JAPAN PRIZE 2009

THE SCIENCE AND TECHNOLOGY FOUNDATION OF JAPAN

The Japan Prize for the world

Masao Ito
President

Science is an expression of humanity's intellectual quest to understand nature and to clarify its mysteries, and technology expands the possible range of human activity, providing vital support for contemporary life. Science and technology are opening new horizons for humanity, and at the same time providing ways to solve many difficult problems that our world is facing.

The Japan Prize was founded as a way of honoring those who have made significant contributions to the progress of science and technology, and thereby to the welfare and prosperity of all humanity. It is aimed at recognizing their achievements and rewarding them for their services from a global perspective, regardless of their country of origin. Ever since the first Japan Prize was awarded in 1985, it has been awarded to outstanding researchers selected from the world's science and technology community each year.

The Japan Prizes imply a deep acknowledgement of Japan's indebtedness to the worldwide community of science and technology, because Japan has been benefited greatly from progress in many areas of science and technology. Also, they represent Japans's great hope for the future, which would not be conceivable without continued developments in science and technology.

Each year, we are honored to hold the award ceremony and banquet in the presence of Their Majesties, the Emperor and Empress of Japan, and representatives of the Three Branches of government. The Science and Technology Foundation of Japan wishes to devote every effort to making this a memorable opportunity for numerous researchers to gather to honor the prize winners, and to celebrate the limitless potentialities of science and technology.

Significance of the Prize

Hiroyuki Yoshikawa
Chairman

Man is a species that has used wisdom to preserve its existence. In modern times, much of that wisdom has come to depend on knowledge derived from academic research. Nowadays, in particular, the rapid development of scientific and technical knowledge owes much to the endeavors of researchers and scientists. Research excellence is recognized through the award of various prizes, of which the Nobel Prize is one. We can say that the pedigree record of recipients reveals, not only to specialists but also to the general public, a history of the unique perspective that characterizes these prizes.

This being the case, what history should the Japan Prize reveal? Considering that the overview of the Japan Prize refers to making concurrent contributions to the progress of science and to human peace and prosperity, it should reveal a history of both scientific and technological progress and a resultant history of peace and prosperity.

Looking back, it is simple to point out the overlapping existence of both of these. Even if, at some point in history, some aspect of science and technology exerted a negative outcome on mankind, over the longer course of time it is indisputable that scientific and technological advances have brought peace and prosperity to humanity.

Through the pedigree record of its recipients, the Japan Prize speaks of a history that combines scientific and technological progress and human peace and prosperity. The Prize is not confined, however, to telling only of developments slowly revealed over the passage of time.

While respecting the various ways science and technology is currently unfolding, the prize endeavours to show history in progress based on a premise that the role of today's researcher is to create an overlapping history.

It is our sincerest wish that by reaching not just researchers but also the broader population the developments revealed will go on to ensure that science and technology make a substantial contribution to the peace and prosperity of humankind.

THE JAPAN PRIZE

PURPOSE

The promotion of peace and prosperity is a widespread ideal. In the course of history, countless individuals, working in a variety of fields, have devoted themselves to the realization of this goal. The remarkable progress of science and technology and social institutions in modern times is the cumulative result of generations of individuals who have sought to raise the standard of living and to improve the social environment.

Science and technology has power to change our lives in both positive and negative ways. Japan has few natural resources, but has managed to achieve a high level of economic growth through the assimilation and application of science and technology. It has also experienced the destructive effect that science and technology can achieve.

We believe that Japan must demonstrate to the international community its commitment to the promotion of the development of science and technology. One way in which we can highlight our resolve is to honor those whose research in these areas have contributed to the peace and prosperity of mankind.

We hope that the Japan Prize will contribute to international cooperation and look forward to the continuing support of scholars and scientists throughout the world.

HISTORY

The Japan Prize Preparatory Foundation was established on November 1, 1982, with the approval of the Prime Minister, for the purpose of establishing the Japan Prize as a prestigious international award in the fields of science and technology.

The creation of the Japan Prize was motivated by the desire to "express Japan's gratitude to international society." This plan was advocated in 1981 by Mr. Taro Nakayama, the then Director General of the Prime Minister's Office of the Suzuki Cabinet, and supported with a fund donated by Mr. Konosuke Matsushita, the founder of Matsushita Electric Industrial Co., Ltd.

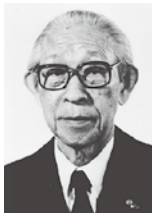
The preparatory foundation was later renamed The Science and Technology Foundation of Japan on May 5, 1983, with its purpose and activities broadened to include the development and dissemination of ideas and information related to science and technology, in addition to the awarding of the Japan Prize.

The Government issued the following cabinet endorsement on the establishment of the Japan Prize on October 28 of the same year.

Establishment of the Japan Prize

The official position of the Japanese Government is that the Japan Prize, to be bestowed by the Science and Technology Foundation of Japan, will serve to deepen the understanding of the role played by science and technology in furthering world peace and prosperity, thereby making a vital contribution to the positive development of mankind. Based on this judgment, the government agencies concerned are urged to offer whatever cooperation necessary in all phases pertinent to this prize.

(Cabinet Endorsement, October 28, 1983)



Peace and Prosperity for All

Peace and prosperity for mankind have been my lifelong desires. I am extremely pleased, therefore, that the Japan Prize has been established with the specific goal of making some con-tribution on behalf of Japan to the development of international society.

The progress of modern science and technology has been phenomenal. It is not overstating its role to say that we owe the civilization we enjoy today to this very progress.

On the other hand, there are still many global problems which remain to be solved, and the necessity to seek the counsel of many people is greater than ever before.

Under such circumstances, it is appropriate that Japan, in consultation with the international community, honors, those who have produced outstanding achievements in the fields of science and technology.

It is my sincere hope that the Japan Prize achieves the recognition it deserves.

Konosuke Matsushita
The first President of the Foundation

OUTLINE

The Japan Prize is awarded to researchers and scientists from all over the world whose original and outstanding achievements in science and technology are recognized as having advanced the frontiers of knowledge and served the cause of peace and prosperity for mankind.

No distinction is made regarding nationality, occupation, race or sex. Only living persons may be named as prize laureates.

Fields of study for the prize encompass all categories of science and technology, with two fields designated for the prize each year in consideration of developments in science and technology.

Each Japan Prize laureate receives a certificate of merit and a commemorative medal. A cash award of 50 million yen is also presented for each prize category. The award is intended for a single person, in principle, but small groups of researchers are also eligible.

The laureates are selected in January. The Presentation Ceremony is held in the presence of Their Majesties, the Emperor and Empress of Japan. The events are 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, foreign ambassadors to Japan and approximately one thousand other guests, including eminent academics, researchers and representatives of political, business and press circles.

The week in which the Japan Prize is awarded is designated as "Japan Prize Week." During this period, the laureates feature at commemorative lectures and attend academic discussion meetings. They take part in various other activities, including courtesy calls on the Prime Minister and the Japan Academy.

The first Japan Prize was awarded in 1985. It has been awarded every year since then.

