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Japan Prize News
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JAPAN PRIZE

2025 Japan Prize Presentation Ceremony

Their Majesties the Emperor and Empress in attendance at this year's function

On Wednesday, April 16, 2025, the 41st Japan Prize Presentation Ceremony took place in the presence of Their Majesties the Emperor and Empress at the New National Theatre, Tokyo in Shibuya-ku, Tokyo. The Japan Prize is an international award presented to individuals whose original and outstanding achievements in science and technology have promoted peace and prosperity for the humankind.

At the ceremony, the 2025 prize laureates were presented with a certificate of merit, a prize medal, and 100 million yen per field as a supplementary prize. This year's laureates were Professor Russell Dean Dupuis from the field of Materials Science and Production as well as Professor Carlos M. Duarte from the field of Biological Production, Ecology/Environment.

Each year, the Japan Prize Foundation receives nominations from around 15,500 prominent scientists and researchers worldwide, and the winners are chosen through a rigorous year-long selection process. Of the fields eligible for the prize in 2025, there were 149 nominations for the Materials Science and Production field and 72 for the Biological Production, Ecology/Environment field, which totaled 221.

JAPAN PRIZE

The establishment of the Japan Prize was motivated by the Japanese government's desire to create an internationally recognized award that would contribute to scientific and technological development around the world. With the support of numerous donations, the Japan Prize Foundation received endorsement from the Cabinet Office in 1983.

The Japan Prize is awarded to scientists and engineers from around the world who have made creative and dramatic achievements that help progress their fields and contribute significantly to realizing peace and prosperity for all humanity.

Researchers in all fields of science and technology are eligible for the award, with two fields selected each year in consideration of current trends in scientific and technological development. In principle, one individual in each field is recognized with the award, and receives a certificate, a medal, and a monetary prize. Each Award Ceremony is attended by the current Emperor and Empress, heads of the three branches of government and other related officials, and representatives from various other elements of society.

Address by His Majesty the Emperor

It brings me great pleasure to be here at the 2025 Japan Prize Presentation Ceremony, together with the distinguished participants and guests from many countries and regions across the world.

The Japan Prize was established based on private donations in 1982, in accordance with the Japanese government's vision of contributing to the development of science and technology throughout the world. The Prize is awarded to scientists and engineers from across the globe who are recognised for their remarkable efforts to contribute to the peace and prosperity of humankind based on their achievements that have contributed significantly to the advancement of science and technology.

The eligible fields for this year's Japan Prize were Materials Science and Production and Biological Production, Ecology/Environment. I would like to extend my heartfelt congratulations to Professor Russell Dean Dupuis from the field of Materials Science and Production as well as Professor Carlos M. Duarte from the field of Biological Production, Ecology/Environment. I would like to pay tribute to the two laureates for their continued outstanding contributions through research towards the further development of science and technology, the enhancement of the convenience of people's lives and the realisation of a sustainable global environment.

In recent years, the challenges facing the world on a global scale, including those in the aforementioned fields, have become increasingly diverse and complex. Consequently, the role of science and technology is growing in importance. It is my hope that a future full of promise will be created by joining forces with each other, drawing on the collective wisdom from various fields of endeavour, underpinned by broader perspectives.

I would like to conclude by expressing my sincere hope that the Japan Prize will further facilitate the advancement of science and technology, bringing happiness to people and contributing to the peace and prosperity of humankind. Thank you very much.

Presentation Ceremony

The 2025 Japan Prize Presentation Ceremony was held at the New National Theatre, Tokyo in the presence of Their Majesties the Emperor and Empress. The magnificent occasion was celebrated by approximately 700 attendees, including distinguished guests such as Mr. Fukushiro Nukaga, Speaker of the House of Representatives; Mr. Masakazu Sekiguchi, President of the House of Councillors; and Mr. Yukihiko Imasaki, Chief Justice of the Supreme Court. During the presentation ceremony, Chairman Hiroshi Komiyama of the Japan Prize Foundation presented the laureates certificates of merit and prize medals. The laureates received warm applause from the audience as they held up their prize medals and expressed joy in their acceptance speeches.

Prof. Russell Dean Dupuis

Prof. Carlos M. Duarte

Congratulatory Address
H.E. Mr. Fukushiro Nukaga

Their Majesties the Emperor and Empress applauding the recipients

Opening Remarks
Dr. Ryozo Nagai

Commemorative concert

Field: Materials Science and Production

Development of metalorganic chemical vapor deposition technology for compound semiconductor electronic and optoelectronic devices, and pioneering contribution to its large-scale commercialization

Prof. Russell Dean Dupuis

Born: 9 July 1947 Based in: USA

Professor
Electrical and Computer Engineering, and Materials Science and Engineering, Georgia Institute of Technology

Message from the Laureate

Your Majesties the Emperor and Empress, Excellencies, Members of the Japan Prize Foundation and its Selection Committees, Prof. Duarte, and Distinguished Guests.

