



HONDA FOUNDATION

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January 2019

Request of Nomination for 2019 Honda Prize

Dear Sir/Madam,

Since its establishment in 1977, the Honda Foundation has been engaging in contribution towards “the creation of a truly humane civilization” by utilizing “ecotechnology” through the activities including awarding of the Honda Prize, hosting international symposia / colloquia, and implementing the Honda Y-E-S Award grant for students in the field of science and technology in Asia.

Since its inception in 1980, the Honda Prize has been awarded to an individual or a group annually who contributes towards the development of science and technology and society along the vision of “ecotechnology” from all over the world with 10 million yen as supplemental prize.

We will again proceed with the selection of the 40th laureate of the Honda Prize 2019.
We would be therefore very much appreciated if you could nominate a candidate.

The eligibility for candidates is as follows:

- ◆ An individual or a group, irrespective of nationality, who has achieved distinguished contribution toward the development of science and technology and society along the vision of “ecotechnology”
- ◆ Achievements should be not only narrow scientific / technological new discoveries and inventions but also be served to the improvement of people’s lives around the world from the view point of entire processes that would bring out, apply, or share solution for facing problems
- ◆ Target fields include the broad range of related scientific fields such as mechanical / electronic / space engineering, chemical, physics, bioscience, agriculture, economics and medicine. It also includes an individual / a group in interdisciplinary research areas

The laureate will be determined through a series of deliberations by multidisciplinary selection committee.

Please use the attached form and return it **by no later than Marth 15th, 2019, by fax to +81-(0)3-3274-5103 or e-mail to h_info@hondafoundation.jp.**

Note: Please read the nomination guide thoroughly then consider a candidate from a variety of fields.

Thanking you most sincerely for your kind cooperation.

Yours faithfully,

Hiroto Ishida
President, Honda Foundation

Enclosures: “The Honda Prize 2019 Nomination Form”, “2019 Honda Prize Nomination Guide”, “2017-18 Honda Foundation Annual Activity Report”, “Advertisement feature from “Nature” (20/27 December, 2018)”



PROFESSOR FUJIO MASUOKA

Flash memory inventor wins 2018 Honda Prize

PROFESSOR FUJIO MASUOKA honored for fundamental contributions to computer engineering

Integral to the digital cameras, washing machines, smartphones, and USB memories that make our lives easier is a tiny semiconductor chip called a flash memory. Its inventor, Fujio Masuoka, professor emeritus of Tohoku University, has been awarded the 39th Honda Prize in recognition of his invention of the technology that realized large-capacity, nonvolatile memories. The prize is also a tribute to his enormous contribution to the acceleration of technical advancement and fostering young engineers in this field.

The Honda Foundation was established in 1977 through the generosity of Soichiro Honda, founder of Honda Motors, and his brother Benjiro. Since 1980, it has given an annual prize to individuals or groups who have shown outstanding achievements in eco-technology development. "Today, flash memory diffusion allows for more compact IT devices, and reduced electricity consumption," a spokesman for the foundation explained. The award ceremony was held in Tokyo on 19 November, 2018.

Masuoka's passion and persistence allowed him to foresee the future market for semiconductor-based memories. Since the 1970s, DRAM (dynamic random access memory) has been the main medium for storing data and programs on computers because of its reading speed and unlimited rewriting capacity. But recorded data is automatically erased when the power is shut down, so it is called a 'volatile memory'.

By contrast, a 'nonvolatile memory', written onto magnetic media such as hard disks, can retain data even when the power is off. Usability of nonvolatile semiconductor memory was far better, but Masuoka saw

a need to replace magnetic memories and bring down the price of storage.

A nonvolatile semiconductor memory cell is typically made of a silicon substrate comprising source and drain electrodes and topped with a floating gate, covered by an insulation film to trap and retain electrons. By charging and discharging electrons to and from a floating gate, the cell can record and erase data. The technology was around as early as the 1960s, but its reliability was poor.

