THE JAPAN PRIZE FOUNDATION

ARK Mori Building, East Wing 35th Floor, 1-12-32
Akasaka, Minato-ku, Tokyo, 107-6035, JAPAN
Tel: +81-3-5545-0551 Fax: +81-3-5545-0554
www.japanprize.jp

Japan Prize News

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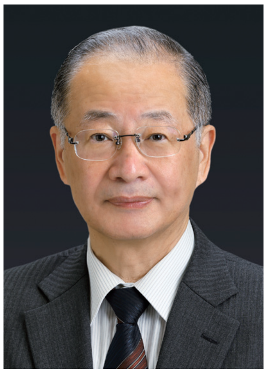
JAPAN PRIZE

2023 Japan Prize Laureates Announced



Prof. Masataka Nakazawa
Distinguished Professor, Specially Appointed Professor,
Tohoku University

Japan

Mr. Kazuo Hagimoto
Principal Researcher,
National Institute of Information and
Communications Technology
Japan

Prof. Gero Miesenböck
Waynflete Professor of Physiology,
Centre for Neural Circuits and Behaviour,
University of Oxford
Austria

Prof. Karl Deisseroth
Professor,
Departments of Bioengineering and Psychiatry,
and Howard Hughes Medical Institute Stanford University
USA

Fields Eligible for the Award:
Electronics, Information, and Communication

Distinguished contributions to global long-distance, high-capacity optical fiber network through the development of semiconductor laser pumped optical amplifier

The world is more closely connected that ever before through email, social networks, online meeting spaces and more, and cloud services have come to be used to store vast amounts of data. The increased diversification and capacity of internet-based information technology resources was made possible by the availability of low-cost optical communication systems that allow large amounts of information to be quickly sent great distances.

In the 1980s, Professor Masataka Nakazawa and Mr. Kazuo Hagimoto combined erbium-doped fiber amplifiers (EDFA) with InGaAsP laser diodes to build small-scale, high-efficiency, long-distance optical amplifiers, a technology considered indispensable to the construction of long-distance optical communication systems but which had until that time been difficult to put into practical use. Within only five years, repeaters equipped with these optical amplifiers were being installed in the transpacific and transatlantic submarine cables and other communication systems that form the long-distance transmission network that spans the world. The optical communication systems built upon this technology have continued to evolve since that time, and are being used in dramatically more applications.

The optical amplifiers they developed paved the way for long-distance, high-capacity optical data transmission, one of the core technologies supporting global Internet society today.

Fields Eligible for the Award:
Life Sciences

The development of methods that use genetically addressable light-sensitive membrane proteins to unravel neural circuit function

All of human behavior – from action to thought, to memory and decision-making – is governed by the neurons that make up our brains. Determining the causal relationships between which neurons influence which patterns of behavior is a major topic of research in neuroscience.

Past research into this topic involved activating and suppressing specific areas of the brain using electrical stimulation, drugs, and other methods, and then observing how behavior thereby clarifying the role each region of the brain plays. However, it was difficult to use such methods to control the targeted neurons with high precision.

However, a new method has emerged that allows researchers to easily control the activity of specific neurons by illuminating them with light. It lets research directly study the relationship between neural activity and behaviors produced because it can be used on live animals.

Prof. Gero Miesenböck successfully devised the concept and principles underlying this technology, and demonstrated its effectiveness. Prof. Karl Deisseroth developed a unique method using a photoactivated protein derived from microorganisms that achieved high spatial and temporal resolution, which allowed it to be harnessed across a broad range of research fields.

The use of light stimulation has become an indispensable tool in neuroscience research, and has led to remarkable progress in the field. It is also expected that this technique will be useful in medical applications, such as restoring sight for the blind and developing treatments for Parkinson’s disease.

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.

