

Achievements and Activities of the BEANS Project

The research organs of the BEANS Project, currently comprising four research centers (Life BEANS Center, Life BEANS Center Kyushu, 3D BEANS Center, and Macro BEANS Center) and the head office of the BEANS Laboratory, have been conducting R&D on biomaterial integration processes, organic material integration processes, 3D nanostructure fabrication processes, and large-area continuous micro/nanostructure fabrication processes and have been developing a knowledge database on hetero-functional integrated device technology. This fiscal year, the G-device Cooperative was added to the BEANS Project for the purpose of developing an advanced sensor network system and environmentally friendly fabrication processes. Thus far this year, the BEANS Laboratory has published its research findings at national and international academic conferences such as μ TAS 2010 through approximately 60 presentations and has completed applications for 8 patents. In order to further publicize the achievements of the BEANS Project, we participated as an exhibitor in the 21st Exhibition Micromachine/MEMS and held the 4th BEANS Project Seminar, both of which took place at MicroNano 2010 on July 28–30. Some of the BEANS achievements were also published in newspapers, journals, and other print media and covered on television.

1. MicroNano 2010 at Tokyo Big Sight

(1) 21st Exhibition Micromachine/MEMS



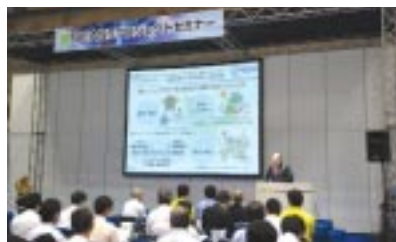
The exhibition provided a venue for each BEANS research center to showcase its R&D achievements through posters and actual demonstrations. Since this year's exhibition coincided with the project's interim evaluation year, our objective for the

exhibit was not simply to attract the attention of passersby, but to introduce our research achievements in exhaustive detail. Therefore, the exhibit space that surrounded the lone beanstalk rising upward at the booth's entrance was densely packed with the following exhibits: (1) futuristic devices the BEANS Project is working to make a reality with the aim of contributing to people, lifestyles, and the Earth, (2) an introduction to our efforts at creating intellectual property, (3) Japan's first public showing of fiber-like large-area pressure sensors, research on nanostructured fiber substrates, and a simulation of non-vacuum deposition, (4) photographs depicting low-damage neutral beam etching, models for elucidating the mechanism of supercritical films, trench capacitors, patterning using peptides, and true 3D machining, and (5) actual glowing microbeads related to a hybrid cell doll created from hydrogel beads and a glowing ear that reflects changes in blood sugar level. During the exhibition, visitors were often seen asking questions and enthusiastically engaging the attendants in conversation.



(2) The 4th BEANS Project Seminar

The seminar was held in MicroNano Conference Area B on July 29 (Thursday). Following greetings by Tomio Suzuki, executive director at NEDO, and Atsushi Yusa, president and project leader of BEANS, Sub Project Leader Hiroyuki Fujita, a professor at the University of Tokyo, gave a lecture entitled "The Shape of BEANS Revealed." Thereafter, the center directors (Associate Professor Shoji Takeuchi, Professor Chihaya Adachi, Associate Professor Masakazu Sugiyama, Professor Masaaki Kimata, and Group Leader Toshihiro Ito) gave clear and concise presentations on research achievements at their respective centers to date. After a brief recess, the invited lecturer Yoshihiro Shibuya, a director at INPIT, talked about the expectations for BEANS from an intellectual property perspective. While the seminar lasted a



considerably long time, the assembled audience of approximately 300 people, many of whom were standing, remained in the conference area throughout.

2. Media Coverage

(1) An article entitled "Developing Robots with a Sense of Smell" by the Life BEANS Center's Shoji Takeuchi, professor at the University of Tokyo, was published in the Proceedings of the National Academy of Sciences (PNAS) of the U.S.A. The story was also picked up by Japanese television on August 24, beginning with the NHK's morning show *Good Morning, Japan* and later on the evening news, and on the same day was published in eight major national newspapers and trade journals, who mentioned the Center's previous press release issued in June of last year and entitled "Is Your Ear Glowing?! Developing a Blood Sugar Sensor That Glows Under the Skin." The foreign press was particularly enthusiastic in its coverage of this latest story, and related articles were also posted on science and technology Web sites and published in the journal *Nature Materials*. The BEANS Project was once again in the spotlight when the PNAS picked up the article on the glowing blood sugar sensor. Some of the foreign press also recorded video footage of the BEANS Project booth at the Exhibition Micromachine/MEMS held in July that appeared on the online news site DigInfo TV and in a health-related segment during America's ABC network news program.

(2) On August 27, Nikkei Sangyo Shimbun published an article linked to Koji Miyazaki, associate professor at the Kyushu Institute of Technology and member of Life BEANS Kyushu, entitled "Thermoelectric Materials That Generate Electricity through a Small Temperature Difference, and Their Applications in Wearable Electronics."