It is with great humility and profound gratitude that I accept the 2025 Japan Prize in the field of Materials Science and Production for my work in the area of semiconductor materials and devices which has resulted in enhanced telecommunications, information processing, and many new energy-saving semiconductor technologies. To be included among the Japan Prize laureates is a tremendous honor.

Like many advances in the fields of science and technology, this work is interdisciplinary and underpinned by the efforts of many individuals. I thank my colleagues, postdoctoral fellows, and graduate students, who have contributed to our research and also thank the researchers in our scientific community who continue to build upon our work. I am especially grateful and honored to receive this award since my mentor, Professor Nick Holonyak, Jr., received the Japan Prize 30 years ago in the same field.

I want to extend my deepest gratitude to the Japan Prize Foundation, the nominators and references, and the award selection committee for this most prestigious award. Finally, I thank my family for their unwavering support and encouragement.

Russell Dean Dupuis

Field: Biological Production, Ecology/Environment

Contribution to our understanding of marine ecosystems in a changing Earth, especially through pioneering research on Blue Carbon

Prof. Carlos M. Duarte

Born: 27 July 1960 Based in: Spain

Ibn Sina Distinguished Professor
Biological and Environmental Science and Engineering Division,
King Abdullah University of Science and Technology

Message from the Laureate

Your Majesties the Emperor and Empress, Excellencies, Members of the Japan Prize Foundation and its Selection Committees, Prof. Dupuis, and Distinguished Guests.

I am very honoured to be awarded the 2025 Japan Prize, the highest honour in my discipline of Ecology and Environment.

The research contribution being recognized is rooted in my pursuit of fundamental questions in understanding the functioning of marine ecosystems. The knowledge generated has provided the underpinning for our capacity to conserve and restore marine ecosystems to mitigate and adapt to climate change. More broadly, my research contributes to shift our extractive approach to nature to design nature-positive economies. The fact that a healthy ocean supports thriving communities is embedded in the Satoumi concept of Japanese culture. This research, therefore, exemplifies the contribution of science to promoting the peace and prosperity of humankind, which the Japan Prize celebrates.

I express my gratitude to all my collaborators and students, present and past, to KAUST President Sir Edward Byrne for his support and friendship, and to my wife and colleague Prof. Susana Agusti, my daughter and colleague Guiomar Duarte, and my family and friends in attendance for their inspiration and unconditional support.

Carlos M. Duarte

Japan Prize Commemorative Lectures

Prof. Russell Dean Dupuis

Field: Materials Science and Production
Theme: The Development of Metalorganic Chemical Vapor Deposition for III-V Compound Semiconductor Devices

Metalorganic chemical vapor deposition (MOCVD) has played a pivotal role in the advancement of III-V compound semiconductor devices. Around 1970, reactors were designed by hand, but in recent years, advanced systems enabling high precision and mass production have been developed. The technologies employed here form the foundation for devices such as LEDs, laser diodes, and advanced solar cells, which are indispensable in today's communications, computing, and energy industries. Such advances in materials science have greatly contributed to societal progress, and the semiconductor and MOCVD markets are expected to continue growing in the future.

Research into MOCVD began around 1960 as an alternative to epitaxial crystal growth technologies, but from 1976 onward, its ability to produce high-performance laser diodes at low cost began to attract attention. At the same time, development on quaternary semiconductor alloys for high-efficiency visible LEDs was underway, with major Japanese companies making significant contributions to early breakthroughs. From the 1980s to the 1990s, reactor-related technologies advanced significantly, enabling large-scale, high-throughput, and homogeneous epitaxy.

Today, more than 3,000 large-scale MOCVD systems are operating worldwide, continuously producing high-quality materials required for LEDs, VCSELs, and multi-junction solar cells. Devices manufactured using MOCVD are used in a wide range of applications where high performance and precision are essential, from space exploration systems to facial recognition in smartphones, power supply, and optical communication networks. The evolution of MOCVD from crude homemade chambers (reactors) to precision industrial tools reflects the trajectory of modern semiconductor advancement. As Moore's Law approaches its physical limits, scalability of performance is expected to become important especially in the fields of AI and high-speed computing. Going forward, further adoption of silicon semiconductor electronics fabricated using MOCVD will be essential for expanding advanced technologies, and with its proven scalability and versatility, MOCVD will serve not just as a manufacturing method but as a foundation for technological progress.

