular carcinoma will continue 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, and 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.

Blood collection at the cooperating medical institutions in Cambodia

At the cooperating medical institutions in Cambodia

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

Healthcare, SDGs, and Social Business
An International Conference

Graduate School of Biomedical and Health Sciences, Hiroshima University

Associate Professor Md Moshiur Rahman

From August 28-30, 2024, Hiroshima University and Kyushu University of Japan jointly organized the 6th International Conference on Healthcare, SDGs, and Social Business. It serves as a platform to share and discuss advanced healthcare technologies, deployment case studies, and policy recommendations. We aim to explore how these technologies can be effectively utilized to achieve Universal Health Coverage (UHC) and advance the Sustainable Development Goals (SDGs) through innovative approaches and collaborations. The conference theme was Transforming Healthcare: Bridging Gaps, Empowering Communities, which reflected a shared commitment to reimagining the future of healthcare and making it more inclusive, equitable, and sustainable.

The session "Future Directions in Public Health: Collaborations between Developed and Developing Countries," explored creative approaches and partnerships across borders to address critical public health challenges. Discussion is conducted on diverse topics such as leveraging artificial intelligence to detect sepsis in children with challenges and opportunities, understanding the impact of early-life environmental exposures with empirical evidence and implications, showcasing community-based healthcare models those initiatives empower communities and contribute to universal health coverage, promoting multisectoral communication to create a resilient public health care system using a scorecard approach, and challenges in collaboration through a one health approach with emphasizing partnership across human, animal, and environmental health sectors. This discussion underscores the importance of global cooperation and aims to foster understanding and generate actionable strategies for shaping the future of public health.

Digital health technologies, robust health information systems, and innovative social business models hold enormous potential to transform healthcare delivery. These innovations, when harnessed effectively, can revolutionize the way we approach healthcare. However, it's important to remember that technology alone is not enough. We must ensure that these innovations are accessible, affordable, and acceptable to the communities they are intended to serve. This requires collaboration across sectors—between governments, healthcare providers, technology companies, academia, and civil society. Together, we can create a healthcare ecosystem that is not only technologically advanced but also socially responsible and equitable. In an interconnected world, the future of public health relies on effective collaboration between developing and developed countries. Let us use this platform to innovate, inspire, and encourage change in our healthcare systems, ensuring that no one is left behind.

Support for the Introduction of Stereotactic Body Radiation Therapy (SBRT) at the National Cancer Center of Mongolia

Department of Radiation Oncology, Graduate School of Biomedical Sciences

Assistant Professor Nobuki Imano

Japan has led the world in the research, development, and clinical introduction of stereotactic body radiation therapy (SBRT) techniques for lung and liver cancer. This technique involves delivering concentrated radiation to tumors from multiple directions in three dimensions. Compared to conventional irradiation methods, SBRT minimizes the radiation dose to surrounding normal organs while enabling a high-dose pinpoint delivery to the tumor over a short period. This results in favorable treatment outcome and fewer side effects. To introduce this technology into Mongolia, a team from the Department of Radiation Oncology at Hiroshima University Hospital visited the Mongolian National Cancer Center to provide support. From June 17 to June 21, 2024, the team, consisting of two doctors, a medical physicist, and a technician, visited Mongolia, where they held lectures on SBRT, provided practical guidance in clinical settings, and collaborated with local staff to successfully initiate the first cases of liver and lung SBRT treatment in Mongolia.

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

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 National Institute of 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 patients who had never measured their own blood pressure, the nurses educated them to take medications, self-manage diet and daily life activities. As a result, the number of patients who died from recurrent stroke was reduced compared to those who did not receive the 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 hospitals.

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 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, unnecessary C/S decreased, and ANC visit increased


One of the field hospital


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 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 introduces the placement of skilled and qualified nurses in the school setting in the future.

—— Project in collaboration with Grameen Caledonian College of Nursing ——


Health education by school nurses


Health checkup 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

Tele-Nursing Project for Diabetes Management in Collaboration with Primary Care Centers

Diabetes is a risk factor for a variety of serious diseases and can lead to severe complications if not properly managed. Due to the lack of healthcare resources in low- and middle-income countries, diagnosis, treatment, and patient education for chronic diseases are very limited, and people are dying from stroke and other diseases that go undiagnosed and untreated. Therefore, we launched a joint project with Grameen Caledonian College of Nursing to initiate nurse-led disease management using tele-nursing technology for patients diagnosed with diabetes at Grameen Primary Care Center. We aim to establish the tele-technology and expand the project to primary care centers nationwide.

Health Projects in Indonesia

Graduate School of Biomedical and Health Sciences

Professor Michiko Moriyama

Development of the Education Program for Health Cadres at Primary Care Level to Reduce Maternal Mortality in Indonesia

The rate of maternal mortality in Indonesia remains high compared to other Southeast Asian countries. In Banjarnegara Regency, the ratio of pregnant women to midwives falls far behind than the target set by the Indonesian Ministry of Health for 2025. Therefore, the health cadres competency need to be improved to assist midwives for the management of maternal health within the health system. To accomplish health cadre's role efficiently, we developed the scenario-based education program to improve their clinical competency and tested the effectiveness at primary care centers. The program successfully improved their overall competencies including health assessment & communication skills. This education program could be officially applied and implemented in the regencies of Indonesia.