SELECTION

Each year, a fields selection committee organized by the Science and Technology Foundation of Japan, chooses the two fields eligible for the award.

Letters are sent to numerous scholars and researchers throughout the world, requesting nom-inations for each category in which the award is being made.

A selection committee consisting of prominent scholars is established to choose Japan Prize laureates from among the candidates nominated.

In addition, the views and evaluations of academics who are well known internationally are sought.

The selection committee will then recommend candidates to the Board of Directors of the Foundation.

After having given serious consideration to the recommendations of the selection committee, the Directors of the Foundation make their decisions and announce the names of the Japan Prize laureates.

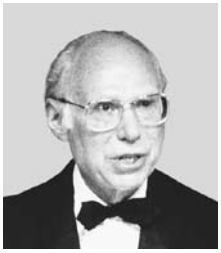
PROFILES OF JAPAN PRIZE LAUREATES

(Titles at the time)

1985 (1st)

Category of Information and Communications

"Outstanding achievement in the field of electronics and communications technologies"



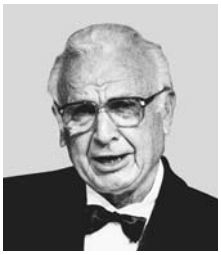
Dr. John R. Pierce
(USA)

Professor Emeritus at Stanford University.
Born in 1910
Died in 2002

Dr. Pierce's achievements in the field of information and telecommunication engineering represent the highest scientific caliber in the United States. His work has resulted in the theoretical development of the possibilities of communications satellites and of broad-band digital transmissions via pulse code modulations and multivalent signals.

Category of Biotechnology

"Outstanding achievement in basic theory in the field of immobilized enzymes and their practical applications"



Dr. Ephraim Katchalski-Katzir
(Israel)

Professor at Tel Aviv University and at Weiz-mann Institute of Science.
Born in 1916

Dr. Katzir, the fourth President of the State of Israel from 1973 to 1978, is credited with the invention and development of the bioanalyzer and bioreactor, two devices employing immobilized enzymes and cells which form part of the foundation of biotechnology.

1986 (2nd)

Category of Materials Science and Technology

"Pioneering contributions to materials science with impact on new materials technology such as amorphous solids"

Dr. David Turnbull
(USA)

Professor at Harvard University.
Born in 1915

Dr. Turnbull, who formulated the guiding principles of new materials development, predicted what kinds of alloys will, like glass, tend to assume an amorphous character with an irregular alignment of atoms in rapid cooling from a molten state. In addition, this prominent scientist cleared the way for the production of high-density ceramics and perfect crystals for use in ICs.

Category of Medical Technology

"Research and development of artificial organs and their relevant technology"

Dr. Willem J. Kolff
(USA)

Professor at the University of Utah. Head of the Institute for Biomedical Engineering.
Born in 1911
Died in 2009

As father of artificial organ technology, Dr. Kolff achieved clinical success in the development of a rotating drum-type kindney device in 1943. He then continued to work to popularize disposable-type artificial kidneys while playing a leading role in the development of artificial lungs and hearts.

1987 (3rd)

Category of Improvement of Biological Functions

"Development of the IR8 and IR36 strains for rice breeding strategies geared to the tropical and subtropical zones"(Joint Award)

Dr. Henry M. Beachell
(USA)

Former head of the Plant Breeding Department at the International Rice Research Institute (IRRI)
Advisor to the Farms of Texas Company
Born in 1906
Died in 2006

Dr. Beachell has taken part in the IRRI's rice strain improvement projects since the institute's establishment. In 1966 he developed the IR8 strain that helped pave the way for the "green revolution" in developing nations.

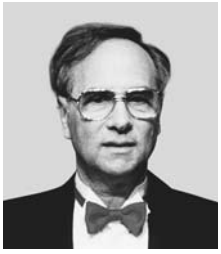
Dr. Gurdev S. Khush
(India)

Head of the Plant Breeding Department at the International Rice Research Institute (IRRI)
Born In 1935

Carrying on the work begun by Dr. Beachell, Dr. Khush further improved IR8 and in 1976 developed IR36, a strain highly tolerant of poor environmental conditions. IR36 contributed immensely to the attainment of production stability and self-sufficiency in rice in tropical and subtropical countries.

Category of Electro-Optics

"Realization of the world's first laser"



Dr. Theodore H. Maiman
(USA)

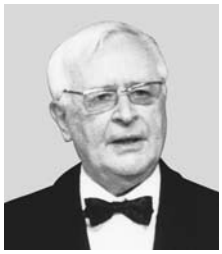
Former chief of research at Hughes Research Laboratories
President of Maiman Associates Inc.
Born in 1927
Died in 2007

This pioneer in electro-optics became in 1960 the first scientist to succeed in generating radiation with a ruby laser, greatly aiding subsequent research on lasers. Dr. Maiman has also made a major contribution towards the advancement of the fields of natural science and engineering technology.

1988 (4th)

Category of Energy Technology

"Establishment of fast breeder reactor technology"



Dr. Georges Vendryes
(France)

Scientific advisor to the president of the Commissariat l'Energie Atomique (CEA).
Born in 1920

Following his contribution to the establishment of the fundamentals of nuclear power design and the promotion of fast breeder reactor development, Dr. Vendryes' work led to the successful completion of "Super Phoenix," the world's first large-scale test breeder, establishing practical technologies for a solution to mankind's energy problem in the future.

Category of Preventative Medicine

"The eradication of smallpox" (Joint Award)

Dr. Donald A. Henderson
(USA)

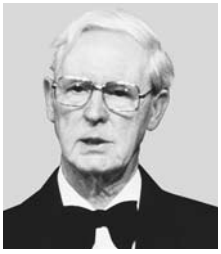
Dean, Johns Hopkins University, School of Hygiene and Public Health
Born in 1928

As the first chief medical officer of the WHO World Smallpox Eradication Office, Dr. Henderson dedicated his efforts to the development of group vaccination programs and contributed to its historic auccess through the worldwide eradication of smallpox.

Dr. Isao Arita
(Japan)

Director, Kumamoto National Hospital
Born in 1926

As the second chief medical officer of the WHO World Smallpox Eradication Office, Dr. Arita established basic disease control knowledge and performed epidemiological analysis as well as surveys and research into vaccine quality improvement.



Dr. Frank Fenner
(Australia)

Professor Emeritus, Visiting Fellow, The John Curtin School of Medical Research, The Australian National University
Born in 1914

Dr. Fenner, as the chairman of the WHO Smallpox Eradication Surveillance Committee, supervised implementation of the global smallpox eradication program and his consistent efforts greatly contributed to its success.

"Discovery of the AIDS causing virus and development of diagnostic methods" (Joint Award)

Dr. Luc Montagnier
(France)

Chief, Department of Virus Tumours, Pasteur Institute
Born in 1932

Leading the joint research staff at the Pasteur Institute in 1983, Dr. Montagnier became the first researcher in the world to discover HIV, the pathogen behind AIDS, thus launching the start of genuine HIV research. He has also developed practical blood serum diagnostic methods for the establishment of basic preventative countermeasures.