Fields of Electronics, Information, and Communication

Achievement

Distinguished contributions to global long-distance, high-capacity optical fiber network through the development of semiconductor laser pumped optical amplifier

Prof. Masataka Nakazawa (Japan)
Born: September 17, 1952 (Age: 70)
Distinguished Professor, Specially Appointed Professor,
Tohoku University

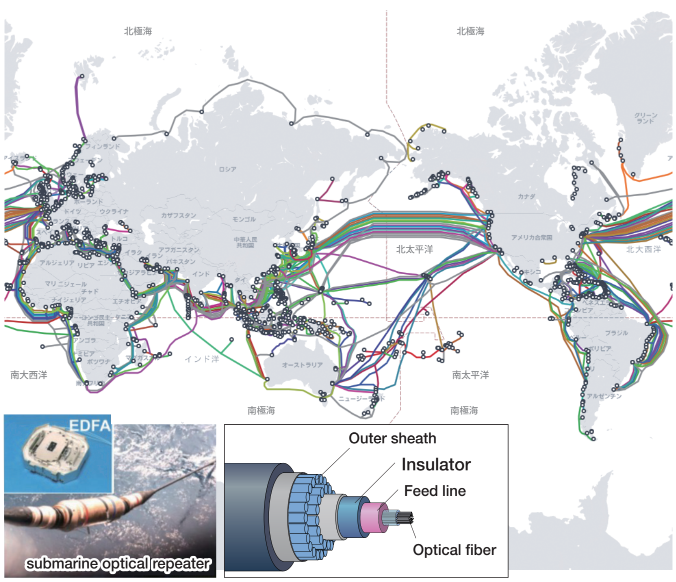
Mr. Kazuo Hagimoto (Japan)
Born: January 8, 1955 (Age: 68)
Principal Researcher,
National Institute of Information and Communications Technology

The optical transmission system connecting the world

Submarine cables are used to bridge the distances between continents and connect the world, and the term optical communication refers to the transmission of information as signals that travel along optical fibers within those cables. Information is sent using flashing light that represents the binary 0s and 1s in digital data, which allows information to be sent faster and over longer distances.

Optical fibers are made of high-purity glass and other materials in order to minimize signal loss, but when transmitting over long distances, there will always be some loss of signal strength. For example, it is impossible to deliver a signal that crosses the Pacific Ocean from Tokyo to San Francisco (roughly 8,300 km) with a single transmission of an optical signal. To resolve this issue, optical repeaters are installed on submarine cables anywhere from a few dozen kilometers to one hundred kilometers apart, and the optical amplifiers inside boost signals that pass through to compensate for signal loss. The erbium-doped fiber amplifiers (EDFA) developed by Nakazawa and Hagimoto to amplify signals in this way are now being used worldwide.

Figure 1: The intercontinental optical submarine cable network



Map source: Submarine Cable Map（https://www.submarinecablemap.com/）

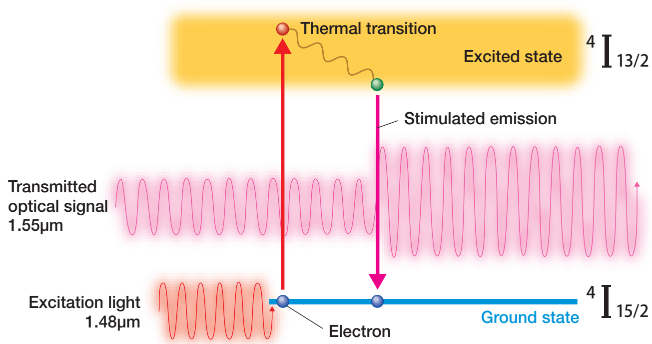
Principles of optical amplifiers and their advantages

Single-mode optical fibers were put into practical use in the 1980s. However, at that time, signal amplification was achieved using electrical amplifiers, which converted optical signals into electrical signals which were then amplified. Such devices were large and required a large amount of power, so there was demand for a compact, highly efficient, broadband optical amplifiers that could amplify the original signals without having to convert them first.

Nakazawa was the first person to propose using a 1.48 μm InGaAsP (Indium, Gallium, Arsenic, Phosphorus) laser diode to excite erbium-doped fibers. The principle under which such an optical amplifier works is shown in Fig. 2. A diode emits an excitation signal at 1.48 μm, which gives energy to an electron in the ground state in an erbium atom ($^4I_{15/2}$) and raises it to an excited state ($^4I_{13/2}$). Energy is released from that electron in a phenomenon called stimulated emission, and it is used to amplify the 1.55 μm optical signal.

Currently, optical communication is carried out in the 1.5 μm band (the minimum loss wavelength), which has the lowest possible optical attenuation at 0.2 dB per kilometer. Energy produced by stimulated emission in erbium atoms occurs in this band precisely, and it provides a gain of 12.5 dB (corresponding to the ratio of input to output strength). Furthermore, it was shown that amplification wasn't limited to a single wavelength; this stimulated emission could be used to amplify signals within a range of 40 nm.