Soon after obtaining a doctoral degree at Tohoku University, then joining Toshiba's Research and Development Center in 1971, Masuoka invented a more reliable structure by adding a control gate above a floating gate, which later became the main mechanism for semiconductor-based memories.

But, like other semiconductor manufacturers, Toshiba put all its efforts on DRAM development. Masuoka and his colleagues were no exception, devoting their working hours to upgrading DRAM products, but working on nonvolatile semiconductor memory technologies in their spare time.

In 1980, Intel announced the world's first nonvolatile, electrically rewritable memory chip, but it was made of two transistors for each bit and Masuoka didn't see a future due to high cost and low capacity. He then hit upon the idea of erasing all bits in blocks — like a camera flash — and rewriting on a per-bit basis by using only a single transistor. That mechanism allowed him to drastically downsize the cell, while increasing the capacity and reducing the cost by 75% or more. In 1984, Masuoka published a paper on the world's first 'NOR' flash memory.

In 1987, Masuoka announced another technology called NAND flash memory.

By redesigning cell arrangements of NOR flash memory, his team eliminated space between cells and increased the density to make the chip more compact and capacious. Currently, NAND chips dominate the world's flash memory market, and applications have diversified from digital cameras to solid-state drives as a replacement for hard disk drives. Even 3D NAND flash memories have recently emerged for use in smart phones.

Masuoka recalls his ideas were often dismissed as "dream-like projects," but he was undaunted. He continued to pursue next-generation semiconductor technologies even after he left Toshiba and became a professor at the Research Institute of Electrical Communication at Tohoku University. In 2007, he retired from the university and was made a professor emeritus.

In 2004, Masuoka also became the director and chief technology officer of Unisantis Electronics (Japan), now Semicon Consulting, where he has been working to make planar transistors for integrated circuits cylindrical to meet growing demand for smaller chips with more capacity. The design, which Masuoka conceived as early as 1988, is called surrounding gate transistor (SGT) — a silicon pillar surrounded by insulation films and gate electrodes.

Masuoka is renowned as a strict and excellent mentor for young engineers. "The most important thing for a scientist is to get in the habit of thinking from the fundamental, and take responsibility for the results," he said.

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"Make people happy with technology."

—This vision is the legacy of our founder, the late Soichiro Honda.

The Honda Foundation was established in 1977 by donations from Honda Motor's founder Soichiro Honda and his younger brother Benjiro.

Although the rapid technical innovation in modern society has achieved high economic growth and dramatic prosperity, bringing revolutionary changes in our lives, it has created serious and complex issues such as environmental destruction, pollution, urban concentration, population and food issues, and growing consciousness-gap between nations and races.

In order to provide the opportunity for scholars, researchers, and specialists to meet together and freely discuss the present state and the future of our civilization, the Foundation sponsors international exchange, symposia and study groups, offers prizes and awards for the promotion of research, education and other such activities, carries on its own study and research utilizing the achievements of modern civilization, thus aims to contribute toward the creation of a truly humane civilization.



Soichiro Honda

What is Honda Prize?

The Honda Prize is an international award that acknowledges the efforts of an individual or group who contribute new ideas which may lead the next generation in the field of ecotechnology. The Honda Foundation has given one award every year for a variety of research results.

The Honda Prize does not merely consider scientific and technological achievements from the viewpoint of new discoveries and inventions; it also takes into account entire processes that would bring out, apply, or share new frontiers in ecotechnology and a broad range of related scientific fields. Supporting top runners in science and technology who have created new value is our first step towards helping to solve the problems we are directly faced with. From this point of view, we at the Foundation want to put a spotlight on achievements in a variety of fields based on a wide perspective in the future.

