

# MICROMACHINE

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## MMC Activities

### The 11<sup>th</sup> International Micromachine / Nanotech Symposium

The Micromachine Center, in conjunction with METI and NEDO, will hold the 11<sup>th</sup> International Micromachine/Nanotech Symposium on November 10 (Thursday), 2005, in the Science Hall of the Science Museum in Kitanomaru Park, Tokyo. Under the subtitle "Micromachine Technology: Driving the Creation and Expansion of New Industries," the symposium will feature 12 lectures presented by four invited speakers from overseas and eight from within Japan, all leading experts in the field, in three sessions: "Micromachine Business Frontiers," "Realizing the Potential of Micromachine Applications," and "At the Cutting Edge of Micromachine Technology." Furthermore, as part of Micromachine Center preparations for the establishment next April of a MEMS Association to promote industrial exchange and technological development, the symposium will also feature a special session entitled, "Towards the Expansion of MEMS Industries," that will include a keynote address and panel discussion comprising panelists representing various industries.

The special session, "Towards the Expansion of MEMS Industries," will begin with a keynote address presented by Professor Hiroyuki Fujita of the University of Tokyo entitled "Strategies for Expanding MEMS Industries and Developing New Fields." This will be followed by a panel discussion comprising Professor Fujita as coordinator and 6 panelists representing various industries: Mr. Yoshinori Komiya, Director of the Industrial Machinery Division, Manufacturing Industries Bureau, METI; Mr. Hiroya Taguchi, President of the Japan Society of Mechanical Engineers and Chief Executive Officer of the Life Science Group at Hitachi Ltd.; Mr. Tsuneyuki Miyake, Deputy Editor of Nikkei Microdevices, Nikkei Business Publications Inc.; Prof. Harri Kopola of VTT Electronics; Mr. Haruo Ogawa, Division Manager of the New Business Planning Division at Olympus Co.; and Mr. Hitoshi Ogata, Sr. Executive Office and Vice President of Corporate R&D at Mitsubishi Electric Corp. This panel discussion is expected to provide extremely useful ideas for the expansion of MEMS industries.

Session 1, "Micromachine Business Frontiers," will feature three lectures presented by representatives of leading manufacturers of products in which micromachine technology plays a significant role. One lecture will recount the success story of Analog Devices, manufacturer of such cutting-edge products as ink-jet printers with heads created using micromachine technology whose application is spreading to previously unimagined fields; rapidly advancing mobile telephones that are expected to evolve even more remarkably through the application of MEMS technology; and acceleration sensors necessary for vehicles (overseas speaker). Symposium participants can look forward to

lectures that paint a vivid picture of R&D at the forefront of the MEMS industry.

Session 2, "Realizing the Potential of Micromachine Applications," will present five lectures concerning either research on the application of MEMS and/or nanotechnology in fields such as medicine, energy, and space, or highly integrated complex MEMS adaptable to a diverse range of applications. Of particular interest are lectures on the application of MEMS in space research at NASA's Jet Propulsion Laboratory (overseas speaker) and research at the VTT Technical Research Center, which has produced many of Finland's technical innovations, most famously those of Nokia. Micromachine technology is being heralded as a means of answering society's needs and resolving social problems; R&D is being actively pursued in a diversity of fields, and high expectations are held for its future development.

Session 3, "At the Cutting Edge of Micromachine Technology," will feature four lectures concerning nanomaterials, ultraprecision micromachining, nanometrology, and thin-film material/nanomaterial limitations. Research on materials, processing, measurement, and reliability-related basic technologies are essential to MEMS development; this session provides a sampling of cutting-edge research being steadily pursued at universities and research institutions. It is anticipated that, through research such as this, micromachine technology will achieve the evolution necessary for it to answer diversifying needs, leading to the further expansion of MEMS industries.

The 16<sup>th</sup> Micromachine Exhibition will also be held at the Science Museum, over the three days from September 9 (Wednesday) to 11 (Friday). The numerous displays will include micromachine-related works created by businesses, universities, and organizations. In order to gain the best possible understanding of micromachine technology, it is recommended that symposium participants also take this opportunity to see actual micromachines in action. Symposium participants will therefore be allowed free and unlimited entry to the micromachine exhibition on presentation of their participation certificate. Furthermore, the interim report for the MemsONE Project will be presented on September 11, the final day of the exhibition, at the Science Museum; symposium and exhibition visitors are warmly invited to attend this meeting also.