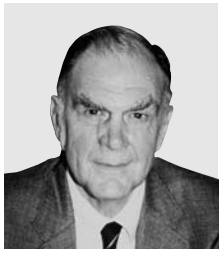
Dr. Robert C. Gallo
(USA)

Chief, Laboratory of Tumour Cell Biology, National Institute of Health
Born in 1937

Leading his own independent research group, Dr. Gallo established a method of culturing human T cells and succeeded in isolating the HIV virus, making a major contribution to analysis of its relationship with AIDS. He is also a pioneer in the research and development of AZT, the most effective AIDS treatment thus far, as well as in the effort to manifest a virus gene and realized and AIDS vaccine.

Category of Environmental Science and Technology

"Studies on the mechanisms of stratospheric ozone depletion by chlorofluorocarbons"



Dr. Frank Sherwood Rowland
(USA)

Profesor at University of California, Irvine
Born in 1927

In 1974, Dr. Rowland, who studied physical chemistry, was the world's first scientist to point out the mechanisms by which chlorofluorocarbons could destroy the ozone layer which protects life on earth from harmful ultraviolet solar radiation.

He also predicted that if emission of chlorofluorocarbons continues at its current rate, it would eventually result in a 7-13% loss of the total ozone.

Dr. Rowland's theoretical insights and predictions have been verified by scientists throughout the world, and have done much to strengthen international efforts for the preservation of stratospheric ozone.

Category of Medicinal Science

"Pioneering contributions to the syntheses of prostaglandins and their related compounds which are of great therapeutic value"

Dr. Elias James Corey
(USA)

Professor at Harvard University
Born in 1925

Dr. Corey's study covered almost all fields of organic chemistry. He became the first researcher to synthesize pure prostaglandins in natural, optically active form. This allowed the large scale production of all natural prostaglandins to provide a stable supply for other researchers, thus contributing considerably to the development of biochemistry and medicine.

His synthesis had three major advantages over other methods in terms of efficiency, versatility, and economy.

Dr. Corey's achievement in the synthesis of eicosanoids is a monumental work in modern medicinal science. It is broadly expected that this synthesis will facilitate development of medicines for such diseases as cerebral thromboisis, arteriosclerosis and gastric and intestinal ulcers.

1990 (6th)

Category of Technology of Integration - Design, Production and Control Technologies

"Establishment of an academic field named Artificial Intelligence and the proposal of fundamental theories in that field"

Dr. Marvin Minsky (USA)

Professor of Electrical Engineering, MIT
Born in 1927

Dr. Marvin Minsky published his paper "Steps Toward Artificial Intelligence" in 1961 and this gave Artificial Intelligence (AI) world wide exposure and has earned Dr. Minsky the title of "Father of AI". Artificial Intelligence became increasingly complex by the 1970s, involving vast amounts of knowledge and the need to use specially appropriate pieces of knowledge at particular times. Dr. Minsky proposed a theory of frames for the effective representation and utilization of knowledge in computers. In the 1980s, AI has produced many more practical application systems and many researchers have turned toward the question of how to make machines learn more by themselves. In addition to the development of the theory and practical application systems, he emphasized the necessity of study on the human mind including emotion and self consciousness. In his book "Society of Mind," he proposed a model of the human mind which consists of many small agents (computers) working together by communicating with each other. His proposal is expected to further expand the AI technology to other fields of science and help promote AI applications.

Category of Earth Science

"Initiation of the theory of plate tectonics and contributions to its development" (Joint Award)

Dr. William Jason Morgan (USA)

Professor at Princeton University
Born in 1935

Dr. Morgan began his revolutionary work by dividing Earth's outer shell into some 20 plates, analyzing their movements as rigid, rotating segments of the shell, and measuring absolute velocities of plate motion. Mid-oceanic ridges, subduction zones and transform faults all came to be interpreted as results of the movements of these plates. The great significance of Dr. Morgan's theory became widely recognized and his work subsequently triggered numerous studies in a variety of fields.

Dr. Dan Peter McKenzie (UK)

Professor at Cambridge University
Born in 1942

Dr. Mckenzie has analyzed earthquake systems in the circum-Pacific region and has demonstrated independently that the floor of the Pacific Ocean moves as a single plate, rotating against North America and East Asia. In collaboration with Dr. Morgan, Dr. Mckenzie has also carried out a geometrical analysis of triple junctions where three plates meet. This work has contributed greatly to understanding the relative motion of plates and the energetics of plate movements. He has also proposed the highly original model that large sedimentary basins, important in the formation of oil and natural gas deposits, are formed by thinning of the crust due to plate motion.

Dr. Xavier Le Pichon (France)

Directeur du Département de Géologie,
Ecole Normale Supérieure
Born in 1937

Dr. Le Pichon, inspired by the work of Dr. Morgan has independently determined plate movements over the entire surface of Earth, using ocean floor spreading velocities estimated from paleomagnetic patterns and the directions of transform faults. He has also published a book on plate tectonics which has had a great influence on Earth scientists throughout the world, and has played a major role in seafloor investigation at plate boundaries. Through these works, he has contributed greatly to the understanding of the geological nature of plate boundaries under the ocean.

1991 (7th)

Category of Applied Mathematics

"Contributions to analysis and control of distributed systems, and to promotion of applied analysis"

Dr. Jacques-Louis Lions (France)

The Chairman of Analysis and Systems Control at the Collège de France and the President of National Center of Space Studies (CNES)
Born in 1928
Died in 2001

Dr. Lions led the world to establish the new field of applied mathematics which makes good use of expertise inherited inside the traditional discipline of analysis and which can fully benefit from the powerful functions of modern computers.

His research and achievements have covered exceedingly wide areas, including establishment and development of the control theory of distributed systems which are governed by partial differential equations.

The method is expected to be the most promising among existing mathematical approaches to global and environmental problems.

As for applications in industry, Dr. Lions made considerable contributions to computational aerodynamics for the aerospace industry, simulation for the petroleum industry and mathematical analysis for the French Energy Agency.

Category of Imaging Techniques in Medicine

"Development of ultrasound imaging in medicine"

Dr. John Julian Wild (USA)

M.D., Ph.D., FAIUM, Head, Physicomedical Institute, Minneapolis
Born in 1914

In 1949, Dr. Wild manufactured prototype equipment for A-mode ultrasonography and with this equipment, he succeeded in measuring the thickness of the human colon. This was the first attempt to use ultrasound for biomedical application.

Subsequently, he developed a two-dimensional ultrasound image employing B-mode equipment, for which he has been also recognized as being the first pioneer of medical ultrasonic imaging. The method today is widely used on a variety of occasions including detection and diagnosis of brain tumors and breast cancer. In particular, the breast imaging by this equipment brought about the successful imaging of a tiny 7mm diameter nipple cancer.

1992 (8th)

Category of Science and Technology of Material Interfaces

"Contributions to the new development of the chemistry and physics of solid surfaces"

Prof. Dr. Gerhård Ertl (Germany)

Director of Fritz-Haber Institute of Max Planck Society, Honorary Professor at the Free University Berlin and at the Technical University Berlin
Born in 1936

Since the 1960s, Professor Ertl has developed extensive studies on the chemisorption phenomena of atoms or molecules of representative chemicals on metal surfaces, and has explained a number of important phenomena such as phase transitions in chemisorbed layers and the surface reconstruction induced by adsorption.