List of Laureates of the Honda Prize

 1980 Gunnar Hambræus Sweden	 1981 Harold Chestnut U.S.A.	 1982 John F. Coates U.K.	 1983 Ilya Prigogine Belgium	 1984 Umberto Colombo Italy	 1985 Carl E. Sagan U.S.A.	 1986 Junichi Nishizawa Japan	 1987 Jean Dausset France	 1988 Paolo Maria Fasella Italy	 1989 Lotfi Asker Zadeh U.S.A.	 1990 Frei Otto Germany	 1991 Monkombu S. Swaminathan India
 1992 Hermann Haken Germany	 1993 Koki Horikoshi Japan	 1994 Benoit B. Mandelbrot France	 1995 Åke E. Andersson Sweden	 1996 Bruce N. Ames U.S.A.	 1997 Günter E. Petzow Germany	 1998 Hubert Curien France	 1999 Aleksandra Kornhauser Shoykha Slovakia	 2000 Shuji Nakamura Japan	 2001 Donald Mackay Canada	 2002 Barry John Cooper U.K.	 2003 Kenichi Mori Japan
 2004 Walter C. Willett U.S.A.	 2005 Raj Reddy U.S.A.	 2006 Richard R. Nelson U.S.A.	 2007 Philippe Mouret France	 2008 Maximilian Haider Austria	 2008 Harald Rose Germany	 2008 Knut Urban Germany	 2009 Ian Frazer Australia	 2010 Antonio Damasio U.S.A.	 2011 Gabor A. Somorjai U.S.A.	 2012 Denis Le Bihan France	 2013 J. Tinsley Oden U.S.A.
 2014 Helmut Clemens Austria	 2015 Russell H. Taylor U.S.A.	 2016 Akira Isogai Japan	 2016 Hiroyuki Yano Japan	 2017 Hiroyuki Matsunami Japan							

For more information, please contact:

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List of Past Laureates of Honda Prize

