

# Newsletter

No. **10**<sup>E</sup>  
 June 1, 2006

The 21st Century COE Program  
 Mechanical Systems Innovation, The University of Tokyo

## The 2nd 21st Century COE Seven Universities Joint Symposium is held

The 2nd 21st Century COE Seven Universities Joint Symposium was held on Wednesday, March 8, 2006 at Noyori Memorial Conference Hall in Higashiyama campus, Nagoya University. This annual symposium aims to promote the research exchange between seven universities, including our university, and transmit the research activities performed by each university to the society. Young researchers from the seven Universities set up and run this session. Following to Waseda University in the last time, Nagoya University acted as the managing university this time.

In this symposium, introduction of the research activities in each COE program, invited lectures, and panel discussions were performed. Ph.D. students in our COE

program made three presentations on the theme of "COE from student's point of view." They introduced new educational programs in our COE program, such as Cross-Department Doctoral Course and ETH Exchange Program, and talked their frank impressions after participating in them. Students from other universities had a high interest in our educational programs, and the Ph.D. students received many questions after their presentations.

Moreover, in the panel discussion after the introduction of the research activities, three topics, namely, "COE from student's point of view," "Whether should we live only for research or not," and "The researchers-estimated future in 20 years," were proposed by the University of Tokyo, Nagoya University and Waseda University, respectively. The audience-participation-type panel session via live discussion and internet chat was very prosperous, and provide a precious opportunity for exchange between young researchers.



Atmosphere of 21COE Seven Universities Joint Symposium

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## *Introduction of Newly Established Departments*

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### *Department of Nuclear Engineering and Management*

#### **Takayuki Terai, Professor, Department of Nuclear Engineering and Management**



The department of Nuclear Engineering and Management (<http://www.n.t.u-tokyo.ac.jp/>) has started on April 1, 2005, in Hongo (Asano) campus, School of Engineering, the University of Tokyo to educate the students in the field of advanced science and technologies including traditional nuclear engineering from a global point of view.

Stable energy supply and environmental protection are great motivations for nuclear engineering and many researches have been conducted continuously.

At the same time, the safety and the public acceptance of nuclear technologies are also great concerns for research and education in the nuclear engineering field. The application of laser/beam technologies is expanding its field not only within engineering but also into science, agriculture, medicine and environment. Furthermore, international co-operation and collaboration are quite important in the application of nuclear power including physical protection, safeguard, nuclear fuel management, and the nuclear safety. From these points of view, our department covers a wide range of research and education mainly categorized into three topics; advanced nuclear energy engineering, advanced laser/beam science and medical physics, and nuclear socio-engineering. These main topics in research and education have a close relationship with 21st Century COE Program "Mechanical Systems Innovation", which promotes innovative energy systems, bio-medical innovations and simulation technologies for innovative systems. Our department would like to positively contribute to this COE program. Any comments and advices to us are very much welcome.

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### *Department of Bioengineering*

#### **Mamoru Mitsuishi, Professor, Department of Engineering Synthesis**



The Department of Bioengineering was established in the School of Engineering of the University of Tokyo on April 1st, 2006. The synthesis of the life sciences and engineering, which provides the practical means for the support of society, is indispensable for the achievement of high quality medical care and treatment, human welfare, and a sustainable society. The development of systems integrating biological tissues and bioengineered mechanical systems, and the development of technologies for the effective utilization of biomass are also included within the scope of the department, as are numerous other fascinating problems in the life sciences, including the use of engineering methods to understand the phenomena of life itself and the functions of the various organs of living organisms.