He has also pioneered and developed the study of the dynamical aspects of chemical processes on metal surfaces in atomic and molecular level.

By a series of outstanding scientific achievements in this area, he has opened up a new area of surface science, and made invaluable contributions to the development of this important and new research area in science and technology of material interfaces.

Category of Science and Technology for Biological Production

"Discovery of method of the cryopreservation of semen and embryos in farm animals"

Prof. Ernest John Christopher Polge (UK)

The Scientific Director of Animal Biotechnology Cambridge Ltd.
Born in 1926
Died in 2006

Prof. Polge developed a new method for preservation of spermatozoa whereby bull semen in glycerol-containing media withstood freezing at a very low temperature (-79°C). This has promoted the growth of what has become a new science of cryobiology with practical applications in various spheres in medicine and agriculture. There is no doubt that the largest application has been in the deepfreezing of semen for artificial insemination, particularly in cattle; in which the impact on breeding and livestock improvement has been great. The development of techniques for the preservation of embryos at low temperatures is now being applied in a number of farm animal species.

1993 (9th)

Category of Safety Engineering and Disaster Mitigation

"Development of modern seismology and advancement of international cooperation in disaster science"

Dr. Frank Press
(USA)

President of U.S. National Academy of Sciences
Born in 1924

Dr. Press was the first to propose that the dispersion of long period eathquake surface wave motion could be used as a tool for studying the structure of the earth's crust and upper mantle. Analyzing surfaces waves, Dr. Press verified that the occurrence of an earthquake is fault motion itself. It was the beginning of modern seismology and the forerunner for studies on earthquake mechanisms.

Dr. Press was the leader in the promotion of scientific reseach and development in the area of disaster mitigation. As demonstrated by his efforts for International Geophysical Year (IGY) and Worldwide Standardized Seismograph Network (WWSSN), he recognized the importance of international cooperation in disaster sciences. He conceived and has been a leader in promoting the International Decade for Natural Disaster Reduction (IDNDR), a UN program in which the international community, under the auspices of the UN, will pay special attention during the last decade of the century to fostering international disaster (such as earthquakes, floods, droughts, volcanos, landslides, windstorms and wildfires) reduction.

Category of Molecular and Cellular Technology in Medicine

"Development of the polymerase chain reaction"

Dr. Kary B. Mullis
(USA)

Founder and Vice President Research, Atomic Tags, Inc.
Born in 1944

The polymerase chain reaction (PCR) which was devised by Dr. Kary Mullis, has revolutionized molecular genetics, molecular biology, medicine and many other related scientific fields. The PCR is a way of amplifying specific DNA sequences from small amounts of a complex template. Thus, in medicine the PCR has had a major impact on the diagnosis and screening of genetic diseases and cancer, the rapid detection of fatidious or slow growing microorganisms and viruses, the detection of minimal residual disease in leukemia. The method has also been applied to studies on molecular evolution. Analysis of DNAs from different human populations allowed the construction of phylogenetic trees. Samples of historic or ancient DNA from extinct species have successfully been subjected to PCR amplification. This capability of analyzing minute quantities of degraded DNA makes it possible to apply PCR for forensic purposes.

1994 (10th Anniversary)

Category of Aerospace Technologies

"Inspirational leadership in unmanned lunar and planetary exploration, and for pioneering achievements in the development of spacecraft and deep space communications"

Dr. William Hayward Pickering
(USA)

Professor Emeritus of the California Institute of Technology
Born in 1910
Died in 2004

Dr. Pickering, as a Director of the JPL, the California Institute of Technology, had made many pioneering contributions to space technologies such as the development of spacecraft as a means for space exploration, and the development of deep space communications network for data acquisition for 32 years. Owing to his command and guidance technologies, the USA's first artificial satellite "Explorer 1" was launched in 1958. And "Pioneer 4", the design of which was led by him, succeeded in becoming the first U.S. man made object to escape from the Earth's gravitational field in 1959. He developed new technologies for digital communications and high definition television. His achievements have made significant contributions to the "expansion of mankind's active domain to outer space". His technologies have been applied in many fields and have contributed to the welfare of mankind.

Category of Psychology and Psychiatry

"Discovery of dopamine as a neurotransmitter and clarification of its role in mental and motor functions and their disorders"

Dr. Arvid Carlsson
(Sweden)

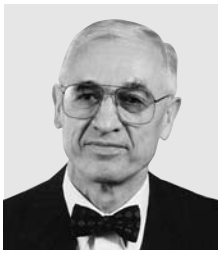
Professor Emeritus, Gothenburg University
Born in 1923

Dr. Arvid Carlsson has made substantial contributions towards the clarification of the functions of dopamine in the brain. This has promoted causal treatment of Parkinson's disease. In 1988, he presented a modified hypothesis on schizophrenia. This showed a direction to understand schizophrenia as a putative transmitter imbalance syndrome and opened up new therapeutic strategies for Parkinson's disease. He has been an international leader in the field of neuropsychophamacology for three decades. His original and unique discoveries in dopamine research have led to a new understanding and new effective treatments for Schizophrenia and Parkinson's disease. He has made a great contribution to the development of psychology and psychiatry from the field of neuropsychopharmacology.

1995 (11th)

Category of Materials Processing Technologies

"Outstanding contributions to research and practical applications of light emitting diodes and lasers through pioneering achievements in the understanding of physical principles and in the process technology of intermetallic compound semiconductors"



Dr. Nick Holonyak, Jr.
(USA)

Professor, Center for Advanced Study, John Bardeen Chair Professor, University of Illinois
Born in 1928

Dr. Nick Holonyak, Jr. focused his research on intermetallic compound semiconductors, which led him to the invention of the first practical light emitting diode (LED) by the use of GaAsP crystals. In 1962, he made the first visible light semiconductor laser.

He extended his research to develop ternary and quaternary compound semiconductors, and was the first to succeed in independent control of the energy gap and lattice constant for preparing devices.

He was the first (1978) to achieve continuous room temperature operation of a laser with quantum-well-structure.

Dr. Holonyak's achievements ranging from research to practical developments on light-emitting diodes and lasers gave continuous stimulus and remarkable enrichment both to physics and technology.

Category of Science and Technology for Agriculture, Forestry and Fishery which conserves the Environment

"Pioneer contributions in the development of integrated pest management by the sterile insect release method and other biological approaches"

Dr. Edward F. Knipling
(USA)

Retired Director, Entomology Research Division, Agricultural Research Service, USDA
Born in 1909
Died in 2000

Dr. Edward F. Knipling has devoted himself to the research on insect pest as a agricultural entomologist since 1931. He proposed the truly original idea of environmentally friendly pest control by suppressing the insect population in agricultural crops and domestic animals. Accordingly, he made outstanding contributions to the improvement of food production. He developed a new concept of insect pest control known as the sterile insect release method. In 1931 he attained great success in eradicating the screwworm fly, a serious and sometimes fatal pest of livestock in the Southwest region of the United States. From 1953, he made important contributions to the development of an environmentally sound method of insect pest control. He proposed and played a key role in promoting Integrated Pest Management. He played a leading role in scientific research and in application of his findings in terms of pest control without harming the environment.