Appendix

Year	Name	Title At That Time	Reason of Receiving the Award	Realization of Ecotechnology
1980	Dr. Gunner Hambræus (Sweden)	Chairman, Royal Swedish Academy of Engineering Sciences	Awarded for his leadership in the promotion of interactions among engineering societies across continents as the head of Royal Swedish Academy of Engineering Sciences.	Realization
1981	Dr. Harold Chestnut (U.S.A.)	SWISS Foundation, Inc.	Awarded for his achievements of the promotion of humanitarian use of technology as a leader in systems engineering for electrical instrumentation and automatic control.	Realization
1982	Dr. John F. Coates (U.K.)	Professor Emeritus, University of Cambridge	Awarded for his achievements associated with the theorization of automatic control technology and its technological transfer to developing countries.	Realization
1983	Dr. Ilya Prigogine (Belgium)	Professor, Free University of Brussels	Awarded for his contributions to international fight against environment issues by applying his unique Dissipative Structure Theory primarily constructed in chemistry and physics.	Realization
1984	Dr. Umberto Colombo (Italy)	Chairman, The Italian National Commission for Nuclear and Alternative Energy Sources	Awarded for his vision and policy recommendations with regard to braking wasteful use of food, energy, and natural resources by developing sustainable technologies to secure them.	Sustainability
1985	Dr. Carl E. Sagan (U.S.A.)	Professor, Cornell University	Awarded for his contributions with the introduction of novel perception of civilization by viewing the earth from a cosmic perspective, featuring the Nuclear Winter in caveat.	Sustainability
1986	Dr. Junichi Nishizawa (Japan)	Professor, Tohoku University	Awarded for his achievements in the invention of pin diode and static induction transistor; and for his pioneering efforts in the application of optical communications technology.	Innovation
1987	Dr. Jean Dausset (France)	Professor, Collège de France	Awarded for his discovery of the major histocompatibility that opened a new way for organ transplantation complex. His longstanding educational roles are also substantial.	Life Practice
1988	Dr. Paolo Maria Fasella (Italy)	Professor, Commission of the European Communities	Awarded for his expertise in medicine and biology with vigorously engaged in the promotion of joint efforts in technology toward a more harmonious development of human civilization.	Life Practice
1989	Dr. Lotfi Asker Zadeh (U.S.A.)	Professor, University of California, Berkeley	Awarded for his construction of the Fuzzy Theory. He made the future of information society a more humane civilization through a broad range of applications in he advocated.	Innovation
1990	Dr. Frei Otto (Germany)	Professor, University of Stuttgart	Awarded for his conceptualization and embodiment of lightweight architectural designs with membrane structures to make the human environment more harmonious with nature.	Sustainability
1991	Dr. Monkombu S. Swaminathan (India)	President, International Society for Mangrove Ecosystems	Awarded for his leading role in the Green Revolution movement, saved the Indian subcontinent from a serious food crisis for environment protection.	Life Practice
1992	Dr. Hermann Haken (Germany)	Professor, University of Stuttgart	Awarded for his initiation of Synergetics. He suggested this discipline could be one of basic principles to achieve equilibrium between ecosystem and human civilization.	Realization
1993	Dr. Koki Horikuchi (Japan)	Professor, Toyo University	Awarded for his lifelong work on Alkaliphilic Micro-organisms, based on which he developed clean industrial technologies such as decontamination of polluted seawater.	Life Practice
1994	Dr. Benoit B. Mandelbrot (France)	Professor, Yale University	Awarded for his lifelong work on the Fractal Geometry. Its implications resulted in many forms of fusion between natural science and other areas such as social science and fine art.	Realization
1995	Dr. Åke E. Andersson (Sweden)	Managing Director, Swedish Institute for Futures Studies	Awarded for his vision of O-Society(Creativity, Culture, Communication) should become key elements that help regional or local economies grow in accordance with the environment.	Realization
1996	Dr. Bruce N. Ames (U.S.A.)	Professor, University of California, Berkeley	Awarded for his development of the Ames test and associated efforts to legislate it. The test is widely used to detect carcinogens as mutagens in the Salmonella/microsome test.	Life Practice
1997	Dr. Gunter E. Petzow (Germany)	Director emeritus, the Max-Planck-Institute for Metals Research/Hon. Professor, University of Stuttgart	Awarded for his expertise in particle technology and powder metallurgy technique, which led to commercialized fineceramic materials for use such as high-temperature turbine blade.	Innovation
1998	Dr. Hubert Curien (France)	Professor of University Pierre et Marie Curie, Paris 6	Awarded for his leadership in the development of the first French earth observation satellite system, with which he improved the way to monitor and manage the earth environment.	Sustainability
1999	Dr. Aleksandra Kornhauser (Slovenia)	Professor, University of Ljubljana and Director, International Center for Chemical Studies-IGCS	Awarded for her contribution to the implementation of environment-friendly product development/manufacturing processes through the use of information system monitoring.	Sustainability
2000	Dr. Shuji Nakamura (Japan)	Professor, University of California, Santa Barbara	Awarded for his development of the first practical Blue LED, a power-saving diode with semi-permanent life. That is substantially expanding LED applications in the real world.	Innovation