Prof. Carlos M. Duarte

Field: Biological Production, Ecology/Environment
Theme: Ocean-positive economies are essential for a sustainable future

As ecosystems that support human life come under threat, there is an urgent need to restore marine ecosystems degraded by overfishing, habitat loss, climate change, and other factors. More than half of the resources in marine ecosystems have already been negatively impacted by human activity, and two-thirds of the abundance of terrestrial plants and animals have been lost. However, it is possible to restore 70% to 80% of ecosystems within 30 years through the sustained implementation of policies and initiatives focused on six key elements: species conservation, sustainable harvesting, habitat protection, ecosystem restoration, environmental pollution control, and mitigation of climate change.

Nature-based "blue carbon" projects, such as those involving mangroves, seagrass meadows, and salt marshes, are becoming increasingly important in terms of mitigation of climate change. These ecosystems were once undervalued, but in recent years, they have been shown to surpass forests in long-term carbon sequestration capacity and are now recognized as playing a vital role in coastal and biodiversity protection. Global investment in blue carbon is expanding, with Japan being the first country to incorporate seagrass-based blue carbon into its climate change policy. By restoring marine ecosystems, blue carbon projects not only enable carbon sequestration, but also help ensure food security, promote self-reliance (especially among women), and restore coastlines and water sources, making them a multifaceted solution with significant growth potential.

Going forward, we should shift from a sustainable model focused solely on carbon to a regenerative model that prioritizes the rebuilding of natural, social, and economic capital. Blue carbon serves merely as step toward recognizing the importance of "blue natural capital," and marine conservation is increasingly being perceived not as a cost, but as an investment in the future. This change in perception is also beneficial from the market perspective and leads to the development of effective strategies for ecosystem restoration. To prevent ecosystem collapse, multilateral cooperation and science-based diplomacy are essential, and peace and prosperity can be achieved by committing not only to "sustainability" as espoused in the past, but also to regeneration.

Watch the videos of the commemorative lectures online.

https://www.youtube.com/user/JapanPrize/videos

Japan Prize Week

April 14

Reception hosted by the Spanish Embassy

April 15

Courtesy Call on the Japan Academy

April 16

Presentation Ceremony

Interaction Gathering

April 17

Courtesy Call on the Prime Minister

Commemorative Lectures

April 17

Academic Roundtable Discussion

April 18

Media Interview

Projects of the Foundation

For the further development of science and technology...

In addition to selecting and awarding the Japan Prize, the Japan Prize Foundation is engaged in projects designed to contribute to the development of science, technology, and society, including the offering of research grants for the training of young scientists, and our "Easy-to-understand Science and Technology Seminars" aimed at the children who will lead the coming generations.

JAPAN PRIZE

The creation of the Japan Prize was motivated by the Japanese government's desire to "contribute to the development of science and technology worldwide by establishing a prestigious international award." The Japan Prize was established in 1983 with a cabinet endorsement and is supported by numerous private donations.

The award honors scientists and researchers from around the world, recognizing individuals who have contributed significantly to the peace and prosperity of humankind through original and outstanding achievements that have greatly advanced the progress of science and technology.

Researchers working in all fields of science and technology are eligible to receive the Japan Prize. Each year, it is awarded for achievements in two fields, which are selected by considering recent developments in science and technology. As a general rule, one award is given for each field and each laureate receives a certificate of merit, a prize medal, and prize of 100 million yen.

The Presentation Ceremony is held annually in the presence of Their Majesties the Emperor and Empress of Japan and is also attended by the Prime Minister, the Speaker of the House of Representatives, the President of the House of Councillors, the Chief Justice of the Supreme Court, numerous government ministers, and eminent figures from various other areas.

Research Grants

The Heisei Memorial Research Grant Program is named after Their Majesties the Emperor Emeritus and Empress Emerita, who have been interested in the research activities of young scientists and have encouraged them for many years.

The Foundation primarily provides research grants to scientists under 45 years of age. The Foundation annually selects four to eight scientists engaged in research that transcends the boundaries between different fields and disciplines and contributes to solving social issues. They are then provided with grants worth five to ten million yen.

The Heisei Memorial Research Grant was established as a means of expressing our profound appreciation to their Majesties the Emperor Emeritus and Empress Emerita for their great generosity in granting this award.

(Applicants must belong to a research organization in Japan to be eligible for a grant.)

"Easy-to-Understand Science and Technology Seminars"

The Foundation holds various seminars for students and other members of the public. These seminars are conducted by experts who use plain language to explain the advanced technologies commonly used in everyday life.

More than 300 seminars have been held since the program was launched in March 1989.