1996 (12th)

Category of Information, Computer and Communication Systems

"For pioneering research on wide-band, low-loss optical fiber communications"

Dr. Charles K. Kao
(USA)

Vice-Chancellor and President, The Chinese University of Hong Kong.
Born in 1933

The research on optical communications, which is expected to bring forth extensive social innovation, substantially started in 1960 with the invention of the laser, followed by studies on light source, transmission line and photodetectors. Dr. Kao predicted in specific terms the possibility of realizing large capacity optical communications using optical fiber, at an earlier phase, based on his own reasoning for the applicability of optical fiber to the large capacity transmission, and estimation of possible transmission range on the basis of presupposed loss and tolerable photoelectric power level. He played pioneering and leading roles in the exploitation of optical fiber transmission lines and his works are clearly appreciated in the world as having exerted a significant impact on the subsequent development of optical communication technology.

Category of Neuroscience

"Elucidation of the functional principles and neural mechanisms of the cerebellum"

Dr. Masao Ito
(Japan)

Director-General, Frontier Research Program, The Institute of Physical and Chemical Research(RIKEN);
President, Science Council of Japan
Born in 1928

Dr. Masao Ito has tried over 40 years to elucidate neural mechanisms of the brain by using a combination of neurophysiological, cell-biological, system-theoretical, and molecular biological approaches. In particular, he succesfully revealed several basic features of cerebellar function, such as inhibitory output of the Purkinje cells which is mediated γ-aminobutyric acid. He also found that the flocculus of the cerebellum plays a key role in adaptive control of the vestibule-ocular reflex, a basic reflex circuit, by way of a synaptic plasticity, the long-term depression, which is the basic of the learning capability of cerebellar cortical neural circuits. Furthermore, he and his collaborators elucidated molecular processes underlying long-term depression. They succeeded in inducing a reversible learning deficit by temporally inactivating long-term depression. The recent model he proposed aims at explaining a certain category of mental function, implicit memory, as function of the newest part of the cerebellum. His success gave a great impetus to researches in the neuroscience discipline.

1997 (13th)

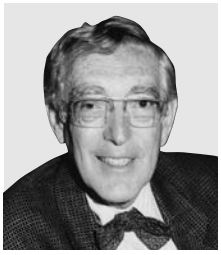
Category of Biotechnology in Medicine

"Contribution to establishment of fundamental concept on causes of cancer" (Joint Award)

Dr. Takashi Sugimura (Japan)

President Emeritus of National Cancer Center and President of Toho University
Born in 1926

As early as 1957, Dr. Sugimura discovered the carcinogenicity of a mutagen, 4-nitroquinoline-1-oxide. In 1967, he successfully induced stomach cancer in rats by oral administration of a mutagen, N-methyl-N'-nitro-N-nitrosoguanidine. He subsequently established the fact that many carcinogens were mutagens. He successfully isolated and identified many carcinogens with a structure of heterocyclic amine from foods cooked under ordinary conditions. He further developed his studies to analyze multiple step carcinogenesis at molecular levels. He demonstrated that many environmental carcinogens could be identified by their mutagenicity. He has made crucial contributions to the establishment of the fundamental concept on causes of cancer.



Dr. Bruce N. Ames (USA)

Professor of Biochemistry and Molecular Biology, University of California, Berkeley
Born in 1928

Dr. Ames first established an efficient in vitro assay for mutagens using Salmonella in 1971. This "Ames test" has been used widely in research institutes, industries and regulatory agencies around the world for screening environmental carcinogens and mutagens. This test has also been used to study metabolisms of carcinogens and mutagens. He established the fact that many carcinogens were mutagens. He made further contributions to the understanding of endogenous oxygenradicals in carcinogenesis and to the understanding of the mechanisms involved in aging. He demonstrated the close relationship between mutagenicity and carcinogenicity. He has made crucial contributions to the establishment of the fundamental concept of causes of cancer.

Category of Systems Engineering for an Artifactual Environment

"Establishment of the robot industry and creation of a techno-global paradigm" (Joint Award)

Dr. Joseph F. Engelberger (USA)

Chairman and Director,
HelpMate Robotics Inc.
Born in 1925

Dr. Engelberger foresaw from the beginning that machines called robots would markedly improve productivity and was a key person in their development and introduction for practical purposes. He has greatly contributed to the long-term expansion and development of the world economy by innovatively improving productivity in the manufacturing industry.

Dr. Hiroyuki Yoshikawa (Japan)

Former President, The University of Tokyo
Born in 1933

Dr. Yoshikawa has shown that the professional disciplines associated with the production of artifacts have been too specialized with respect to the system of knowledge, which has made the solving of such problems as environmental destruction and depletion of resources difficult.

He has played a leading role in research in systematizing knowledge related to design and manufacturing and has developed a new field called general design theory. Based on this concept, he has proposed artifactual engineering in order to solve the above problems.

1998 (14th)

Category of Generation and Design of New Materials Creating Novel Functions

"For the creation and realization of the concept of man-made superlattice crystals which lead to generation of new materials with useful applications"

Dr. Leo Esaki
(Japan)

Former President, University of Tsukuba
Born in 1925

Dr. Leo Esaki proposed the concept of "semiconductor superlattice," realized it, and discovered its peculiar properties such as negative differential conductivity and resonant tunneling. His concept of the superlattice inspired many other scientists. It underlies the high-speed transistor HEMT, optical devices with multiple-quantum wells, and giant magneto-resistance. "Superlattice" was a great accomplishment in terms of the generation and design of new materials to create novel functions. (Dr. Esaki was awarded with a Nobel Prize in Physics in 1973 for his discovery of tunneling in semiconductor p-n junctions. Superlattice is another great accomplishment he has made.)

Category of Biotechnology in Agricultural Sciences

"Establishment of the theory and method of the production of transgenic plants" (Joint Award)

Prof. Dr. Jozef S. Schell
(Belgium)

Director, Department of Genetic Principles of Plant Breeding, Max-Planck-Institute für Züechtungsforschung, Germany
Born in 1935
Died in 2003

Dr. Marc C.E. Van Montagu
(Belgium)

Professor, Department of Genetics, University of Ghent, Belguim.
Born in 1933

Dr. Schell and Dr. Van Montagu showed that the formation of tumors in plants with Agrobacterium is attributable to insertion of some genes contained in the bacteria into the nuclear genomes of host plants. They utilized this system to develop methods for efficient transfer of foreign genes into plant genomes. Recent advances in the production of transgenic plants have been based on their work.