Figure 2: Principles of optical amplifiers



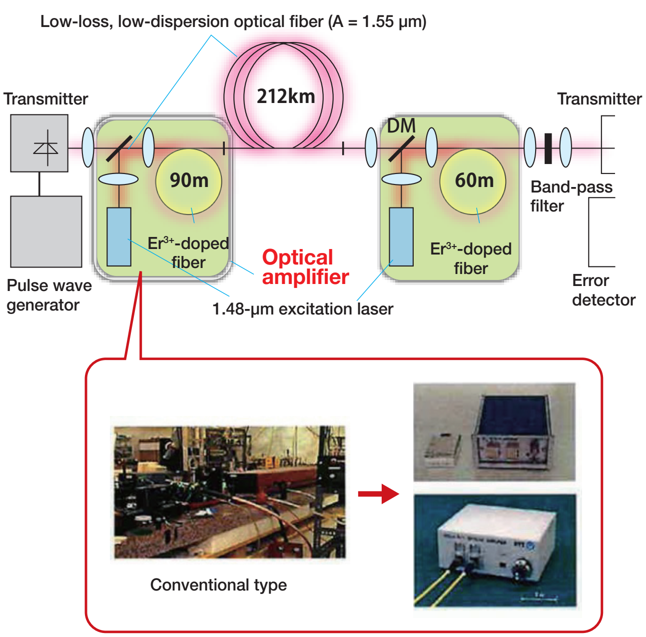
An urgent need for practical applications

Nakazawa's proposal showed that it was possible to build a battery-powered optical amplifier much more compact than existing amplifiers, which required light sources as big as 1.5 square meters. Moreover, they were broadband amplifiers capable of amplifying 1.5 µm signals over a 40 nm band, which illustrated their potential to help increase optical communication capacity.

Hagimoto learned of Nakazawa's proposal and immediately began building a practical optical communication system based on its principles. He used an EDFA measuring roughly 10 cm square, a device that had only recently been developed, and harnessed intensity modulation and direct detection to show that a 1.8 Gbit/s signal could be delivered over as long a distance as 212 km. This was the first successful demonstration of the practicality of optical amplifiers.

This technology was so exceptional that within only five years, it was being used in the long-distance transmission networks that connect the world.

Figure 3: Semiconductor laser pumped EDFAs and the 212km repeaterless transmission experiment at 1.8 Gbps



Source : https://www.youtube.com/watch?v=v_Xkn14XWcQ

Driving greater increases in capacity

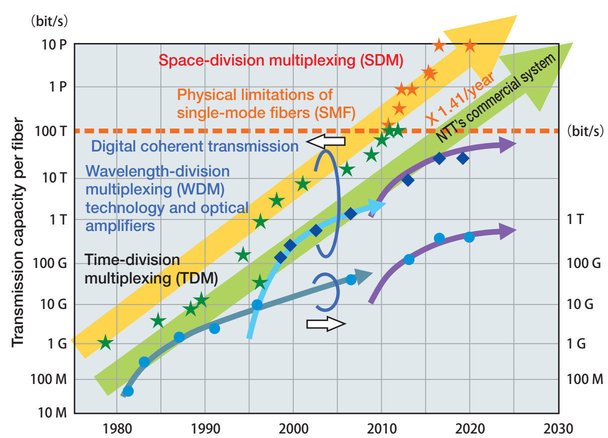
After optical amplification was introduced in the 1990s, it became absolutely indispensable to optical communications. Other optical amplifiers have been developed, but EDFAs remain the most commonly used around the world. The work of Hagimoto and his fellow researchers in standardizing the technology internationally also helped demonstrate its superiority.

EDFAs are capable of amplifying multiple optical signals at different wavelengths simultaneously, so they can be combined with wavelength-division multiplexing, a technology that allows multiple signals at different wavelengths to be transmitted together and separated again at the detection end. Since the mid-1990s, that combination has driven greater increases in optical communication capacity, and opened the door to terabit-scale (10^{12} bit), large-capacity optical data transmission.

In addition, new technologies appear with regularity – technologies such as multi-level modulation transmission and digital coherent transmission – and both Nakazawa and Hagimoto continue to research these latest developments in transmission technology.

