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Supporting

Techno- Entrepreneurship

The Takeda Foundation

財団法人 武田計測先端知財団

Bulletin

Selection Process for 2002 Takeda Awards Is Under Way

The Takeda Foundation is well into its second full year of operations. The major activity under way is the process for determining the winners of the 2002 Takeda Awards. Nominations have been received, and achievements are being researched by the Foundation staff. Selection panels are reviewing the nominations and research write-ups for their deliberations. The 2002 awards will be announced in early September and the award ceremony will take place on November 21.

In addition, topics for the Takeda Techno-Entrepreneurship Awards have been chosen, and the Cyber Workshops will begin on July 1, 2002. These are discussed elsewhere in this bulletin.

This year, the Foundation is expanding its public outreach activities. A major symposium addressing the theme of "Engineering Intellect and the Wealth of the Market and the Public -

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Highlights from the 2001 Takeda Award Ceremony

The first annual Takeda Award Ceremony was held at the ANA Hotel Tokyo on December 3-4, 2001. The event began with The Takeda Award Forum, held throughout the day of December 3. In separate sessions for each of the three focal areas of the Foundation, awardees provided introductory remarks regarding their achievements. These were followed by questions and answers and general discussion. The first day ended with a festive welcome reception.

*"Award winners and family members
share a photo with Dr. and Mrs. Takeda"*



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page 2....*

Selection Process for 2002 Takeda Awards is Under Way (continued from page 1)

The Silicon Valley Model versus the Scandinavian Model" will be held at the University of Helsinki, Finland and the Krusenberg Herrgård (Krusenberg Manor House) in Uppsala, Sweden in June. Also in June, the Foundation will host a dinner and

roundtable discussion featuring J. Craig Venter, 2001 awardee, to introduce the Foundation and its goals to the U.S. science and technology policy community.

Highlights from the 2001 Takeda Award Ceremony (continued from page 1)

The award ceremony itself was held on Wednesday, December 4. The ceremony began with initial comments describing the Foundation, its goals and the award selection process. The Takeda Techno-Entrepreneurialship Awards were bestowed. This was followed by the presentation of the Takeda Awards to the first-year awardees. After the formal ceremony concluded, a press conference was held. The final event was the Takeda Award dinner, during which the entire Takeda Foundation "family" relaxed, listened to a superb musical recital, and reflected on the activities of the two-day event.

"Awardees Hunkapiller and Venter share some thoughts with Foundation leaders"



"Awardees Torvalds, Stallman and Sakamura joke with the press."



"Awardees Schmidt-Bleek and Weizsaecker field questions in the Takeda Award Forum"

Award Winner Perspectives on Techno-Entrepreneurship

The winners of the Takeda Award in 2001 differ in many respects. They vary considerably in age, background and personality. They come from Japan, Europe and North America. They hold many different perspectives.



However, the Award winners hold one thing in common - their passionate pursuit of engineering excellence and techno-entrepreneurship, the hallmark of the Takeda Foundation. The following excerpts from interviews given by awardees confirm this shared quality.¹

Ken Sakamura

Ken Sakamura received his Takeda Award for developing and promoting the TRON open architecture, a real-time operating system specification for embedded systems. He credits the development of his techno-entrepreneurial skills from



¹Further information on the Takeda Award Winners and their achievements can be found on the Takeda Foundation Web site, www.takeda-foundation.jp.

having lived in Akihabara, Japan, one of the largest electronics towns in the world where he was able to "buy electronics parts for various purposes by visiting small shops." He believes that this attribute of the town allowed him to "try [my] ideas by buying parts there and start experimenting right away."

Dr. Sakamura believes that his studies at the University of Tokyo in Japan allowed him to "proceed with a very long-term view of my work." The university atmosphere allowed him to be "independent from the influences of various commercial organizations." This freedom from financial obligations offered him the opportunity to "expand the scope of the open architecture" and to promote the project to a wider audience so that more people will use the research results.

Sakamura's experiences with government regulations during the development and marketing of his TRON project have led him to be vehemently opposed to "political meddling." He believes that such government interference can inhibit the progress of a "technological project in a significant way." He regards the regulations enacted by the U.S. Trade Representative Office in the late 1980s as one of the greatest obstacles he faced, scaring away potential financial backers, and gradually discouraging the project members who had large trade business with USA from actively promoting "the TRON project inside their organizations."