1999 (15th)

Category of Information Technologies

"Establishment of coding theory for reliable digital communication, broadcasting and storage"

Dr. W. Wesley Peterson
(USA)

Professor of Information and Computer Sciences, University of Hawaii at Manoa
Born in 1924

Dr. W. Wesley Peterson authored Error-Correcting Codes, the "bible" for the coding theory, and established the fundamentals of this field. He created the conceptual framework of coding theory on the basis of modern algebra and invented practical implementation methods for error detection and correction. This led to an exceptionally important contribution in the industrial application of error-correcting codes. Current digital communication, broadcasting and storage systems owe their reliability to his research results.

Category of Molecular Recognition and Dynamics in Bioscience

"Elucidation of the three-dimensional structures of class I and class II human histocompatibility antigens and their bound peptides" (Joint Award)

Dr. Jack L. Strominger
(USA)

Higgins Professor of Biochmistry, Harvard University.
Born in 1925

Dr. Don C. Wiley
(United States.)

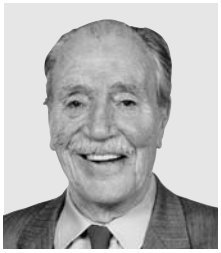
John L. Loeb Professor of Biochemistry and Biophysics, Harvard University.
Born in 1944
Died in 2001

Dr. Jack L. Strominger and Dr. Don C. Wiley were the first to elucidate the three-dimensional structures of the human histocompatibility complex class I and class II molecules. Their work provided a detailed understanding of how peptides derived from processed foreign antigens and self proteins are presented to T lymphocytes for the initiation of an immune response. Their work also opened a wide vista for investigation of autoimmunity, transplantation rejection, tumor immunity and the response to foreign pathogens.

2000 (16th)

Category of City Planning

"Establishment of an ecological city planning process and proposal of a land use evaluation system"



Prof. Ian L. McHarg (USA)

Professor Emeritus, Department of Landscape Architecture and Regional Planning, University of Pennsylvania.
Born in 1920
Died in 2001

Prof. Ian L. McHarg introduced ecological ideas into city planning, visualized environmental ecosystems on overlay maps of factors such as physiography, hydrology, vegetation, and historical landmarks, and developed an innovative land use evaluation system, clarifying the suitability of, and restrictions on, land use. He is recognized as a founder of ecological planning, because of his distinguished achievements in the 1960s - when disorderly urban developments dominated - in ecological city planning, making the most of the abundant potential capabilities of nature. His methodology has had great influence upon city planning in an age when the global environment is of the utmost concern.

Category of Host Defense

"Discovery of Immunoglobulin E and mechanisms of IgE-mediated allergic reactions"

Dr. Kimishige Ishizaka (Japan)

President Emeritus, La Jolla Institute for Allergy and Immunology
Born in 1925

Dr. Kimishige Ishizaka was the first to discover immunoglobulin E and to elucidate fundamental mechanisms of allergic reaction at cellular and molecular levels. His work has profoundly influenced other medical research areas and even contributed to the clinical diagnosis and treatment of allergic diseases.

2001 (17th)

Category of Science and Technology of Environment Conscious Materials

"Discovery of environmentally benign electrode materials for high energy density rechargeable lithium batteries"

Dr. John B. Goodenough (USA)

Professor, University of Texas
Born in 1922

Dr. Goodenouth recorded notable achievements in the field of solid-state science and made a great contribution to fundamental science. His well-known studies are on magnetism and the conductivity of transition metal compounds and on superionic conductors. Based on these research results and with profound insights, he found electrode materials for high-performance lithium batteries and used these materials to develop high-capacity portable rechargeable batteries. These batteries are not only environmentally benign but also very effective in the reduction of carbon dioxide emission.

Category of Marine Biology

"Contribution to the development of biological / fisheries oceanography and for conservation of fishery resources and marine environment"

Dr. Timothy R. Parsons (Canada)

Professor Emeritus, University of British Columbia
Born in 1932

Through his research devoted to obtaining a holistic understanding of how pelagic organisms are interconnected in the trophodynamic food-web of the sea, Dr. T.R. Parsons has made a great contribution to the development of Biological Oceanography as determined today. His goal has been to present an alternative method for the management of fisheries, based on measuring of dynamic relationships between fish and their physical, chemical and biological environments.

2002 (18th)

Category of Computing and Computational Science and Engineering

"Advancement of civilization through invention, implementation and deployment of the world wide web"

Dr. Timothy John Berners-Lee (UK)

Senior Research Scientist, Laboratory for Computer Science, M.I.T.
Born in 1955

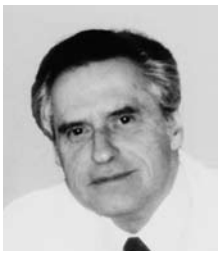
Dr. Timothy John Berners-Lee is the inventor of the World Wide Web. Through his invention people were able to acquire information and work together by combining their knowledge in a web using hypertext documents through the Internet. He implemented the first World Wide Web using HTML, Hypertext Markup Language developed by himself. The World Wide Web has made revolutionary change in information exchange and communication among people, contributing to the globalization of information and communication in the world. It has created new forms of commercial and industrial activities like E-commerce, internet publications of newspapers and books, and more. The World Wide Web has made a profound and farreaching contribution not only to science and technology but also to the advancement of the civilization.

Category of Developmental Biology

"Pioneering work on mammalian embryonic development" (Joint Award)

Dr. Anne McLaren, DBE, FRS, FRCOG (UK)

Principal Research Associate, Wellcome Trust / CRC Institute
Born in 1927
Died in 2007



Dr. Andrzej K. Tarkowski (Poland)

Director of the Institute of Zoology, Warsaw University
Born in 1933

Drs. Anne McLaren and Andrzej K. Tarkowski pioneered the developmental biology of mammals using a mouse as a model and established technologies to manipulate early embryos. Taking advantage of chimeric embryos in particular, they demonstrated the enormous plasticity of early embryonic cells, and gave deep insight into fundamental questions on mammalian embryonic development, such as how sexes differentiate, how genetic information of sexually distinct parents differentially contributes to development, and how cells interact in developing tissues. This work has proved fundamental as regards major issues not only of current developmental biology which are of increasing importance, but also for the progress of basic medical and veterinary sciences.

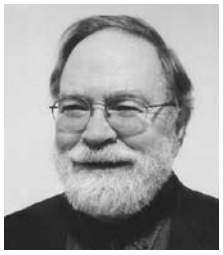
2003 (19th)

Category of Science and Technology of Complexity

"Creation of universal concepts in complex systems - chaos and fractals" (Joint Award)

Dr. Benoit B. Mandelbrot (USA)

Sterling Professor of Mathematical Sciences, Mathematics Department, Yale University IBM Fellow Emeritus, TJ Watson Research Center, International Business Machines Corporation
Born in 1924



Dr. James A. Yorke (USA)

Distinguished University Professor of Mathematics and Physics, Institute for Physical Sciences and Technology, University of Maryland
Born in 1941.

The world we live in is so complex that it is an enormous challenge to understand the fundamental nature of its complexities. Nature is filled with complex geometrical shapes. Dr. Mandelbrot discovered that "self-similarity"is the universal property that underlies such complex shapes, and he coined the expression "fractal."

Many different, variable complex patterns of behavior are found in dynamic phenomena, Dr. Yorke found the universal mechanism underlying such nonlinear dynamic phenomena and summed it up using the term "chaos."

