

## News

### 2003 C&C Prize Recipients are Honored

The Foundation for C&C Promotion (President: Hajime Sasaki, Chairman of the Board, NEC Corporation) was established as a nonprofit organization funded by the NEC Corporation in March of 1985. It was established to promote pioneering research and development efforts related to C&C, the integration of computers and communications technologies, with the aim of advancing the sciences, advancing communication between people, and contributing to a culture in which each person can reach their maximum potential.

In order to advance these objectives, the foundation has three main activities: 1) awards (C&C Prizes), 2) grants (for researchers attending international conferences, for non-Japanese researchers, and for receivers of doctorates), and 3) surveys and research.

The year 2003 marks the 19th year of awards presentation by the Foundation for C&C Promotion. The 2003 C&C Prize was announced in a presentation ceremony at the Hotel Okura on November 20th, 2003. This year, 2 awards were given for researchers in two separate research areas.

The first was for Dr. Shun-ichi Amari, Director of Riken Brain Science Institute and Professor Emeritus, University of Tokyo for pioneering leadership in research on neurocomputing and mathematical neuroscience. His works on the “associative memory model,” the “dynamic theory of neural assembly,” the “theory of neural fields,” and “neural self-organization” are the basis of today’s neural network theory. In the late 1970’s, Professor Amari initiated so called “Information Geometry” which is a powerful new method for information sciences and is applied to brain science and artificial intelligence.

Professor Amari continues to lead the academic community with his creative new ideas.

The second C&C Prize was for Dr. Gordon E. Moore, Chairman Emeritus, Intel Corporation, for “Outstanding Leadership in Moving the Integrated Circuit Industry forward by Presenting the Guidelines for the Technical Innovation Known as Moore’s Law.” Dr. Moore has played a leading role in most of the major developments of the semiconductor industry. He was one of the founders of Fairchild Semiconductor Corporation and the director of its Research and Development when it created the integrated circuit, and was one of the founders of Intel Corporation where the microprocessor was invented. Dr. Moore wrote an article in 1965 saying that “The complexity for minimum component costs has increased at a rate of roughly a factor of two per year.” (Note: Complexity means complexity on an integrated circuit.) This statement became known as Moore’s Law and became the driving force for the pace of innovation and development within the worldwide semiconductor industry.

At the awards ceremony, President Sasaki presented a certificate, a plaque, and a cash award (10,000,000 yen) to Dr. Amari and Dr. Moore, respectively. After the awards ceremony, the two scientists presented acceptance speeches, followed by a reception.



**Photo 1 2003 Prize Recipients (from left, Dr. Amari and his wife, President Sasaki, Dr. Moore).**

*Foundation for C&C Promotion*

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**Development of World's First Next Generation DVD Player - Compatible Drive Developed –Achieved with a single optical head –**

NEC has developed a technology enabling recording and playback of both existing DVDs and next generation DVDs (HD DVD) with one optical head, and succeeded in building the first prototype in the world (Photo 1).

It is currently predicted that there will be increasing demand for optical disks that record and play back high-definition images at home or on a personal computer. In order to popularize next-generation optical disks capable of long length recording and playback of high-definition images, compatibility with the abundantly distributed existing media is extremely important. Further, while red laser diode (LD) is used in the DVD players popular today, the light source for the next-generation optical disks is a shorter wavelength blue LD. This means that two kinds of light sources need to be incorporated in a compatible machine, which raises the issue of how a compact, low-profile, inexpensive model can be achieved.

Based on recent research achievements, NEC has realized an HD DVD player that is compatible with current DVDs using a disk with dimensions equivalent to the current DVD and memory capacity four times higher. This will enable smooth transition of media from existing DVDs to HD DVDs and facilitate wide popularization of HD DVDs.