Participation in the symposium, exhibition, and report presentation is sure to stir the imagination and suggest ideas instrumental to future research and business. We therefore look forward to welcoming a large number of participants to each of these events.

**The 11<sup>th</sup> International Micromachine / Nanotech Symposium**  
**- Micromachine Technology is Pulling the Creation and Development of New Industries -**  
**November 10, 2005, The Science Museum, Tokyo**

| Opening         |                                                                                 | Chairman: Keiichi Aoyagi (MMC)                                                                                                                                                                                                                                                                                                     |
|-----------------|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9:15 – 9:20     | Opening Remarks                                                                 | Tamotsu Nomakuchi (Micromachine Center)                                                                                                                                                                                                                                                                                            |
| 9:20 – 9:25     | Guest Speech                                                                    | Yoshinori Komiya (Industrial Machinery Division, Manufacturing Industries Bureau, METI)                                                                                                                                                                                                                                            |
| Special Session | Towards Development of New MEMS Industries                                      |                                                                                                                                                                                                                                                                                                                                    |
| 9:25 – 9:40     | Strategies for Further Development of MEMS Industries and Emerging Applications | Hiroyuki Fujita (The University of Tokyo)                                                                                                                                                                                                                                                                                          |
| 9:40 – 11:00    | Panel Discussion<br>Towards Development of New MEMS Industries                  | Coordinator: Hiroyuki Fujita (The University of Tokyo)<br>Panelist: Hitoshi Ogata (Mitsubishi Electric Corp.),<br>Haruo Ogawa (Olympus Corp.), Yoshinori Komiya (METI),<br>Hiroya Taguchi (The Japan Society of Mechanical Engineers),<br>Tsuneyuki Miyake (Nikkei Business Publications, Inc.),<br>Harri Kopola (VTT Electronics) |

| Session 1     | The Forefront of the Micromachine Business        | Chairman: Isao Shimoyama (The University of Tokyo)           |
|---------------|---------------------------------------------------|--------------------------------------------------------------|
| 11:00 – 11:25 | The Inkjet Printer and Its Industrial Application | Mitsuro Atohe (Seiko Epson Corp.)                            |
| 11:25 – 11:50 | Trends in Mobile Phones and RF-MEMS Applications  | Kunihiko Nakamura (Matsushita Electric Industrial Co., Ltd.) |
| 11:50 – 12:20 | Acceleration Sensors                              | Bob Sulouff (Analog Devices Inc.)                            |

12:20 – 13:20 Lunch

| Session 2     | Micromachine Applications Expected to Flower                                 | Chairman: Kazuhiro Hane (Tohoku University) |
|---------------|------------------------------------------------------------------------------|---------------------------------------------|
| 13:20 – 13:45 | Biomedical Application of BioMEMS and Nanotechnology                         | Yoshinobu Baba (Nagoya University)          |
| 13:45 – 14:15 | Optical Applications - Potential and Challenge for MEMS -                    | Harri Kopola (VTT Electronics)              |
| 14:15 – 14:40 | Development of Integrated Micro Reactors with Reformers for Small Fuel Cells | Osamu Nakamura (Casio Computer Co., Ltd.)   |
| 14:40 – 15:10 | MEMS and Nanotechnology for Space Applications                               | Thomas George (ViaLog Corporation)          |
| 15:10 – 15:35 | Fine MEMS                                                                    | Isao Shimoyama (The University of Tokyo)    |

15:35 – 15:50 Break

| Session 3     | The Leading Edge of Micromachine Technology                                               | Chairman: Ryutaro Maeda (AIST)                               |
|---------------|-------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| 15:50 – 16:15 | MEMS-related Nanomaterials                                                                | Gen Hashiguchi (Kagawa University)                           |
| 16:15 – 16:40 | Ultraprecision Micromachining and Its Application                                         | Yoshimi Takeuchi (Osaka University)                          |
| 16:40 – 17:05 | Nanometrolog - Subnanometer-scale Dimensional Measurement Using Atomic Force Microscopy - | Satoshi Gonda (Advanced Semiconductor Research Center, AIST) |
| 17:05 – 17:35 | Understanding the Limitations of Structural Films and Nanomaterials                       | Christopher Muhlstein (The Pennsylvania State University)    |

| Closing       |                 |                      |
|---------------|-----------------|----------------------|
| 17:35 – 17:40 | Closing Remarks | Keiichi Aoyagi (MMC) |