The two concepts, chaos and fractals, have been established as universal concepts underlying such phenomena. Dr. Mandelbrot and Dr. Yorke utilized, respectively, the terms fractal and chaos and elucidated their fundamental properties. They have provided new frameworks for understanding complex phenomena, and have defined both their foundations and their applications.

Category of Visualizing Techniques in Medicine

"Discovery of the principle for functional magnetic resonance imaging"

Dr. Seiji Ogawa (Japan)

Director, Ogawa Laboratories for Brain Function Research,
Hamano Life Science Research Foundation
Born in 1934

Dr. Seiji Ogawa discovered the principle upon which the field of functional and physiological imaging of the human body, particularly the human brain, is based. He searched for physiologically dependent signals in magnetic resonance imaging (MRI), and found BOLD (Blood Oxygenation Level Dependent) signal contrast in MR images of the brain, This work has proved to be the fundamental basis of noninvasive functional imaging methodology that is now widely used not only in many biological and medical sciences, such as neurobiology, psychology and neurology, but also in many fields of clinical medicine as diagnostic tools.

Category of Chemical Technology for the Environment

"Pioneering work on photochemical catalysis and its application for the environment" (Joint Award)

Dr. Kenichi Honda
(Japan)

Professor Emeritus, The University of Tokyo
Born in 1925

Dr. Akira Fujishima
(Japan)

Chairman, Kanagawa Academy of Science and Technology
Born in 1942

Dr. Honda and Dr. Fujishima found that irradiation of solar light onto a single crystal titanium dioxide (TiO_2) electrode resulted in the splitting of water into hydrogen and oxygen (The Honda-Fujishima effect). Thus, they pioneered research on artificial photosynthesis and production of hydrogen as a clean energy from water by using solar light. Furthermore, the development of the self-cleaning coatings of TiO_2 on a variety of surfaces is going to produce a new industry of photocatalysts, which significantly contributes to environmental conservation. The contributions of these two scientists to "Chemical Technology for the Environment" for the sustainable development of society are enormous.

Category of Food Production Based on Ecosystem Concepts

"Contributions to the understanding of shelf ecosystems and their sustainable utilization"

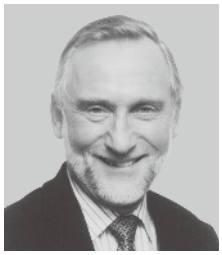
Dr. Keith J. Sainsbury
(New Zealand)

Senior Principal Research Scientist, Division of Marine Research, Commonwealth Scientific and Industrial Research Organization (CSIRO)
Born in 1951

Dr. K.J. Sainsbury greatly contributed to the establishment of marine bio-resource management strategies for sustainable fishery production based on his basic studies on population dynamics including experimental fishery management mainly of demersal fish resources in the shelf ecosystem and consequently to the planning of the Australian marine policy. He also contributed much to the development of a paradigm for sustainable utilization of fishery resources in tropical and temperate marine areas.

Category of Science and Technology for Conservation of Biodiversity

"Observational, experimental and theoretical achievements for the scientific understanding and conservation of biodiversity"



Prof. John H. Lawton
(UK)

Chief Executive, Natural Environment Research Council
Born in 1943

Prof. John H. Lawton is a prolific contributor to fundamental research on the ecological aspect of biodiversity. He studied various organisms, including birds, mammals, insects, and plants. He analyzed various species of these groups and the ways in which they co-exist with other species. Based on conservation, biological observation and analysis, he also contributed to the protection of bird species, actually serving as a key person in environmental NGOs.

2005 (21st)

Category of Information and Media Technology

"Pioneering contributions to natural language processing and intelligent image processing"

Dr. Makoto Nagao
(Japan)

President, National Institute of Information and Communications Technology
Born in 1936

Dr. Makoto Nagao has pioneered research in the fields of machine translation, natural language processing, and image processing, and has achieved extensive results that have had a significant impact on other researchers in this field. Notably, he developed a fully functional Japanese-to-English / English-to-Japanese translation system, and was the world's first advocate of example based translation in machine translation. In image processing, he was the first to introduce feedback analysis mechanisms, which had a dramatic impact on many later research activities. He developed the world's first digital library prototype system incorporating natural language processing and image processing technologies, and has contributed to the new digital library era. In addition to being a pioneer, Dr. Nagao has been a leader in this field as well, for example as a founder of the International Association for Machine Translation and The Association for Natural Language Processing.

Category of Cell Biology

"Fundamental contribution in elucidating the molecular mechanisms of cell adhesion" (Joint Award)

Dr. Masatoshi Takeichi
(Japan)

Director of RIKEN Center for Developmental Biology
Born in 1943

Dr. Erkki Ruoslahti
(USA)

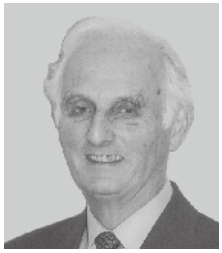
Distinguished Professor, The Burnham Institute
Born in 1940

Cell adhesion is fundamentally important in the construction of tissues and organs. Dr. Masatoshi Takeichi and Dr. Erkki Ruoslahti pinpointed the essential core processes in the complex phenomena of cell adhesion and succeeded in elucidating the mechanisms at the molecular level. Their accomplishments are expected to fundamentally contribute to working out the etiology and developing therapy of serious diseases such as malignant tumors.

2006 (22nd)

Category of Global Change

"For pioneeering research on atmospheric structure and composition based on his satellite observation technology and for promotion of international assessments of climate change."



Sir John Houghton CBE FRS
(UK)

Honorary Scientist, Hadley Centre for Climate Prediction and Research and Formerly Chief Executive, Meteorological Office, U.K.
Born in 1931

Observations by weather satellites began in the 1970s. When Sir John Houghton developed a new means for making observations to measure the temperatures and composition of the upper atmosphere based on his independent theory. This opened the way to elucidating the three-dimensional temperature structure of, and distribution of micro-components such as ozone in the atmosphere across the entire globe. Then he established the Hadley Centre for Climate Prediction and Research to pursue this research and to study international climate change. He also has played a central role in compiling the First, Second and Third Assessment Reports under the auspices of the Intergovernmental Panel on Climate Change (IPCC).

Category of The Development of Novel Therapeutic Concepts and Technologies

"The discovery of the statins and their development"

Dr. Akira Endo
(Japan)

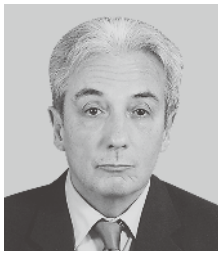
Director, Biopharm Research Laboratories, Inc., Tokyo, Japan
Born in 1933

In 1973 Dr. Akira Endo isolated from penicillium a ground-breaking substance called ML-236B (currently known as compactin) that lowers blood cholesterol levels, and confirmed that it was also effective in humans. This discovery triggered world-wide research into the compactin group and resulted in the birth of several hypercholesteremia drugs from amongst that group. These drugs, known collectively as statins, are presently used by approximately thirty million people around the world and help to prevent cardiac disease and strokes and so on.