Richard M. Stallman

Richard Stallman started the free software movement and led the development of the GNU operating system. According to Dr. Stallman, he got his head start at MIT, a community environment that helped him achieve his goals. The collaborative atmosphere of the MIT labs, where students were allowed to develop software jointly and to change existing source codes developed by the university, offered him an opportunity to learn and to be creative. The idea of free software as a tool for learning was so entrenched in his mind that even in the 1980s, when software companies began marketing their proprietary software, Stallman held fast to his principles. Believing that proprietary software is "antisocial" and "evil," he decided to fight for "freedom and cooperation" by writing software that would be freely available to the public.

Dr. Stallman's advice to young people who want to learn and follow his example is to start reading and making changes to existing free source codes. He believes that free software is essential in a Computer Science degree and asserts that universities should allow students "to take existing large

programs and make changes to them" so that they can successfully learn the skills of programming. He also suggests, "Universities should tell the students to forget about the proprietary software because the software companies want to stop you from learning."

On the current regulations surrounding Intellectual Property, Stallman believes that patents are obstacles to software development. He stresses, "there has been no speedup in software development because of software patents" and believes that in areas where one "needs previous innovations, patents get in the way." However, he asserts, "if patents only lasted 3 years, then we could live with them, otherwise [the use of previous innovations] would be impossible."

Linus Torvalds

Linus Torvalds personally created the first version of Linux, an increasingly popular open source operating system kernel for computers, and has depended on thousands of global volunteers to help improve the system. Torvalds modestly ascribes his achievements to his family, "which forms you for life," and to luck. He enjoyed the creative environment he encountered in his native Helsinki, but he also thrives in the more intensive environment of Silicon Valley, where he currently resides.



Open-style software created through distributed development is like a biological process, according to Torvalds. As in biology, products have a life cycle - they are born, they evolve, and they die. "It's all part of an ecosystem, with mutation, cross-pollination, competition and selection, and massively parallel development."

Torvalds feels that the environment for entrepreneurship is critical. "There is an acceptance of failure in Silicon Valley. In Europe, failure brings with it a stigma, and so people often don't take risks. The best thing you can do to stimulate techno-entrepreneurship is to reduce the size of risks."

Michael W. Hunkapiller

Michael Hunkapiller received his Takeda Award for the development of automated high-throughput DNA sequencers and the promotion of the foundation of Celera Genomics. He feels fortunate to have been situated in the San Francisco bay area, where the extensive infrastructure that supports entrepreneurship helped the development of his company. However, once his company became



successful, he witnessed the emergence of a new set of constraints beyond the technological impediments to which he had become accustomed. He recognized that he was no longer judged on the viability of the project, but rather by the financial success and the profitability of Celera. These new entrepreneurial barriers forced him to adopt new methods to think about his work and how he decided to market Celera.

According to Dr. Hunkapiller, the United States is more conducive to technological entrepreneurship than Japan because of "the terms of risk taking and capital." For example, "the venture capitalists in the U.S. have experience in selecting technologies and concepts to support." In addition, the "management teams could easily recognize some of those ideas." On the other hand, Hunkapiller believes that Japan could be favorable to the "more established companies" because of their ability to "make riskier moves" with a more forgiving financial market.

Dr. Hunkapiller's advice to young entrepreneurs is that they should first be grounded in the fields of science and technology. He emphasizes that a good understanding of these disciplines will make the "best leaders and hedgers in technological enterprises, particularly in the early stages." Entrepreneurs need to "have a vision of what is possible and what [they] can do to contribute to realizing that vision. It requires more than just an understanding of business, it requires an understanding of what science can do."

J. Craig Venter

J. Craig Venter took on the "establishment" - the global scientific community - when he endeavored to accelerate the painstaking and time-consuming process of human genome sequencing by applying the "whole genome shotgun approach." He maintains that most people want to maintain the status quo, and that most scientists seek to maintain the flow of funding for their research. Both of these attitudes can slow the pace of progress. Willing to challenge conventional wisdom and the establishment, Venter sought to solve a problem as quickly as possible, and succeeded.



Dr. Venter raised private funding to finance his scientific "venture." He believes that alternative sources of funding helps stimulate techno-entrepreneurship. Even though entrepreneurship is sometimes viewed as derogatory among the scientific community, even in the United States, he could not have accomplished his goal outside the U.S.

Like his fellow Takeda Award winners, Dr. Venter believes that all events in one's life contribute to one's drive and vision. He points to his being drafted into the military and serving in

Vietnam (in the medical service) and his scientific training. His advice to young techno-entrepreneurs is, "Don't waste a day of your life, and don't be afraid to take risks. Don't be afraid of taking a different route."