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

Accepting young dentists from overseas for training

Graduate School of Biomedical and Health Sciences, Department of Pediatric Dentistry
Assistant Professor Yuko Iwamoto

We are continuously accepting young dentists, mainly specializing in pediatric dentistry, from dental schools in countries such as Southeast Asia. First, we guide them on tours of dental clinics at university hospitals and laboratories. In addition, we implement programs that are useful for social welfare in each country, such as participating in awareness events hosted by Department of Pediatric Dentistry and introducing examples of initiatives in the field of social welfare administration. We also continue to cooperate and exchange academically through research on oral bacteria.
In 2023, we accepted two people from India, including a director of The International Association of Paediatric Dentistry, and four doctors from Brazil.

Promotion of International Cooperation in Education with the Administration in the Republic of Maldives : Minister training

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

SDGs-Related Activities by Students and Graduates

Students' Activities

Activities of the Positive Peace Society

The first student club in Japan based on the principles of positive peace

Positive Peace Society (PPS) Launch

On Thursday, September 21st, 2023, the Positive Peace Society (PPS) was officially launched at Hiroshima University, coinciding with the International Day of Peace. This significant event marked a landmark moment for Hiroshima University, beginning a new era in peace and sustainability efforts on campus by students. The Positive Peace Society is the first student club in Japan based on the principles of positive peace.

During the inauguration, Vrajesh Rawal – a master's student at the Graduate School of Humanities and Social Sciences and the founder of the Positive Peace Society at Hiroshima University, delivered a speech highlighting the mission and vision of the Positive Peace Society. He emphasized the importance of creating a platform for dialogue, learning, and collaboration aimed at fostering a peaceful and sustainable future for all. The Positive Peace Society looks forward to hosting more events that inspire, educate, and contribute to a safer, harmonious, and respectful community at Hiroshima University. Stay tuned for upcoming events and initiatives from the Positive Peace Society as we continue to work towards a peaceful and sustainable future.

Positive Peace Society (PPS) Movie Screening

On Friday, December 1st, 2023, the Positive Peace Society (PPS) hosted a movie screening at the multipurpose room of MIRAI CREA, Higashi-Hiroshima campus. This event was attended by over 60 participants, including international students, faculty members, and local community members, making it a diverse gathering of individuals united by a common interest in global peace and understanding.

The featured movie was "Farha," a powerful drama from 2021 that tells the poignant story of a Palestinian girl's struggle and determination to pursue education amidst the turmoil of her homeland. This film provided a deeply moving portrayal of the human spirit's resilience in the face of adversity, and it resonated strongly with the audience.

The film not only shed light on the Palestinian experience but also served as a catalyst for broader discussions on the ongoing conflict between Israel and Palestine. Following the movie, a discussion session was held where participants engaged in a thoughtful dialogue about the ongoing war between Israel and Palestine. The discussion emphasized the need for mutual respect and understanding as fundamental components of resolving long-standing conflicts.

The event also highlighted how the concept of positive peace can be applied in various contexts, including political dissent within Japanese universities. Participants were very engaged throughout the session, asking insightful questions and sharing their perspectives on how education and cultural exchange can contribute to peacebuilding efforts. The dialogue reinforced the idea that fostering a peaceful and inclusive community requires active participation and willingness to understand diverse viewpoints.

The Positive Peace Society is committed to organizing such enriching events that provide valuable learning experiences and that inspire and educate.

Graduates' Activities

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.

Comments from the Stakeholders

Peace Promotion Project Team, Hiroshima Prefecture

Director of Peace Promotion Project Team, Hiroshima Prefecture
Mariko Nishizawa

Hiroshima Prefecture and the Hiroshima Organization for Global Peace (HOPe) are working to incorporate nuclear disarmament into the next set of United Nations development goals, which are expected to be formulated by 2030, from the perspective of a "sustainable future for the earth and humanity."
The issue of "nuclear weapons" - a global challenge directly linked to climate change, global health, human rights, gender, and food security, is not something that can be solved by any single country alone. It is a common issue for humanity that requires the wisdom and resources of all nations to tackle now, before it is too late.
In the New Agenda for Peace issued by the United Nations in July 2023, the UN Secretary-General committed to linking action for peace with Sustainable Development Goals (SDGs), based on the understanding that these global challenges are interrelated.
Subsequently, at the UN "Summit of the Future" held in New York in September 2024, it was recognized that "transforming global governance and reinvigorating the multilateral system is needed to reflect today's situation and address future challenges," and the importance of advancing a world without nuclear weapons was explicitly stated (Action 25) in the outcome document, the "Pact for the Future."
Against this backdrop, we are greatly encouraged that the Network for Education and Research on Peace and Sustainability (NERPS) at Hiroshima University continues to explore the nexus between peace and sustainability. We believe that academically clarifying the major threats that surround us and how they can potentially create dangerous situations due to their complex intertwining, as well as ensuring that more people are fully aware of those threats, is the foundation for 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

As basic guidelines for community development toward the year 2030, we have 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.
Now that we celebrate the 50th anniversary of the establishment of the city, 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 so that we can grow into a city where all citizens can feel a sense of well-being for the next 50 years. We will also promote "sustainable community development" by promoting social implementation of the fruits resulting from such measures and actions in our city and surrounding areas.
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 fourth 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 held last year, 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.

NERPS

Network for Education and Research on Peace and Sustainability (NERPS), Hiroshima University

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