The world has entered the Data Era with the use of IoT, big data, and other developments, and the demand for increased communication capacity continues to rise. Experiments have shown that petabit-scale (10^{15} bit) transmission is possible, surpassing the 100 Tb physical limitations of single-mode fiber, thus illustrating that the evolution of optical communication – a technology that is interwoven into modern life – continues unabated.

Figure 4：Practical application of long-distance large-capacity optical fiber communication



Field of Life Sciences

Achievement

The development of methods that use genetically addressable light-sensitive membrane proteins to unravel neural circuit function

Prof. Gero Miesenböck (Austria)
Born: July 15, 1965 (Age: 57)
Waynflete Professor of Physiology,
Centre for Neural Circuits and Behaviour, University of Oxford

Prof. Karl Deisseroth (USA)
Born: November 18, 1971 (Age: 51)
Professor,Departments of Bioengineering and Psychiatry,
and Howard Hughes Medical Institute Stanford University

Previous methods using electrical stimulation and drugs

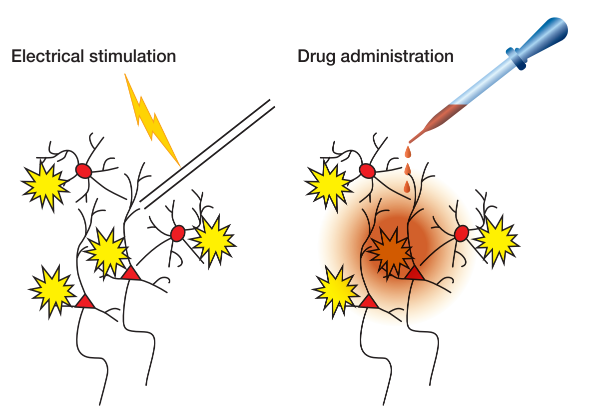
The brain is composed of an enormous number of nerve cells, or neurons, which form complex circuits that are used to exchange information. The reason humans are able to think and move is because the neurons responsible for controlling those functions are activated and thereby transmit information correctly.

Electrical stimulation and the administration of drugs have long been used to study the neural circuitry that controls behavior, thought, and other functions.

Electrical stimulation is applied by inserting a thin electrode into a specific region of the brain and passing an electrical current through it, which either activates or deactivates neurons in the area to study how behavior changes. However, this method changes the behavior not only of the targeted neurons but also any surrounding cells, which makes it difficult to precisely determine the role of a specific neuron.

The drug method involves local administration to the brain of a drug that activates or deactivates specific neurons, at which point subsequent behavioral changes are observed to understand the role of those neurons. However, neural activity moves at a rate measurable in milliseconds, so because it takes time for drugs to affect the targeted neurons, there is a limit to what can be gained from this method.

Figure 1: Conventional methods for investigating the role of neurons



Using conventional methods such as electrical stimulation (left) and drug administration (right) to manipulate neural activity results in other cells near the targeted neurons also being affected (yellow explosions in figure).

A new technology that controls neurons freely using light

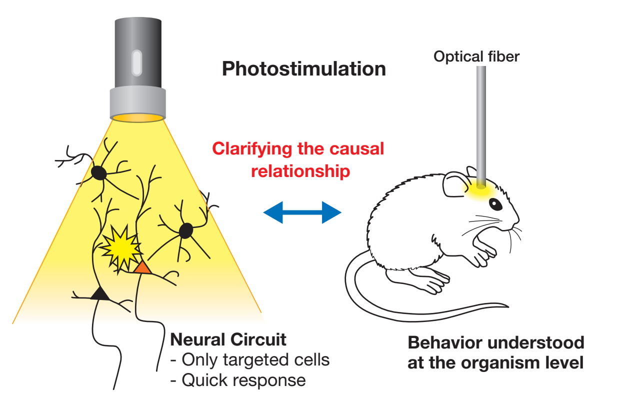
The method using light developed by Miesenböck and Deisseroth overcomes all the shortcomings of previous methods.

In 2002, Miesenböck developed a new technique that allowed him to use genetic manipulation to express photo-sensitive proteins in specific neurons, the activity of which could then be controlled through exposure to light. Then in 2005, Deisseroth used Chlamydomonas, a type of green algae that contains a photosensitive protein called channelrhodopsin, to improve this technology and make it more precise and easier to use, thereby making it possible to apply in a wide range of research fields.