Friedrich Bio Schmidt-Bleek

Friedrich Bio Schmidt-Bleek was honored by the Takeda Foundation for developing and promoting the Ecological Rucksacks and Material Input Per unit Service (MIPS) concepts. Dr. Schmidt-Bleek has had a rich and varied career, beginning as a nuclear chemist and progressing through an impressive list of research and policymaking position. His professional focus has moved increasingly oriented toward environmental issues. He is the founding president of the Factor 10 Institute, which seeks a ten-fold increase in the efficiency of material use.



Schmidt-Bleek asserts forcefully that "The key issue in the future is achieving stability of the biosphere. We sorely need techno-entrepreneurship to find ways to achieve that stability, moving away from the current stalemate of thinking."

According to Dr. Schmidt-Bleek, the United States still pursues the traditional mode of environmental protection, focusing on reducing effluents from the "tailpipe and chimney." There is better awareness in Japan and Europe on the need for complete systems approaches. He notes, "We need economic models that allow us to create wealth rather than eating up resources. This will require greater dematerialization, increased resource productivity, and new service delivery mechanisms."

Ernst Ulrich von Weizsaecker

Ernst Ulrich von Weizsaecker received his Takeda Award for his contribution in refining and promoting the Ecological Rucksacks and MIPS concepts. Dr. von Weizsaecker feels that he has grown over his distinguished career by "jumping careers" every five years or so. This gave him a broad set of experiences and insights. He feels strongly that research institutes should take interdisciplinary approaches. According to von Weizsaecker, "Most German research organizations follow a wholly disciplinary world view, and this is not enough to solve our most pressing problems."



On entrepreneurship, von Weizsaecker notes that culture is important. "For example, the Germans and Japanese are not born entrepreneurs. In the United States there is a strong entrepreneurial spirit, for there is prestige associated with it." He encourages people to take risks and trust that this will lead to good outcomes, and he believes that it is wrong to penalize risk-taking.

Dr. von Weizsaecker is truly passionate about finding market mechanisms to address long-term sustainability conditions, which in his view have been long neglected. "Traditional markets often lead us in the wrong direction, and so we need to conceptualize new market signals that encourage behavior that can contribute to rather than detract from environmental sustainability."

Distinguished Managing Directors Advise the Foundation

The Takeda Foundation could not carry out its many activities without the valuable time and effort given by eminent leaders of the scientific, engineering, research and academic communities. These individuals advise the Foundation on a wide range of technical issues. Perhaps no one contributes more to Foundation activities than the Managing Directors of the Foundation.

Dr. Ken'ichi Matsubara



Dr. Ken'ichi Matsubara, Professor at the Nara

Institute of Science and Technology, Graduate School of Biosciences Expression and President of DNA Chip Research Inc., chairs the Selection Committee for Individual/Humanity Well-Being. Dr. Matsubara has had a distinguished career, recently serving as Vice-Director of the International Institute for Advanced Studies, and previously in leadership positions at the Society of Japanese Molecular Biologists, the Institute of Molecular and Cellular Biology (Osaka University) and other leading research organizations. He has received many technology leadership awards.

Dr. Motoyuki Suzuki



Dr. Motoyuki Suzuki, a chemical engineer by training and an environmental engineering specialist, leads the Selection Committee for Environmental Well-Being. Currently Vice-Rector of The United Nations University, he has served as Chairman of

Tokyo University's Graduate School of Chemical Engineering and Director General of the University's Institute of Industrial Science. Dr. Suzuki is very actively involved in eco-restructuring activities, and is author of 10 environmental engineering books and over 300 papers in scientific journals. Like his colleagues, he has received numerous awards for his contributions.

Dr. Yasuo Tarui



Dr. Yasuo Tarui, chairs the Selection Committee for Social/Economic Well-Being. Dr. Tarui is

Professor Emeritus of Tokyo University of Agriculture and Technology. He is well known for his research and contributions in the entire field of semiconductor devices (e.g., development of Very Large Scale Integrated Circuits, fostering the VLSI industry, etc.). Dr. Tarui was former Chief of the Semiconductor Device Section of MITI, and over his career has been associated with the Electrotechnical Laboratory, NEC, and other technology-oriented organizations. He also has been given many awards for his achievements.

Founder's Message

"Increased Choice Translates into Increased Wealth"

The Takeda Foundation was established to implement my wish to honor and encourage engineering intellect and knowledge, as well as entrepreneurship. I would like to express some thoughts regarding the second year of the Foundation's activities and the 2002 Takeda Award.