The Department of Bioengineering is located intellectually between medicine, engineering, and the life sciences, to add new value in all three areas. The 5 professors and associate professors in the Department of Bioengineering and 12 key faculty members from other departments within the Faculty of Engineering take primary responsibility for the department's management and educational programs, with 5 faculty from institutes or departments outside the Faculty of Engineering assisting with the educational programs. The 21st Century COE Program "Mechanical Systems and Innovation" has contributed to the development of the Department of Bioengineering since it was established. According to the categories given previously, 2, 2 and 1 faculty members joined the department from the COE program. It would be greatly appreciated if you could take a look at the Department of Bioengineering homepage at <http://www.bioeng.t.u-tokyo.ac.jp>

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## *Project Promoter Newly Joins 21COE*

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**Shinji SUZUKI**, Professor,  
Department of Aeronautics and Astronautics, School of Engineering



I am Shinji Suzuki, a professor in the department of aeronautics and astronautics. I was newly assigned as a project promoter of the 21st Century COE program. While I have been concerning myself in IARP (Innovative Aerial Robot Project) that was newly organized in our COE program, I will promote IARP on my own responsibility. In 2005, we developed the Innovative Flying Robot for Expo 2005 Aichi Japan, and held the 1st All Japan Student Indoor Flying Robot Contest. From now, we are developing several types of Aerial Robots for different missions, and promoting the contest to the international competition.

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## *Project Lecturer and Research Associate Newly Join 21COE*

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**Tomonori YAMADA**, Project Lecturer,  
Department of Quantum Engineering and Systems Science, School of Engineering



My name is Tomonori YAMADA. I was appointed to be a project lecturer of this 21st Century COE Program on April 1, 2006. I worked as a team manager of a private company, a researcher in RIKEN and a research associate in the department of quantum engineering and systems science after finishing my Ph.D course. When I was a Ph.D student, my main interests were the mesh generation algorithms and the implementation of FEA code on parallel computers, and they are somewhat far from the essence of mechanics. However, through the experience in private company and research institute, real industrial applications, such as MEMS, engine and trabecular structure of bone have been attracting me. In the department of quantum engineering and systems science, I started research on the multiphysics phenomena in the flapping motion of insect flight to assist the development of micro aerial vehicle under the supervision of Prof. Yoshimura, who is one of the project promoters in the COE. By collaborating with distinguished professors and RAs in the different fields, though in this same COE program, I would like to contribute to the developing simulation technologies, which can help developing innovative mechanical systems.

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**Yoshiaki AKEMATSU**, Project Research Associate,  
Department of Environmental & Ocean Engineering, School of Engineering



My name is Yoshiaki AKEMATSU. I started working as a research associate of the 21st century COE program in April 1st of this year. I worked as Post-Doctoral Fellow for two year of the 21st century COE program. I appreciate having the opportunity to do interdisciplinary research and take part in the mechanical system innovation lecture. I would like to make use of my past experience to assist the mechanical system innovation lecture. My research topic is a health monitoring by using optical fiber vibration sensor in "The Energy Innovation Project". I would like to propose a new inspection method for safety and reliability. Your continued support will be greatly appreciated.

## Program Executive Organization

### Project Promoters

#### Program leader

Nobuhide Kasagi  
Professor, Department of Mechanical Engineering, School of Engineering

#### Energy innovation

Toshio Nagashima  
Professor, Department of Aeronautics and Astronautics, School of Engineering  
Chisachi Kato  
Professor, Department of Mechanical Engineering, Institute of Industrial Science  
Takayuki Terai  
Professor, Department of Nuclear Engineering and Management, School of Engineering  
Kazuo Kageyama  
Professor, Department of Environmental and Ocean Engineering, School of Engineering  
Nobuo Takeda  
Professor, Department of Advanced Energy, School of Frontier Sciences  
Tamaki Ura  
Professor, Department of Environmental and Ocean Engineering, Institute of Industrial Science  
Shinichi Nakasuka  
Professor, Department of Aeronautics and Astronautics, School of Engineering  
Toyoshisa Fujita  
Professor, Department of Geosystem Engineering, School of Engineering  
Shigehiko Kaneko  
Professor, Department of Mechanical Engineering, School of Engineering  
Shinji Suzuki  
Professor, Department of Aeronautics and Astronautics, School of Engineering