2007 (23rd)

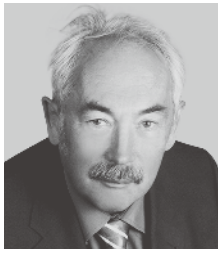
Category of Innovative Devices Inspired by Basic Research

"The discovery of Giant Magneto-Resistance(GMR) and its contribution to development of innovative spin-electronics devices" (Joint Award)



Prof. Albert Fert
(France)

University of Paris-South
Born in 1938



Prof. Dr. Peter Grünberg
(Germany)

The Research Center of Solid State Physics
Born in 1939

Computer hard discs, which store vast amounts of memory, are improving year by year and at a faster rate than ever before. Now, however, these memory storage discs are not limited to computers, but are also being used in such electronic appliances as mobile music devices and video cameras. The reason behind the great increases in memory storage capacity and the rapidly diversifying use of hard discs is the discovery of Giant Magneto-Resistance (GMR), a groundbreaking technological innovation. The researchers responsible for this astonishing discovery are Prof. Albert Fert and Prof. Dr. Peter Grünberg.

Category of Science and Technology of Harmonious Co-Existence

"Contribution to the conservation of tropical forest"

Dr. Peter Shaw Ashton
(UK)

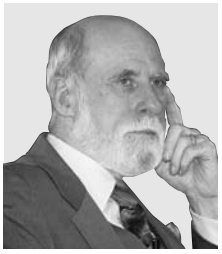
Charles Bullard Professor of Forestry
Born in 1934

In recent times, the destruction of tropical forests has been progressing at an alarming rate. Tropical forests are a veritable treasury of a diverse array of many forms of life, and it is widely believed that the loss of this environment would have a major impact on the ecosystem of the entire planet. Dr. Peter Shaw Ashton was awarded the 2007 Japan Prize in the category of "Science and Technology of Harmonious Co-Existence" for his extensive research into the phylogenetic systemization of flora and ecological studies in the tropical forests of Southeast Asia, and the contribution his findings have made to tropical conservation efforts.

2008 (24th)

Category of Information Communication Theory and Technology

"Creation of network architecture and communication protocol for the Internet" (Joint Award)



Dr. Vinton G.Cerf
(USA)

Vice President and Chief Internet Evangelist, Google Inc.
Born in 1943

Dr. Robert E.Kahn
(United States)

Chairman, CEO & President of Corporation for National Research Initiatives (CNRI)
Born in 1938

The appearance of the Internet has pioneered the way for the establishment of a network society that has completely transformed the lifestyles of people around the world. Two men in particular were instrumental in the creation of the concept for the basic framework and the TCP/IP communication protocol which has made the Internet possible. These men are Dr. Vinton G.Cerf and Dr. Robert E.Kahn. Known as the "Fathers of the Internet," Dr. Cerf and Dr. Kahn continue to lead advances in information communication.

Category of Medical Genomics and Genetics

"Establishment of medical genetics and contributions to its development"

Dr. Victor A. McKusick
(USA)

University Professor of Medical Genetics, the McKusick- Nathans Institute of Genetic Medicine at the Johns Hopkins University
Born in 1921
Died in 2008

With the completion of the human genome project, we have come to understand almost all of the genetic information contained in DNA, which is encoded in a series of letters. However, we are still some way from fully identifying those parts which are related to the treatment of diseases. Dr. Victor A. McKusick, has spent over half a century compiling related knowledge, and advocating the importance of the formulation of a genomic map for genetic disorders. Today, researchers and clinicians around the world are sharing the fruits of Dr. McKusick's labors which have become indispensable to the world of genetic medicine.

Category of Transformation towards a Sustainable Society in Harmony with Nature

"Contribution towards a sustainable world as founded in the 1972 Report titled 'The Limits to Growth' "

Dr. Dennis L. Meadows
(USA)

Professor Emeritus of Systems Policy,
University of New Hampshire
President,Laboratory for Interactive Learning
Born in 1942

For humanity, the Earth is both irreplaceable and finite. The continued survival of humanity on Earth depends on its success in creating a "sustainable society." More than 30 years ago, Dr. Dennis Meadows was at the center of a research group that used scientific analysis to make this point. "The Limits to Growth" shocked the world when first published in 1972, and it continues even today to illuminate the way forward.

Category of Technological Integration of Medical Science and Engineering.

"Contribution to tomographic imaging in nuclear medicine"

Dr. David E. Kuhl
(USA)

Professor, Radiology,
University of Michigan Medical School
Born in 1929

Today various types of diagnostic imaging systems including CT (computed tomography) are used on a daily basis in hospitals and clinics all over the world. Dr. David Kuhl, one of the world pioneers in tomography, began experimenting in the late 1950s by taking cross-sectional images of the distribution of radioisotopes in the body. He went on to develop SPECT (single photon emission computed tomography) in the late 1960s and succeeded in producing the world's first tomographic images of the human body. In addition to having a profound impact on the subsequent development of X-ray CT scanning and MRI (magnetic resonance imaging), Dr. Kuhl's research brought about the realization of PET (positron emission tomography), which is proving to be invaluable in the early detection of cancers.

THE SCIENCE AND TECHNOLOGY FOUNDATION OF JAPAN

PURPOSE

The Japan Prize Preparatory Foundation was established in November 1982 with the approval of the Prime Minister. It was renamed and reinaugurated as the Science and Technology Foundation of Japan in May 1983 with the objective of "promoting the comprehensive spread and development of ideas and information in science and technology, bearing in mind the fact that peace and prosperity for mankind is the common aspiration of all people, and encouraging research that will contribute to this end by targeting scientific and technological advancement."

ACTIVITIES

The Foundation conducts the following activities to accomplish its objectives:

1) Surveys the achievements of scientists and technologists, both domestic and foreign, who have made outstanding contributions to the progress of science and technology.
2) Holds symposia, lectures and discussions, inviting distinguished Japanese and foreign scientists.
3) Issues publicity pamphlets and monographs of scientific and technological papers.
4) Presents the Japan Prize, an international award to honor those who have made remarkable achievements in the fields of science and technology.
5) Maintains close contact and promotes cooperation with Japanese and foreign organizations and bodies related to science and technology.
6) Provides aid and encouragement for both domestic and foreign research in the fields of science and technology.
7) Carries out other activities that support the goals of the Foundation.

MANAGEMENT

The Science and Technology Foundation of Japan is a nonprofit foundation under the direction of the Cabinet Office, The Ministry of Foreign Affairs, and The Ministry of Education, Culture, Sports, Science and Technology.

The Foundation is managed by a board of directors consisting of Prof. Hiroyuki Yoshikawa (Chairman), and other knowledgeable people from various fields. Also established within the Foundation are an advisory council, a selection committee which screens nominees for the Japan Prize and a fields selection committee which decides upon the fields of endeavor within which Japan Prize Laureates will be named.

CONTRIBUTION

Should you wish to support our activities at the Science and Technology Foundation of Japan, we would be glad to furnish you with details on this matter.

Please contact us on:

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(As of April 1, 2009)

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