The ultimate goal of the foundation - and the key qualification for those receiving the Takeda Award - is to bring wealth, richness, and happiness to people. Brainpower, unbreakable spirit, and courage are the essence of engineering intellect and knowledge and techno-entrepreneurship, and without them, the Foundation's goal cannot be met. In most cases, new products, new technologies and new values are developed and provided to people through engineering intellect and knowledge and through techno-entrepreneurship.

In my own personal case, about 50 years ago I founded Takeda Riken Kogyo, a predecessor of the present company, Advantest. In those early days, I set a target of making the company the "best and brightest" in the emerging field of semiconductor testing, and with perseverance we achieved that goal.

My personal experience has taught me that companies survive only when they can satisfy people's desires, which are to attain greater wealth and higher standards of living. Companies grow only when their products and services are chosen by people through market forces. Acting on this experience, I seek to reward engineering intellect and knowledge as well as techno-entrepreneurship, the unbreakable spirit of growing companies, since these qualities bring

new wealth and standards of living to humanity. In my view, the 21st Century will dramatically raise people's wealth - not only those living in Japan, but those living throughout the borderless society of the entire world.

But what does it mean to increase people's wealth? It means not only adding to wealth in the form of exchangeable goods, services, and other material things, but also expanding the common cultural wealth embodied in knowledge, technology, and the arts. All of these forms of wealth can be increased through market activities.

As the 21st century unfolds, economic activities surrounding the market are experiencing a new phase due to the introduction of personal computers and a cyber network driven by information technology. E-commerce on the cyber network is well known. In this century we see four economic spaces or "dimensions" emerging:

Through the "Cyber Dimension," E-commerce has been developing and moving over national borders because of its universal availability.

Through the "Borderless Dimension," people, goods, services, and many other things, as well as electronic business, traverse national borders.

Financial markets are pursuing the "Dimension of High Multiples" in which investors seek more advantageous transactions.

Finally, the "Visible Dimension" is one in which products are moved from warehouses to shops, eventually to be bought by consumers.

This analysis of economic spaces is borrowed from a book, "The Borderless World," written by Mr.

Kenichi Ohmae. I completely agree with his analysis.

All people, including investors, want to see high-quality products in the market. In most cases, they cannot see the technologies and ideas incorporated into superior products when they choose them. Whether those technologies and ideas are visible or not, consumers choose superior products by instinct. This form of choice is the strongest power exerted by people. Only through consumers' choices do products and hence companies survive and grow.

The products selected by consumers must embody new technologies and ideas. Without new technologies and ideas, which I consider essential, products will not be purchased. Tremendous energy is necessary when an epoch-making technology is born or when bold ideas are realized. Techno-entrepreneurship and engineering intellect and knowledge are the origin of this energy.

I praise and encourage the efforts of those who seek to realize new technologies and bold ideas, and I respect the power of their spirit and energy. I especially recognize the importance of markets for information and electronic technology, life science technology, and world environment technology. In these markets, people's wealth will accumulate and will increase in the 21st Century. As a compass for navigation, by selecting great achievements visualizing techno-entrepreneurship and engineering intellect and knowledge in these areas, I hope to send a message that helps set the course for the future.

Ikuro Takeda

Meet the Foundation Staff

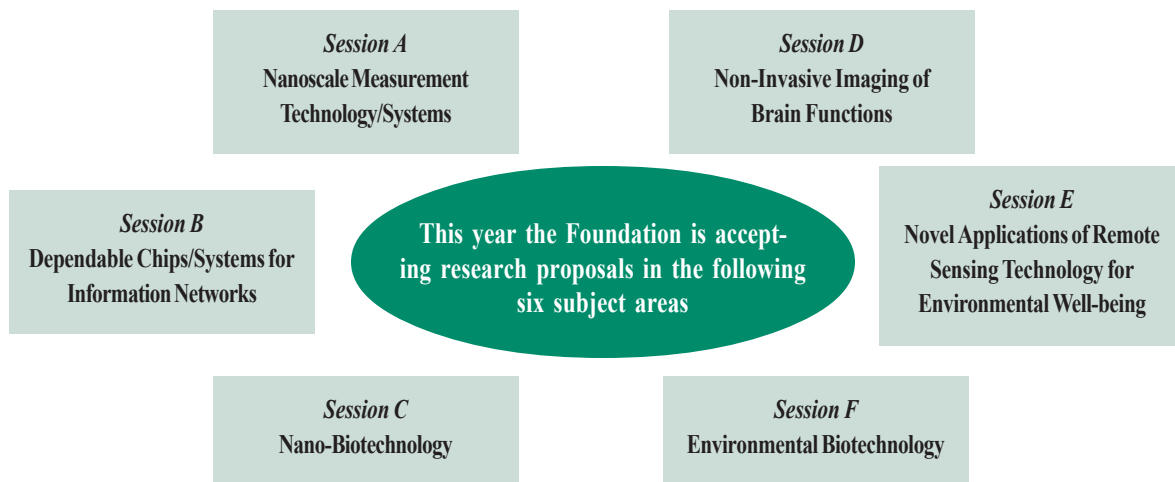
The many activities of the Takeda Foundation are carried out by its able and committed staff. Staff members have been recruited for their technical expertise, research experience and other relevant skills to meet the challenges posed by the Foundation. The Foundation's activities are overseen by its Founder and Chairman, Ikuo Takeda. Tohru Kazamaki serves as Senior Managing Director.