This technology makes it possible to illuminate and control the activity of specific neurons in the brain of a living animal using optical fibers and other equipment, only changing the activity of the neurons being targeted. Furthermore, this technique allows neural activity to be freely turned on and off on a time scale of milliseconds or microseconds. For example, channelrhodopsin can be expressed in neurons in mice in the part of the brain called the amygdala, and they can then be illuminated with light using an optical fiber. Mice are normally uneasy in open spaces and so they tend to stay close to walls when they move, but after light is shone on specific neurons, they can temporarily be made to feel less anxious such that they can walk around far from walls without issue. In this way, the direct causal relationship between neuron activity and behavior can be made observable.

This light-based technology has revolutionized research in the field of neuroscience, and it continues to evolve today.

Figure 2: The award-winning technique



By expressing photosensitive proteins in specific nerve cells, it is possible to control the activity of target neurons through photostimulation.

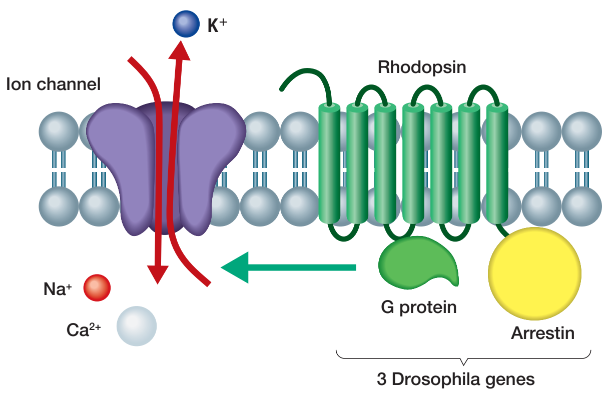
Developing the technique – Concepts and principles

Miesenböck was first to come up with the concept behind the technique and the principles upon it is based, and he was the first to demonstrate its utility. In 2002, Miesenböck took three photoreceptor genes from the eye of Drosophila, including a photosensitive protein called rhodopsin, and expressed them in hippocampal neurons of rats, whereupon he demonstrated that activity in these neurons could be freely controlled by illuminating them with light. This is possible because when rhodopsin senses light, the cell membrane opens something called ion channels, proteins that transport ions in and out of a cell. The flow of ions in and out of the cell produces an action potential, the mechanism by which neurons are activated.

Initial experiments were conducted in vitro, but the experiments were repeated in 2005 on living Drosophila. That experiment successfully induced escape behavior in the flies (flying and flapping wings) by using light to control activity in specific neurons. Moreover, in 2008, the same principles were used to identify the neural network in male Drosophila responsible for controlling courtship behavior.

These results had an immense impact as they demonstrated that photostimulation could be used to directly research the relationship between neural activity and behavior.

Figure 3: Illustration of one of Miesenböck's principles



Source : Miesenböck (Neuron 2002)

The structure of rhodopsin changes when exposed to light, activating G proteins and indirectly opening ion channels (green arrow.) When an ion channel is opened, Na^+, Ca^{2+}, and K^+ move in and out of the cell (red arrows) thereby transmitting information by inducing a large change in the membrane potential called an action potential.

Algae genes open the way to discovering the potential of the technique

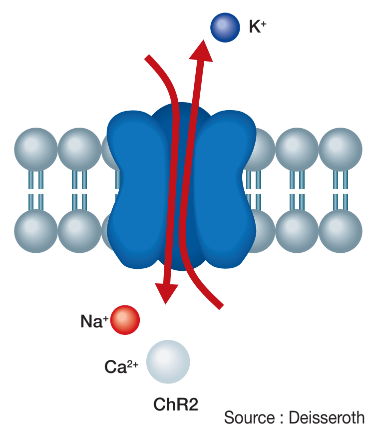
Deisseroth developed a technique for manipulating neural activity using light by focusing on the protein channelrhodopsin, or ChR2, a microbiological rhodopsin reported to be involved in photoaxis in green algae.

ChR2 is a protein that functions as a rhodopsin, which reacts to light, and as an ion channel, which allows ions to pass through the cell membrane, and one of its properties is the short time between it being exposed to light and the channel opening. In other words, using ChR2 has the benefit of making the process simpler because it involves the introduction of only one gene, and still allows for precise control of neural activity.

