The 2nd International Symposium Series on Mechanical Systems Innovation is held

The International Symposium Series on Mechanical Systems Innovation was held for six full days at the end of 2005, from Friday, December 2 to Thursday, December 8, at the Takeda Conference Hall at the University of Tokyo. There were, in fact, three international symposia, centered on three different topics: Innovative Aerial/Space Flyer Systems, Biomedical Systems Innovation, and Distributed Energy Systems and Micro Grids. Each symposium lasted two days.

Professor Nobuhide Kasagi, the program leader, presided over the opening of these series and introduced the 21st Century COE Program, “Mechanical Systems Innovation.” We invited famous researchers from home and abroad, and provided them multiple opportunities to exchange information about frontier research in their various fields. Poster sessions in each symposium invited presentations from numerous graduate students and young faculty members in the COE. In some parts of the symposia, a mini-oral presentation for the graduate students and young faculty members was planned, and their active participation attracted the attention of all in attendance.

Opening address by Prof. Kasagi, the 21COE program leader.
The 2nd International Symposium on Innovative Aerial/Space Flyer Systems

“The 2nd International Symposium on Innovative Aerial/Space Flyer Systems,” sponsored by the 21st Century COE program, “Mechanical Systems Innovation,” was held on Friday and Saturday, December 2 and 3, 2005, at Takeda Conference Hall, the University of Tokyo. This symposium dealt with both (1) R&D on MAVs (micro air vehicles) and UAVs (unmanned air vehicles), and (2) R&D on space energy utilization. Both of these were organized by members of the Innovative Aerial Robot Project (IARP) and the Space Energy Research Group in the Energy Innovation Project (SERG) of our COE program, respectively.

The research results accomplished in the COE program were presented by our researchers, and up-to-date summary reports were made by the ten leading researchers from abroad, including Asia, the USA and Europe. Young graduate students and Ph.D. candidates made short oral presentations with posters. Demonstration experiments also stimulated discussions among our researchers and the invited speakers.

The 2nd International Symposium on Biomedical Systems Innovation

“The 2nd International Symposium on Biomedical Systems Innovation,” sponsored by the 21st Century COE Program, “Mechanical Systems Innovation,” was held on Monday and Tuesday, December 5 and 6, 2005 at Takeda Conference Hall. The symposium consisted of five sessions, namely, “Non-invasive Therapeutic Systems,” “Medical Robotics,” “Innovation in Medical Systems,” “Imaging & Simulation” and “Nanoparticle Engineering & Tissue Engineering.” About 130 researchers from home and abroad gathered and had an information exchange. Seventeen researchers, leaders in various fields, delivered lectures. Prof. Michael R. Bailey (University of Washington), Prof. Wei Tech Ang (Nanyang Technological University), Dr. Jocelyne Troccaz (TIMC/IMAG Laboratory), Dr. Jeffrey A. Ketterling (Riverside Research Institute) and Prof. Shuichi Mizuno (Harvard Medical School) presented new information about medical therapy and biotechnology research.

In the poster session, which was held at lunch time, young researchers, who participate in this COE program, presented their work and had an active discussion with the invited researchers. At the close of the symposium, three posters were selected by a vote of the participants and given poster awards.

International Symposium on Distributed Energy Systems and Micro Grids

“The International Symposium on Distributed Energy Systems and Micro Grids,” sponsored by the 21st Century COE program, “Mechanical Systems Innovation,” and co-hosted by the Holonic Energy Systems Laboratory, was held on Wednesday and Thursday, December 7 and 8, 2005, at Takeda Conference Hall. The invited leading experts were in the areas of energy vision and energy systems, fuel cell and hybrid systems, biomass gas turbines, sodium sulfur batteries, energy storage and transportation, etc. Hot topics on the recent development of distributed energy systems were also introduced by Prof. Aristide Massardo (Universita di Genova, Italy), Prof. Jack Brouwer (University of California Irvine, USA), and Prof. Raffaele Tuccillo (University of Naples, Italy). Recent topics on micro grid technology were introduced by Johan Driesen (Katholieke Universiteit Leuven, Belgium) and Prof. Reza Iravani (University of Toronto, Canada). Poster sessions by young graduate students, post-docs and Ph.D. candidates, on energy systems and related topics were held and 26 posters were presented.

The discussions and interactions with invited speakers were intensive and exciting. The workshop was very successful in providing good opportunities to learn about the recent progress in each field by young researchers.
Power MEMS 2005 is held

The 5th International Workshop on Micro and Nanotechnology for Power Generation and Energy Conversion Applications (PowerMEMS 2005), sponsored by the 21st Century COE program, “Mechanical Systems Innovation,” was held on November 28-30, 2005, at Takeda Hall on the Asano campus.

The workshop has been held at Tsukuba, Chiba and Kyoto for the past five years since 2000, when the first workshop was held in Sendai. It is the 5th International workshop, which specialized in the energy-related applications of micromachine technology and nanotechnology, and dealt with miniaturized fuel cells, micro heat engines, micro reactors and micro space promotions.

