

THE TAKEDA FOUNDATION HONORS 2nd YEAR WINNERS OF HUNDRED MILLION YEN AWARDS FOR ACHIEVEMENTS IN ENGINEERING

*Blue Light Emitting Semiconductor Devices, DNA Microarrays, and Spaceborne Radars
for Monitoring the Global Environment are Chosen as Key Applications of Engineering
Intellect and Knowledge*

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The Takeda Foundation has announced the winners of this year's Takeda Awards. This major award, which was established last year, is presented annually to individuals who have made outstanding achievements in creating and applying new engineering intellect and knowledge in three fields: social/economic well-being (information and electronics), individual/humanity well-being (the life sciences), and world environmental well-being.

One award is given in each of these three fields. The monetary value for each award is 100 million yen (approximately US\$833,000 or 856,000 Euros). A ceremony honoring the winners will take place on November 20, 2002, in Tokyo, Japan.

Development of the Blue LED and Blue Laser Enable New Displays, Energy-Saving Lighting and Higher Density CDs/DVDs

The Takeda Award 2002 Techno-Entrepreneurial Achievement for Social/Economic Well-Being is "the development of blue light emitting semiconductor devices - development of the blue light emitting diode and laser diode is the final link in completing the light spectrum for semiconductor devices." A light emitting semiconductor device refers to electronic devices that use either light emitting diodes (LEDs) or laser diodes (LDs). Red and green LEDs and LDs were developed in the 1970s, but the blue LED and LD, although much sought after, were not developed and commercialized until the mid-1990s. LEDs are used as indicator lights and backlights for displays in electronic devices. LDs are used in optical fiber networks and CD/DVD players.

The development of the blue LD has enabled the development of the next generation of large-capacity CDs/DVDs, which will increase by six-fold the amount of digital content (audio, video, television, photographs, etc.) that can be stored on a single disc. The development of the blue LED has completed the light spectrum for semiconductor devices, thereby enabling the creation of the white LED. LED lighting has many advantages over traditional incandescent light bulbs, including higher energy efficiency, longer life (by several years) and brighter, clearer light even in direct sunlight. This has resulted in the use of LEDs in traffic signals, for backlight in car displays and electronic devices, and for full-color, outdoor screens. In the future, it is expected that white LED lighting will replace incandescent bulb lighting.

One half of the prize is awarded jointly to Isamu Akasaki (Meijo University) and Hiroshi Amano (Meijo University), and the other half is awarded to Shuji Nakamura (University of California, Santa Barbara).

DNA Microarrays Advance Study of Gene Expression Across Thousands of Genes Simultaneously

The technical achievement honored by the Takeda Award 2002 Techno-Entrepreneurial Achievement for Individual/Humanity Well-Being is "the development and promotion of DNA Microarrays." DNA microarrays are very small glass or silicon chips on which up to 50,000 known DNA fragments can be placed. DNA microarrays are used to study gene expression analysis and for gene discovery. Previously, researchers could only monitor the expression of a few genes at a time. The significance of DNA microarrays is that they have enabled very large-scale studies and have greatly increased the throughput of these studies.

The human genome has approximately 30,000 genes, but the function of many of these genes remains unclear. Gene expression analysis is of particular interest to many researchers, since changes in gene expression due to pathological processes, such as cancer and viral diseases, and due to cellular

responses to medication, provides valuable information that can be used to better target new drugs and to diagnose patients.

The prize is awarded jointly to Patrick O. Brown (Stanford University and Howard Hughes Medical Institute) and Stephen P. A. Fodor (Affymetrix Inc.).

Spaceborne Radars Enhance Ability to Monitor the Global Environment

The technical achievement honored by the Takeda Award 2002 Techno-Entrepreneurial Achievement for World Environmental Well-Being is “the development of spaceborne microwave radar for global environmental monitoring.” Spaceborne radars are a technologically advanced way of measuring changes in the global environment. The use of spaceborne or airborne radars as opposed to ground-based radars is referred to as “remote sensing.” An important advantage of remote sensing is that it enables researchers to collect high-quality information on various parameters (rainfall, glaciers, particles in the air, etc.) even in areas where there are no ground-based monitors, such as over the oceans, in tropical rainforests, and over the polar regions. Moreover, rather than collecting a montage of discrete measurements from several different points, large tracts of land or sea can be surveyed at one time.

Such data will be increasingly important as researchers strive to obtain an accurate picture of current global climate and environmental change and to produce accurate simulations of future changes. Data collected from spaceborne radar greatly enhances data collected from conventional sensors.

One half of the prize is awarded Charles Elachi (Jet Propulsion Laboratory, California) and the other half is awarded jointly to Nobuyoshi Fugono (Advanced Telecommunications Research Institute International, Kyoto, Japan) and Ken'ichi Okamoto (Osaka Prefecture University).

About the Takeda Award

Conferred annually, this award is presented to individuals who have demonstrated outstanding achievements in the creation and application of new engineering intellect and knowledge. The awards are presented for research achievements that began with a concern for human needs, and which have made an outstanding contribution to the industrial technologies intended to satisfy those needs. The Foundation has coined the term “techno-entrepreneurship” to define activities that challenge technological frontiers through the application of engineering intellect and knowledge.

About the Takeda Foundation

Awarding and supporting techno-entrepreneurship is the core goal of the Tokyo-based Takeda Foundation that was established in April 2001. In addition to its award and research grant programs, which are being implemented on an international basis, the Foundation is sponsoring fellowships and scholarships. The Foundation also conducts research and disseminates information related to advanced measurement intellect and knowledge. Further information on the Foundation's activities, awards and grants is available on its website (URL: <http://www.takeda-foundation.jp>).

Leading Silicon Valley research institute SRI International is assisting the Takeda Foundation in its award and grant process.

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