In 2005, Deisseroth demonstrated that photostimulation of ChR2 expressed in cultured hippocampal neurons from rats could affect neuronal activity within milliseconds. He later used the technique on live mice and successfully identified the neuronal population that produces gamma brain waves, and clarified the neural mechanism that controls social behavior and learning.

A variety of channelrhodopsins with different functions are currently being developed, and the technique is in wide use in everything from pure research to the development of treatments for neurological diseases. Algae genes opened the way to discovering the potential of this technique that has revolutionized neuroscience research.

Figure 4: Using the technique with channelrhodopsin (ChR2)



Source : Deisseroth (Nat Neurosci 2005)

The structure of ChR2 changes when exposed to light, opening ion channels contained with the protein itself. When an ion channel is opened, Na^+, Ca^{2+}, and K^+ move in and out of the cell (red arrows) thereby transmitting information by inducing a change in the membrane potential called an action potential.

Nomination and Selection Process

- Every November, the Field Selection Committee of The Japan Prize Foundation designates and announces two fields in which the Japan Prize will be awarded two years hence. At the same time, the Foundation calls for over 15,000 nominators, strictly comprised of prominent scientists and researchers from around the world invited by the Foundation, to nominate the candidates through the Web System. The deadline for nominations is the end of January of the following year.
- For each field, a Selection Subcommittee conducts a rigorous evaluation of the candidates' academic achievements. The conclusions are then forwarded to the Selection Committee, which conducts evaluations of candidates' achievements from a wider perspective, including contributions to the progress of science and technology, and significant advancement towards the cause of world peace and prosperity, and finally the selected candidates are recommended for the Prize.
- The recommendations are then sent to the Foundation's Board of Directors, which makes the final decision on the winners.
- The nomination and selection process takes almost two years from the time that the fields are decided. Every January, the winners of that year's Japan Prize are announced. The Presentation Ceremony is held in April in Tokyo.

2021 | 2022 | 2023

July - October | November | January | November | January | April

1 → 2 | 3 → 4 | 5 → 6 | 7 | 8

1 Consider the eligible fields for the 2023 Japan Prize
(Board of Directors)
Electronics, Information, and Communication
Life Sciences

2 Determine the eligible fields for the 2023 Japan Prize
(Board of Directors)

3 Invite the nominations

4 Closing of the nominations

5 Japan Prize (Selection Committee)
Electronics, Information, and Communication (Selection Subcommittee)
Life Sciences (Selection Subcommittee)

6 Selecting the Laureates of the 2023 Japan Prize
(Board of Directors)

7 Announce the Laureates of the 2023 Japan Prize

8 The 2023 Japan Prize Presentation Ceremony

Members of the 2023 Japan Prize Selection Committee

Chairman

Makoto Asashima
Deputy Director General of Advanced Comprehensive Research Organization, Research Professor, Teikyo University
Academic Advisor, Japan Society for the Promotion of Science
Professor Emeritus, The University of Tokyo

Deputy Chairman

Yoichiro Matsumoto
Professor Emeritus
The University of Tokyo

Members

Mariko Hasegawa
President
The Graduate University for Advanced Studies, SOKENDAI

Hiroto Ishida
Adviser
The Japan Prize Foundation

Kazunori Kataoka
Vice Chairperson, Kawasaki Institute of Industrial Promotion
Center Director, Innovation Center of NanoMedicine (iCONM)
Professor Emeritus, The University of Tokyo

Masayuki Matsushita
Director
The Japan Prize Foundation

Kyosuke Nagata
President
University of Tsukuba

Hideyuki Okano
Professor and Chair
Department of Physiology, Keio University School of Medicine

Tatsuya Okubo
Executive Vice President, The University of Tokyo
Professor, School of Engineering, The University of Tokyo

Hiroto Yasuura
Director General, Fukuoka Asian Urban Research Center
Vice-Director-General, National Institute of Informatics,
Inter-University Research Institute Corporation,
Research Organization of Information and Systems
Professor Emeritus, Kyushu University

Selection Subcommittee for the "Electronics, Information, and Communication" field

Chairman

Hiroto Yasuura
Director General, Fukuoka Asian Urban Research Center
Vice-Director-General, National Institute of Informatics,
Inter-University Research Institute Corporation,
Research Organization of Information and Systems
Professor Emeritus, Kyushu University