2001	Dr. Donald Mackay (Canada)	Professor, Trent University	Awarded for his achievements of the development of the Mackay Model, a method to measure environment pollution by predicting behaviors of chemical substances.	Sustainability
2002	Dr. Barry John Cooper (U.K.)	Vice-President of Johnson Matthey Inc, Catalytic Systems Div	Awarded for his achievements of the development of the three-way catalyst, an environment-friendly device, for exhaust gas treatment/ clean emissions for automobiles.	Sustainability
2003	Dr. Kenichi Mori (Japan)	Adviser to the Board of Toshiba Tec Corporation	Awarded for his achievements of the development of the first Japanese word processing engine. This was applied, and adopted as a basis, later for a number of multi-byte languages.	Innovation
2004	Dr. Walter C. Willett (U.S.A.)	Professor of Epidemiology and Nutrition, Harvard School of Public Health	Awarded for his achievements associated with the widely-accepted finding as a result of his efforts in large-scale cohort study that diet has the key role in chronic diseases prevention.	Life Practice
2005	Dr. Raj Reddy (U.S.A.)	Professor of Computer Science and Robotics Carnegie Mellon University	Awarded for his pioneering role in robotics and computer science used in the future for a broad range of applications including education, medicine, healthcare, and disaster relief.	Innovation
2006	Dr. Richard R. Nelson (U.S.A.)	George Blumenthal Professor of International and Public Affairs, Business, and Law, Emeritus, Columbia University	Awarded for his achievements of the Evolutionary Theory of Economic Change viewing innovation as a key factor to impact subsequent growth or deterioration of a given industry.	Innovation
2007	Dr. Philippe Mauret (France)	M.D., General Surgery	Awarded for his performance of the first Laparoscopic Cholecystectomy, marked the beginning of rapid spread of Endoscopic Surgery and its related technologic innovations.	Life Practice
2008	Dr. Maximilian Haidor(Austria), Dr. Harald Rose(Germany) and Dr. Knut Urban(Germany)	Managing Director, CEOS GmbH, Heidelberg Research Fellow, Advanced Light Source, L. Berkeley National Lab President and Vice-president, German Physical Society	Awarded for their development of the world's first transmission electron microscope capable of atomic-level imaging using aberration correction technology.	Innovation
2009	Dr. Ian Frazer(Australia)	Director, Diamantina Institute for Cancer, Immunology and Metabolic Medicine The University of Queensland Princess Alexandra Hospital, Australia	Awarded for the development of the world-first cervical cancer vaccines. His achievement said to be the first case of a cancer being prevented through human intervention.	Life Practice
2010	Dr. Antonio Damasio(U.S.A. / Portugal)	David Dornsife Professor of Neuroscience Director, Brain and Creativity Institute University of Southern California	Awarded for his contributions in the world of neuroscience by focusing emotions and feelings in human behavior, including consciousness and decision-making with his influential Somatic Marker Hypothesis.	Life Practice
2011	Dr. Gabor A. Somorjai (U.S.A.)	Professor of Chemistry, the University of California, Berkeley, U.S.A.	Awarded for his innovative achievement in catalysis of surface science, materials, physics and engineering, which contributed to the development of "Green Chemistry".	Sustainability
2012	Dr. Denis Le Bihan (France)	Director of NeuroSpin, CEA Saclay, France	Awarded for development of theorization of water diffusion measurement by MRI and its application in clinical practice. It spared many patients suffering acute stroke and other neurological disorders.	Life Practice
2013	Dr. J. Tinsley Oden (U.S.A.)	Director of the Institute for Computational Engineering and Sciences (ICES) at The University of Texas at Austin	Awarded for his contribution to establishment and development of "Computational Mechanics," a new discipline which has enabled the development of computer simulation technology used across industry and research today.	Innovation
2014	Dr. Helmut Clemens (Austria)	Head of the Department of Physical Metallurgy and Materials Testing at the Montanuniversität Leoben	Awarded for his outstanding contributions and eminent achievements in the development of light-weight structural intermetallic titanium aluminides, so-called γ -TiAl based alloys which are presently seen as key structural materials for high-temperature application in advanced jet and automotive engines of the next generation.	Innovation
2015	Dr. Russell H. Taylor (U.S.A.)	John C. Malone Professor at Johns Hopkins University	Awarded for his contributions in the development of surgical medical robots and systems and technological evolution in the field. He is one of the pioneers who established the field of robot research in the 1970's and has become widely known as the "father of medical robotics."	Life Practice
2016	Dr. Akira Isogai (Japan) Dr. Hiroyuki Yano (Japan)	Professor of the Graduate School of Agricultural and Life Sciences at The University of Tokyo Professor of the Research Institute for Sustainable Humanosphere at Kyoto University	Awarded for their outstanding contributions to the development of high-efficiency production methods of Cellulose Nanofiber (CNF), its application to products, and the enhancement of its potential for further utilization.	Innovation
2017	Dr. Hiroyuki Matsunami (Japan)	Professor Emeritus of Kyoto University	Awarded for his tremendous contributions to pioneering research on "silicon carbide (SiC) power devices" and its practical applications.	Sustainability
2018	Dr. Fujio Masuoka (Japan)	Professor Emeritus of Tohoku University	Awarded for his invention of the world's first flash memory technology, enabling large capacity non-volatile semiconductor memories.	Innovation