NEC, together with Toshiba, has been promoting technology development of HD DVD using blue LD as a light source and its standardization at the DVD Forum. At the Executive Meeting of the DVD Forum

held in New York in mid November 2003, the HD DVD-ROM (playback-only disk) Standard (Ver. 0.9) was adopted.

Based on the belief that this recently developed technology will greatly contribute to facilitating the standardization of HD DVD, NEC intends to further accelerate research and promote product development.

The recent achievements of NEC were exhibited at the “International Consumer Electronics Show 2004/CES” held from January 8 to 11, 2004 in Las Vegas, Nevada, USA.

*Research Planning Division*



**Photo 1 Next-generation DVD player.**

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**NEC Succeeds in Development of Highly Flame Resistant Bio-Plastic - A non-petroleum plastic, free of environmentally harmful halogen and phosphorus -**

NEC has recently developed the first-ever biomass-source plastic (polylactic acid-based) with high flame resistance by adding an inorganic material that absorbs heat during ignition and proprietary property modifiers in place of environmentally harmful halogen and phosphorus-based flame retardants. As well as achieving a high flame resistance (highest level in UL Standard) applicable to a wide range of electronics equipment, material properties (heat resistance, moldability, and strength) required for plastics in cases for desktop equipment and comparable to those of existing fiber-reinforced flame re-

tardant polycarbonate resin have also been realized. This recent development will make it possible to expand application of bio-plastic to electronic equipment and help to improve the environmental-friendliness of that equipment.

Features of NEC’s recently developed bio-plastic are as follows:

- 1) Top-level flame resistance has been achieved for bio-plastic for the first time by using a highly safe inorganic material that absorbs heat during ignition instead of using harmful halogen and

phosphorus-based flame retardant. (Highest UL Standard levels of 5V and V-0 achieved with 1.6mm-thick sample bar.)

2) By using its proprietary property modifiers (superplasticizer, impact modifier) in combination with the above inorganic material, NEC has achieved the level of other major practical properties (heat resistance, strength, and moldability) required in case material. (A level comparable to

that of high heat resistant/high strength fiber-reinforced flame retardant polycarbonate resin used in desktop equipment has been achieved.)

With the aim of putting this new material into practical use for electronic equipment within two years, NEC will further intensify research and development.

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**Face Recognition Technology for Image Content Search Adopted as International Standard**

Face recognition technology jointly proposed by NEC and Samsung Advanced Institute of Technology (SAIT; Representative: Wook Sun, Location: Yongin-si, Gyeonggi-do, Korea) has been adopted by the international standard for multimedia content description interface, MPEG-7\*, and will be published in the spring of 2004. This technology enables an automatic search for a person appearing in an image.

The face recognition technology adopted is a description method to represent the facial features of a person in still or moving pictures. This method boasts extremely small data size as well as high-speed search capability. By using this technology to describe facial features appearing in image contents as metadata, it is possible to use the human face as the query factor in searching an image archive or instantly accessing the beginning of a recorded scene in

which a targeted person appears.

Merits of the recently adopted facial features description method are as follows:

- 1) The NEC-developed "Cascaded Linear Discriminant Analysis," which selects facial features data in order starting from highest performance features, makes it possible to represent facial features in a minimum data size of 253 bits per face.
- 2) By combining 1) with the SAIT-developed "Face Component Based Face Feature Representation Method," which extracts facial features such as eyes and mouth, it is possible to further improve accuracy.

As a result, search accuracy has been significantly improved, with the search error rate being reduced to 1/8th on average compared to that of the previous standard. Under MPEG-7, high-speed matching performance as fast as 1,000,000 times per second is possible on an ordinary personal computer, enabling a face search in data covering 24 hours of images in about one second.

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\*MPEG-7: An international standard for multimedia content description interfaces for bibliographic information, and information on video and audio signals. Part-3 of this standard is a specification for description of visual features, such as color and shape in still and moving pictures. The official name for the recently adopted standard is ISO/IEC 15938-3:2002/Amd.1.