Deputy Chairman

Hironori Kasahara
Professor
Department of Computer Science and Engineering
Waseda University

Members

Akiko Aizawa
Vice-Director-General, Professor
National Institute of Informatics, Inter-University Research Institute Corporation,
Research Organization of Information and Systems

Takako Hashimoto
Vice President, Chiba University of Commerce
Professor, Faculty of Commerce and Economics,
Chiba University of Commerce

Toshiro Hiramoto
Professor
Institute of Industrial Science, The University of Tokyo

Nei Kato
Dean, Professor
Graduate School of Information Sciences, Tohoku University

Akira Matsuzawa
Professor Emeritus
Tokyo Institute of Technology

Shin-ichi Minato
Professor
Graduate School of Informatics, Kyoto University

Michihiko Minoh
Director
RIKEN Information R&D and Strategy Headquarters (R-IH)

Atsuko Miyaji
Professor
Graduate School of Engineering, Osaka University

Kae Nemoto
Professor, Quantum Information Science and Technology Unit,
Okinawa Institute of Science and Technology Graduate University

Takao Onoye
Executive Vice President
Osaka University

Seiichi Uchida
Senior Vice President, Kyushu University
Professor
Faculty of Information Science and Electrical Engineering, Kyushu University

Selection Subcommittee for the "Life Sciences" field

Chairman

Kyosuke Nagata
President
University of Tsukuba

Deputy Chairman

Shigeo Koyasu
Executive Director
RIKEN

Members

Kiyokazu Agata
Director General
National Institute for Basic Biology,
National Institutes of Natural Sciences

Fuyuki Ishikawa
Vice-President, Kyoto University
Director, Research Administration Center (KURA), Kyoto University
Professor, Graduate School of Biostudies, Kyoto University

Hisakazu Mihara
Vice President, Tokyo Institute of Technology
Professor
School of Life Science and Technology, Tokyo Institute of Technology

Junichi Nabekura
Director General
National Institute for Physiological Sciences,
National Institutes of Natural Sciences

Noriko Osumi
Vice President, Tohoku University
Professor, Graduate School of Medicine, Tohoku University

Ichiro Sakuma
Professor
Graduate School of Engineering, The University of Tokyo

Kenichi Shinoda
President
National Museum of Nature and Science

Haruko Takeyama
Professor
Faculty of Science and Engineering, Waseda University

Minoru Yoshida
Research Strategy Advisor, RIKEN
Professor
Graduate School of Agricultural and Life Sciences, The University of Tokyo

Michisuke Yuzaki
Dean, Keio University Graduate School of Medicine
Professor, Keio University School of Medicine

(alphabetical order, titles as of January, 2023)

Eligible Fields for the 2024 Japan Prize

Areas of Physics, Chemistry, Informatics, and Engineering
Resources, Energy, Environment, and Social Infrastructure

Background and Rationale:

Science and technology have helped to free humanity, with all its vulnerabilities, from the bonds of the natural world, and to lessen the unreasonable hardships of labor. Advancements have reduced the number of casualties due to natural disaster and disease, and have given us greater freedom to choose where and how we live our lives, all while expanding the scope of our knowledge. However, many vulnerable people are yet to benefit from such scientific and technological advances - many have yet to be freed from the chains of poverty and scarcity. In addition, there are concerns about the adverse effects of climate change and an increased loss of biodiversity resulting from the growing, increasingly active human population.

The development of a carbon-neutral society with a circular economy is expected to help resolve such global issues, and simultaneously result in a world where people can live in safety and comfort. To achieve this, it is essential that we develop innovative elemental technologies and improve efficiency and reliability of relevant technologies in the fields of energy, mineral resources, water resources, material recycling, and more, and re-design the residential and transportation systems in place in our urban and rural areas.

We must also work to promote the transition into a sustainable and peaceful society in which all people can have a sense of self-respect and dignity. To do so, we must revolutionize our understanding, our theories, and our research and development into the Anthropocene, complex systems, networks, human behavioral selection, and trust-building. We must propose ideas and frameworks that can change society's path. It is also important to develop, design, and implement new social systems that will harness these ideas.

Eligible Achievements:

The 2024 Japan Prize will be awarded to breakthroughs in the creation, innovation or dissemination of science and technology in the fields of Resources, Energy, Environment, and Social Infrastructure, thereby contributing significantly to solving social issues and improving sustainability in our society.