#### Project members

Toshiki Iino  
Project Professor, International Research and Education Center for Mechanical Systems Innovation, School of Engineering  
Tomonori Yamada  
Project Lecturer, International Research and Education Center for Mechanical Systems Innovation, School of Engineering  
Yosuke Hasegawa  
Project Research Associate, International Research and Education Center for Mechanical Systems Innovation, School of Engineering  
Yoshiaki Akematsu  
Project Research Associate, International Research and Education Center for Mechanical Systems Innovation, School of Engineering

### Advisory Committee

#### Advisory Committee

Koutaro Inoue  
Senior Fellow, Japan Science and Technology Agency  
Noboru Kikuchi  
Professor, The University of Michigan

#### Biomedical innovation

Mamoru Mitsuishi  
Professor, Department of Engineering Synthesis, School of Engineering  
Masao Washizu  
Professor, Department of Mechanical Engineering, School of Engineering  
Masayuki Nakao  
Professor, Department of Engineering Synthesis, School of Engineering  
Teruo Fujii  
Associate Professor, Department of Environmental and Ocean Engineering, Institute of Industrial Science  
Takashi Ushida  
Professor, Center for Disease Biology and Integrative Medicine, Graduate School of Medicine

#### Hyper modeling / simulation

Yoichiro Matsumoto  
Professor, Department of Mechanical Engineering, School of Engineering  
Takafumi Fujita  
Professor, Department of Engineering Synthesis, Institute of Industrial Science  
Hideaki Miyata  
Professor, Department of Environmental and Ocean Engineering, School of Engineering  
Shinsuke Sakai  
Professor, Department of Mechanical Engineering, School of Engineering  
Shinobu Yoshimura  
Professor, Department of Quantum Engineering and Systems Science, School of Engineering

## Activities of Mechanical Systems Innovation Program

#### Open Seminars

##### FY2005-17th Seminar

Date : March 24, 2006 3:00pm-5:00pm  
Venue : Conference room 2-31A, Faculty of Engineering Bldg.2, Hongo campus  
Subject : Fluorescence of Semiconducting SWNTs under Various conditions  
Speaker : Prof. Manfred M. Kappes (Institut für Physikalische Chemie, Universität Karlsruhe (TH))

#### IARP liaison meeting

Date : April 26, 2006 5:00pm-7:00pm  
Venue : Main conference room 2F, Faculty of Engineering Bldg.7, Hongo campus  
Subject : 1) Report on 1st student indoor flying contest.  
2) Optimum design method of MAV by using genetic algorithm.  
3) Aerodynamic performance of NACA0012 airfoil and 4% camber airfoil on low Reynolds number.  
4) Development of integrated design tool of small robot aircraft.  
Speaker : 1) Lect. T. Tuchiya, Department of Aeronautics and Astronautics  
2) K. Akiyama, Department of Aeronautics and Astronautics  
3) M. Okuno, Department of Aeronautics and Astronautics  
4) M. Kawaide, Department of Aeronautics and Astronautics

#### Domestic Symposia

##### The 2nd 21st Century COE Seven Universities Joint Symposium

Date : March 8, 2006  
Venue : Noyori Conference Hall, Nagoya University

##### 21st Century COE Mechanical Systems Innovation

Date : March 10-11, 2006  
Venue : Lecture room 27, 28, Faculty of Engineering Bldg.2, Hongo campus

##### Advanced Underwater Technology for Bio-SONAR Study Workshop 2006

Date : March 23-24, 2006  
Venue : Institute of Industrial Science Conference Hall "Haricot"

##### The 37th Underwater Technology Forum Program

Date : April 21, 2006  
Venue : Institute of Industrial Science Conference Hall "Haricot"

##### The 3rd Japan Hydrogen Industrial Forum

Date : May 12, 2006 1:30 pm-5:45pm  
Venue : Takeda Hall, Takeda Building, Asano Campus