2019 Honda Prize Nomination Guide



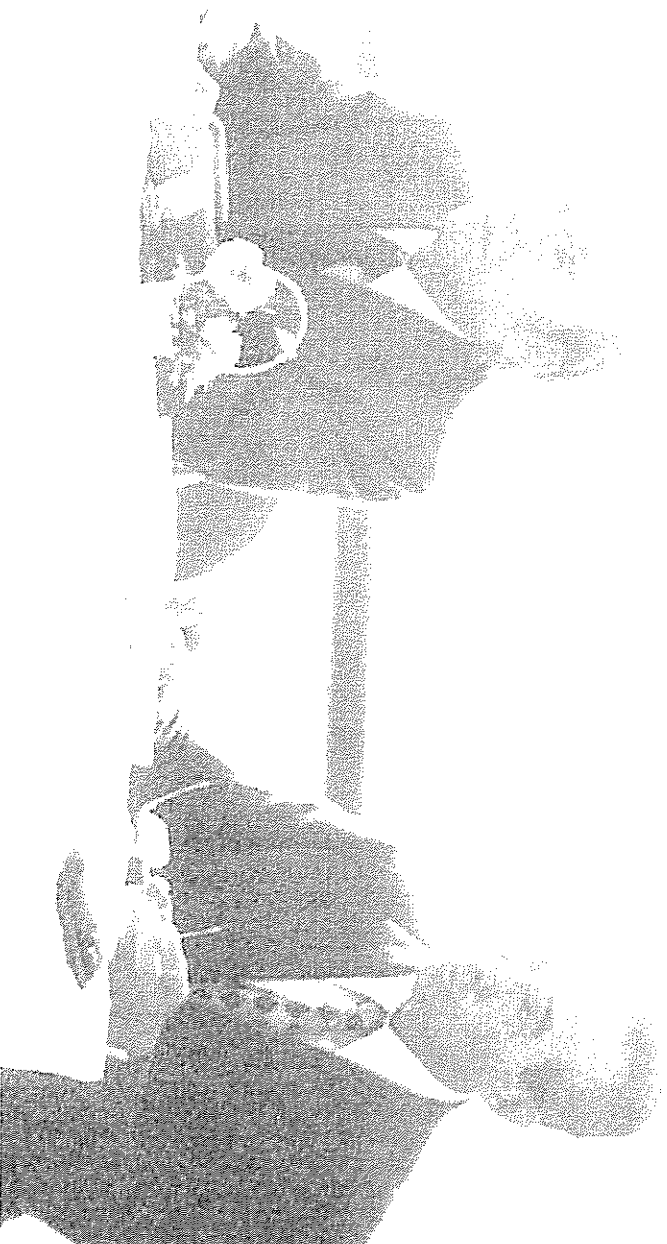
HONDA FOUNDATION

公益財団法人 本田財団

Honda Foundation

"I reached where I am now just through technology. If we really can solve problems with technology, then I definitely want to be of some use."

(Soichiro Honda, the founder of Honda Motor Company)



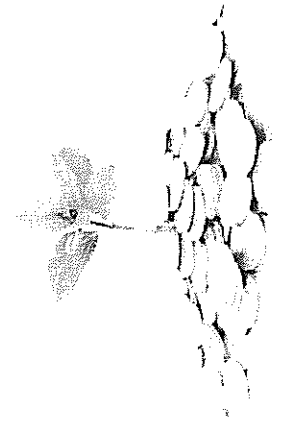
Honda Foundation was established in December 1977 by donations from the founder of Honda Motor Company, Soichiro Honda, and his younger brother, Benjiro.