Areas of Life Sciences, Agriculture, Medicine, and Pharmacology
Medical Science and Pharmaceutical Science

Background and Rationale:

Advances in science and technology leading to major new trends in medicine and pharmacology have elucidated the mechanisms of many diseases and produced revolutionary pharmaceutical solutions and medical technologies - notably in genomic medicine, cancer immunotherapy, gene therapy, and cell therapies, as well as new types of vaccines and drug-delivery systems. These achievements have greatly contributed to improvements in both quality of life and life expectancy by offering more satisfying therapeutic options for patients with cancer, infectious and lifestyle-related diseases, and many other pathological conditions.

Recently, medical researchers have entered into rewarding collaborations with workers in informatics, materials science, and other branches of science, contributing greatly to progress in brain-computer interface design and regenerative medicine, among other areas. They have brought us into a new era in which, though fraught with ethical challenges, treatments for high-level mental dysfunctions and modulation of age-related physical changes, for example, will no longer be mere wishful thinking. On the other hand, ever more conspicuous challenges are posed by dementia and geriatric diseases in aging societies, and by emerging infectious diseases and the spread of pandemics accompanying the globalization of commerce and population movements.

Thus, in this age of challenges it is hoped that Medical and Pharmaceutical Sciences, not only by continuing to make discoveries in the basic sciences but also by applying those discoveries and joining forces with other fields of endeavor, will continue to enhance human health and well-being.

Eligible Achievements :

The 2024 Japan Prize in Medical Science and Pharmaceutical Science will reward the development of innovative technologies and novel discoveries that promise seminal scientific and technical advances pertaining to the mechanisms of disease; to disease prevention, diagnosis, treatment, and prognosis; and to medical follow-up and monitoring - technologies and discoveries that confer substantial benefits to society by enhancing human health and well-being.

Fields Selection Committee for the 2024 Japan Prize

Chairman

Kohei Miyazono
Executive Director, RIKEN
Distinguished University Professor, Department of Applied Pathology, Graduate School of Medicine, The University of Tokyo

Vice Chairman

Kazuhito Hashimoto
President
Japan Science and Technology Agency

Members

Hiroyuki Arai
Executive Director, Pharmaceuticals and Medical Devices Agency
Emeritus Professor, The University of Tokyo

Mutsuko Hatano
Professor, Department of Electrical and Electronic Engineering, School of Engineering, Tokyo Institute of Technology

Kazuhiro Hono
President
National Institute for Materials Science (NIMS)

Jinichi Igarashi
Adviser, ENEOS Research Institute, Ltd.
Former Director, Senior Vice President, JXTG Nippon Oil & Energy Corporation

Erina Kuranaga
Professor
Graduate School of Life Sciences, Tohoku University

Tadahiro Kuroda
Professor
Graduate School of Engineering, The University of Tokyo

Yukiko Motomura
Editorial writer
The Mainichi Newspapers Co., Ltd.

Toru Nakano
Professor Emeritus
Osaka University

Taikan Oki
Professor
Graduate School of Engineering, The University of Tokyo

Nobuhiro Tsutsumi
Dean, Graduate School of Agricultural and Life Sciences, The University of Tokyo

Naonori Ueda
NTT Fellow, NTT Communication Science Laboratories
Deputy Director, RIKEN Center for Advanced Intelligence Project

Minoru Yoshida
Research Strategy Advisor, RIKEN
Professor, Graduate School of Agricultural and Life Sciences, The University of Tokyo

(alphabetical order, titles as of November, 2022)

Schedule (2024-2026)

The eligible fields for the Japan Prize (2024 to 2026) have been decided for the two research areas, respectively.
These fields rotate every year in a three year cycle. Every year the Fields Selection Committee announces the eligible field for the next three years.

Areas of Physics, Chemistry, Informatics, and Engineering

Year	Eligible Fields
2024	Resources, Energy, Environment, and Social Infrastructure
2025	Materials and Production
2026	Electronics, Information, and Communication

Areas of Life Sciences, Agriculture, Medicine, and Pharmacology

Year	Eligible Fields
2024	Medical Science and Pharmaceutical Science
2025	Biological Production, Ecology/ Environment
2026	Life Sciences