*Seated, starting at the left, are:
Hideto Kakida, Ikuo Takeda, and
Tohru Kazamaki. Standing, from the
left, are Norio Ohto, Yoshio Miura, Aiko
Ubasawa, Reiko Abe, Kenichi Gomi,
Kazuaki Tasaka, Mitsuo Akagi, Yuji
Hatano, Mariko Tsusaka, Junko Ikeda,
Etsuko Mitsui, Yuzo Mizobuchi,
Setsufumi Kamuro, Nobuo Suzuki,
Ryuichiro Hara, Naoaki Aizaki, and
Kazuyoshi Shimada*



Cyber Workshops for TTEA Selection

The process for selecting winners of the second annual Takeda Techno-Entrepreneurship Award (TTEA) is well under way. The awards provide research and development (R&D) grants of up to 10 million yen (approximately US \$80,000) to researchers who are creating and applying new engineering knowledge that will generate substantial value for people.



Research proposals were accepted from April 1st until May 31st, 2002. Cyber Workshops in each of the topic areas are used to refine the proposals and assist in the selection process. The Cyber Workshops will take place from July 1, 2002. Following the workshops, the Foundation's three Selection Committees will make their decisions for 2002 TTEA winners.

Winners of the 2001 Takeda Techno-Entrepreneurship Awards

The Takeda Techno-Entrepreneurship Award (TTEA) is presented to research proposals that show the greatest promise of contributing to human well-being in the near future through the practical application or commercialization of new engineering knowledge (i.e., techno-entrepreneurship). In 2001, six awards were bestowed to research teams represented by the following individuals:

- Yasuo Nagazumi (GDS, Inc.) for "A Programmable Low-Power Matched Filter Using Charge-Domain Signal Processing," in the area of Ultra-Low Power Consumption Devices, Circuits, Architecture and Systems.
- Tsutomu Sasao (Kyushu Institute of Technology) for "A New Type of Programmable Logic Devices and Their Logic Synthesis" and Tetsuo Hironaka (Hiroshima City University) for "Reconfigurable Computer with Cycle-by-Cycle Reconfiguration and Execution Aimed to be a General-purpose Computer" in the area of Design and Development of Hardware Possessing Flexibility and Expandability of Functionality and Performance.
- Shinsuke Fujiwara (Osaka University) for "Application of Hyperthermophilic Enzymes in Hydrophobic and

Supercritical Fluid Environments" in the area of Extremophilic Biomes.

- Katsuto Tamai (Hirosaki University) for "Development of In Vivo Tissue Engineering System Based on Non-Invasive and High-Affinity In Vivo Delivery Technique-Challenge for Improvement of QOL in Highly Aged" in the area of Systems Aiming at Tissue Engineering.
- Joaquim I. Goes (Bigelow Laboratory for Ocean Sciences) for "Assessing the Influence of Enhanced Solar Ultraviolet Radiation on Marine Phytoplankton and Its Consequences for Ecosystem Structure and Function" and Akira Naganuma (Tohoku University) for "Studies on the Genes Determining Individual Sensitivity for Methylmercury Toxicity" in the area of Evaluation and Management of Environmental Risks.
- Toyohide Takeuchi (Gifu University) for "Development of Environment-Friendly High-Efficiency Capillary Separation Analytical System" in the area of Novel Technologies for Chemical Measurement Used for Environmental Monitoring.

"Winners of the 2001 Takeda Techno-Entrepreneurship Awards"

*Standing from the left are:
Ms. Kitamaki, accepting the award for
Toyohide Takeuchi, Akira Naganuma, Ms.
Helga Gomes accepting the award for
Joaquim I. Goes, Katsuto Tamai, Shinsuke
Fujiwara, Tetsuo Hironaka, Tsutomu
Sasao, and Yasuo Nagazumi.*



For Further Information

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