Funding Prospectus

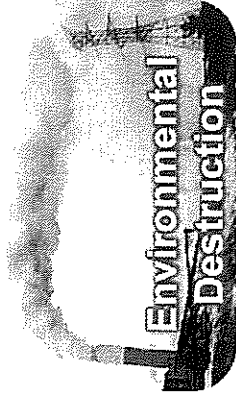
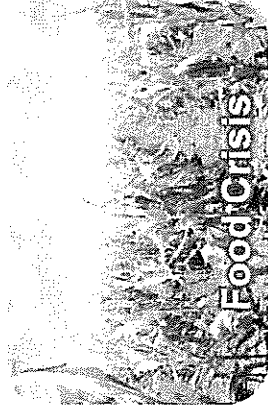
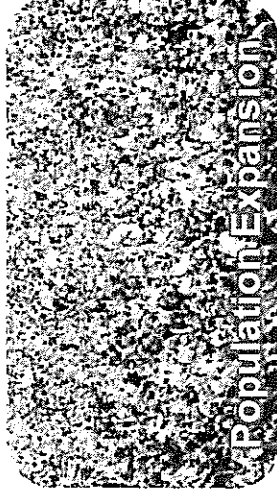
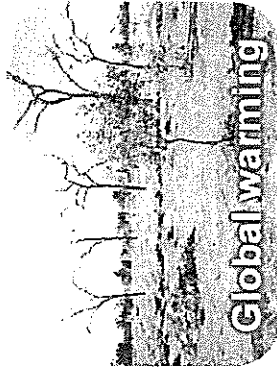
- Modern society has been achieving great prosperity, thanks to sustained high economic growth that has been made possible through various technological innovations in production, traffic, transportation, telecommunications and other activities. We are experiencing revolutionary changes in our way of life, and in our changing lifestyles we have also expanded our horizons.
- This achievement has had negative effects too: environmental destruction, pollution, urban density, food shortages due to the population explosion, the growing consciousness gap between nations, races and religions plus a number of other deep-rooted, complex issues.
- Various research and efforts have been made to resolve these problems. Each of them, however, is a kaleidoscopic reflection of different elements of modern civilization, and thus requires a completely new approach in the search for a resolution.
- A makeshift resolution serves no purpose. Wisdom and effort must be pooled on an international level, and through an interdisciplinary approach to the analysis of modern civilization, the results can be used to promote human welfare and happiness. In this way we must strive to create a higher level of humane society.
- In order to provide the opportunity for scholars, researchers and specialists from all walks of life, irrespective of nationality, to meet together and freely discuss the present state and the future of our civilization, the HONDA FOUNDATION sponsors international symposia and colloquia, and offers prizes and awards for the promotion of research, education and other such activities, and also carries on its own studies and research, making use of the achievements of modern civilization, the FOUNDATION was established with such objectives in mind, and by extending its own activities to fulfill the requirements of the modern age, it contributes towards the creation of a truly humane civilization.

Funding Prospectus

Prosperity



Negative effect



**Requires a completely new approach
in the search for a resolution**



Ecotechnology

**Requires a completely new approach
in the search for a resolution**

Ecotechnology



- Harmonize human activities with the natural environment
- Develop science and technology in harmony with human environment
- Science and technology for the welfare of human beings

E-mail to h_info@honda-foundation.jp or Fax to +81 3-3274-5103

The Honda Prize 2019 Nomination Form

Date: _____

Nominator	
Name :	Affiliation, Title :
Address :	
E-MAIL :	
TEL :	FAX :
Name of Informant (if you are not registered nominee by Honda Foundation) :	

Nominee	
Name	
Nationality, Date of Birth	
Affiliation, Title	
Academic Area	
Contact Information	Address : E-MAIL : TEL : FAX :
Biography	
Honors / Awards	

Details of Nomination		
Achievements	Title of Achievements	
	Problems to solve	
	Utilized ecotechnology (Mark an item)	<ul style="list-style-type: none"> • Paradigm Shift • Sustaibability • Innovation • Life Frontier
	<u>Details of contribution toward the development of science and technology and society along the vision of “ecotechnology”</u>	

Details of Nomination	
Contributions by each stage	* Describe what the nominee and his/her/their achievements contribute at each phase.
	<u>Invention/ Discovery</u>
	<u>Application / Development</u>
	<u>Prevalence at General Level</u>

* Please keep the form within three pages and Do Not add extra page