The invited lectures were “Pathways to Near-Perpetual Radioactive Micro Power Sources” given by Prof. A. Lal (Cornell University, USA), “The Experience Gained on the Ultra Microturbine: from Energetics to Component Bricks Studies” by Dr. Y. Ribaud (Onera, France), “Miniaturised Power and Propulsion for Small, Low Cost Space Exploration Missions: Current Status and a Look at the Future” by Dr. A. M. Baker (Surrey Satellite Technology Ltd, UK) and “Enzyme-Based Fuel Cells for Biomedical Microdevices” by Prof. M. Nishizawa, (Tohoku University, Japan).

Fifty-three high quality lectures and poster presentations were given, and more than 135 people from 14 countries as well as young Ph. D. candidates in the 21st Century COE program attended the workshop. It was very successful in providing good opportunities for the young researchers to discuss and interact with the invited speakers. The next workshop is scheduled to be held at the University of California at Berkeley beginning November 26, 2006.
Project Promoters

Program leader
Nobuhide Kaşagi
Professor, Department of Mechanical Engineering, School of Engineering

Energy innovation

- Masahiro Shoji
  Professor Emeritus, Department of Mechanical Engineering, School of Engineering
- Toshio Nagashima
  Professor, Department of Aeronautics and Astronautics, School of Engineering

Advisory Committee

- Koutaro Inoue
  Senior Fellow, Japan Science and Technology Agency
- Yoshitsugu Kimura
  Professor Emeritus, The University of Tokyo

Project members

- Toshiki Iino
  Project Professor, International Research and Education Center for Mechanical Systems Innovation, School of Engineering
- Shigehiko Kaneko
  Professor, Department of Mechanical Engineering, School of Engineering
- Toyohisa Fujita
  Professor, Department of Aeronautics and Astronautics, School of Engineering
- Shinichi Nakasuka
  Institute of Industrial Science
- Kazuo Kageyama
  School of Engineering
- Takayuki Terai
  Professor, Department of Human and Society, Institute of Industrial Science
- Chisachi Kato
  Professor, Department of Aeronautics and Astronautics, School of Engineering
- Toshio Nagashima
  Professor Emeritus, Department of Mechanical Engineering, School of Engineering
- Masahiro Shoji
  Professor, Department of Energy Innovation and Management, School of Engineering

Biomedical innovation

- Mamoru Mitsuishi
  Professor, Department of Engineering Synthesis, School of Engineering
- Masao Wachi
  Professor, Department of Mechanical Engineering, School of Engineering
- Masayuki Nakao
  Professor, Department of Engineering Synthesis, School of Engineering

Program Executive Organization

- Noboru Kikuchi
  Professor, The University of Michigan
- Tetsuya Tateishi
  Fellow, National Institute for Material Science

Venue : Takeda Hall, Takeda Building, Asano Campus
Date : December 7, 8, 2005

Advisory Committee

- Noboru Kikuchi
  Professor, The University of Michigan
- Tetsuya Tateishi
  Fellow, National Institute for Material Science

Activities of Mechanical Systems Innovation Program

International Symposia

- 21COE Forum on Micro Scale Energy Conversion
  Date : November 9, 2005
  Venue : Lecture Room No.226, Faculty of Engineering Bldg.8, Hongo Campus

- Power MEMS 2005
  Date : November 28-30, 2005
  Venue : Lecture Room No.226, Faculty of Engineering Bldg.8, Hongo Campus

- The 2nd International Symposium on Innovative Aerial/Space Flyer Systems
  Date : December 2, 3, 2005
  Venue : Lecture Room No.226, Faculty of Engineering Bldg.8, Hongo Campus

- The 2nd International Symposium on Biomedical Systems Innovation
  Date : December 5, 6, 2005
  Venue : Lecture Room No.226, Faculty of Engineering Bldg.8, Hongo Campus

- International Symposium on Distributed Energy Systems and Micro Grids
  Date : December 7, 8, 2005
  Venue : Lecture Room No.226, Faculty of Engineering Bldg.8, Hongo Campus

Domestic Symposium

- Toward Holonic Energy Systems
  Date : July 11, 2005
  Venue : Lecture Room No.226, Faculty of Engineering Bldg.8, Hongo Campus

Open Seminars

- FY2005-10th Seminar
  Date : September 5, 2005
  Venue : Lecture Room No.226, Faculty of Engineering Bldg.8, Hongo Campus
  Subject : Fluid Flow with Free Surfaces and Phase Change
  Speaker : Dr. Gustav Amberg (Department of Mechanics, KTH)

- FY2005-11th Seminar
  Date : October 18, 2005
  Venue : Lecture Room No.226, Faculty of Engineering Bldg.8, Hongo Campus
  Subject : Nucleation and Growth of SWNTs Studied by QM/MD Simulations
  Speaker : Dr. Stephan Irle (Cherry Emerson Center for Scientific Computation, Emory University)

- FY2005-12th Seminar
  Date : October 26, 2005
  Venue : Lecture Room No.226, Faculty of Engineering Bldg.8, Hongo Campus
  Subject : Novel Floating Catalyst and Surface CVD Synthesis of Carbon Nanotubes
  Speaker : Prof. Esko I. Kauppinen (Department of Physics & Centre for New Materials, Helsinki University of Technology)

- FY2005-13th Seminar
  Date : November 9, 2005
  Venue : Lecture Room No.226, Faculty of Engineering Bldg.8, Hongo Campus
  Subject : Thermal Conductance of Solid-Solid and Solid-Liquid Interfaces
  Speaker : Prof. David G. Cahill (Department of Materials Science, University of Illinois)