

## **Workshop**

**6/19 (Fri.) 13:50 – 18:00**

### For a construction of future technology -From “micro-nano” to “intelligence”-

Organizers: T. Sato (Tokyo Denki Univ.), S. Saegusa (Hiroshima Univ.), K. Toma (Panasonic),  
S. Shen (Univ. of Washington), N. Schirle (HGST)

One of the fundamental fields related to this international conference is Micro-Nano Science and Engineering. This field together with MEMS/NEMS technologies can be used as a basis for constructing ultra-precision devices for information processing and other applications. Information-processing devices are an example of how information and precision-element technologies can progress by combining basic research in the micro/nano field with micro/nano technologies. A rich information-based society can be created through the systematic convergence and synthesis of various types of information-related devices. Information and precision-element technologies will also pave the way to the development of intelligent systems. Finally, linking intelligent machines with human brain research is important for the advancement of intelligent systems and the creation of even better man-machine interfaces.

In this workshop, we will hear from well-known researchers in representative technologies that are part of this stream, and about future directions for these technologies. It will conclude with comprehensive discussions examining this development stream from an overall perspective.

Co-Chairs: Professor Hiroshi Takahashi, Shonan Institute of Technology, Japan  
Professor Frank E. Talke, UCSD, USA

**13:50 – 14:00**

Opening Address

Kazushi Yoshida (Hitachi Ltd., Chair of IIP division, Japan)

**14:00 – 14:40** WS-01

**MEMS Science: An Attractive Area Providing a Plenty of Room for Multidisciplinary Research**

Kazuo Sato (Professor, Nagoya University, Japan)

Textbooks and common sense still have to be rewritten in MEMS areas, because knowledge is not matured in micro/nano science. Examples are presented in wet etching of silicon and fracture of silicon microstructures. It is argued that interdisciplinary research collaboration is quite effective and essential for solving such problems.

**14:40 – 15:20** WS-02

**MEMS/NEMS Technologies and Information Devices**

Liwei Lin (Chancellor's Professor, University of California at Berkeley, USA)

In the past decades, the application of microelectronic technology to the fabrication of mechanical devices stimulated emerging research in micro/nano sensors and actuators. The versatility of semiconductor materials and the miniaturization of VLSI patterning techniques promise new systems with better capabilities and improved performance-to-cost ratio over those of conventionally machined devices. This talk will discuss MEMS/NEMS technologies and its applications to information devices, such as the design, fabrication and testing of MEMS/NEMS force and strain sensors to monitor disk/head contacts. Specifically, a micro pressure sensor and a pitch and roll motion sensor have been designed, fabricated and tested for possibly applications in the field of information devices.

**15:20 – 16:00 WS-03**

**A Forward Look: HDD Mechanical Technology Evolution in the Expanding Data Storage Universe**

**Nils Larson (Sr. Director of Mechanical Engineering, Western Digital, USA)**

Rotating magnetic data storage systems are providing solutions in a growing digital world, facing expanding challenges in satisfying end-user needs. Various critical customer attributes are explored and how HDD mechanical technology is evolving to meet these needs.

**16:00 – 16:20 BREAK**

**16:20 – 17:00 WS-04**

**Multi-layered Intelligent Support for Active Safety of Transport Systems**

**Toshiyuki Inagaki (Professor, University of Tsukuba, Japan)**

This paper discusses the need for multi-layered support for assuring active safety of transport systems. It also argues that a machine-initiated trading of authority may be indispensable even in the framework of human-centered automation.

**17:00 – 17:40 WS-05**

**Measurement of electromagnetic signals generated from the human brain**

**Yoshinori Uchikawa (Professor, Tokyo Denki University, Japan)**

The measurement of electromagnetic fields, using SQUID magnetometer, generated by activation of the human brain and application to the interface technology of the human adaptive mechatronics (HAM) system are introduced.

**17:40 – 18:00**

**Panel Discussion**

**Closing Address**