



Prof. de Weck lectures at ALPS

Message from the Director and Dean

After the holiday week in May, the activities of research and education at the Graduate School of System Design and Management (SDM) intensified. Firstly, Design Project ALPS (Active Learning Project Sequence) started, and interesting themes related to long term safety and security were presented in the first workshop and students, mainly the 1st year in master's course, started to work on their assigned subject. I would like to thank all of the organizations for proposing themes and for participating in ALPS.

Secondly, we had more frequent international collaborations. Professor Leifer from Stanford University gave a special lecture titled "Dancing with Ambiguity", Dr. Beiter from Stanford University and Professor de Weck from MIT were involved in the aforementioned ALPS, the partnership agreement with Istanbul Technical University has been concluded, and Second TPM (Delft University of Technology, Faculty of Technology, Policy and Management) /SDM workshop was held at Delft University of Technology (TU Delft). Education and research activities at SDM shift into full swing around this time of the year, and all faculty members are deeply involved with their students. We appreciate your continued support.



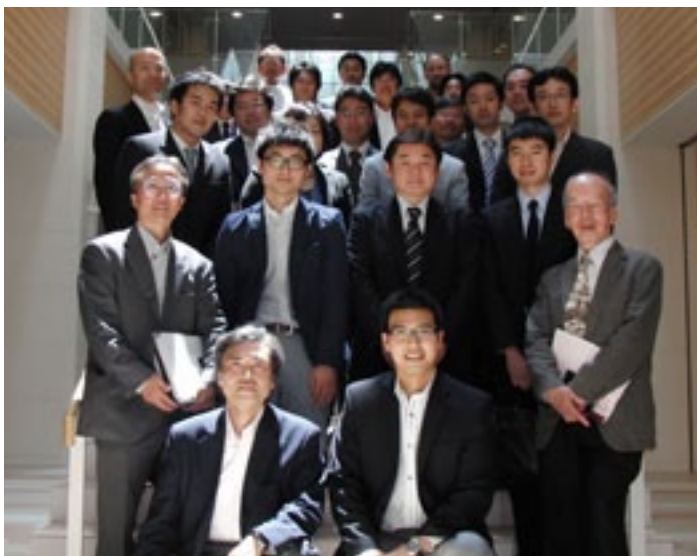
Yoshiaki Ohkami
Director, SDM Research Institute
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System Design and Management

News

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ALPS Kickoff Meeting and ALPS #1 Report



Proposers of 2010 ALPS with SDM professors

Responding to SDM's call, 13 companies and one university submitted 15 project themes relating to "Safe and Secure System Design", the theme for 2010 Design Project ALPS (Active Learning Project Sequence).

Many of the submitted themes were related to behaviors to cope with disasters, such as immediate restoration of social systems after a major disaster, how port activity should be continued after a huge earthquake, and systems run by renewable energy, such as solar power, at the time of emergency. There were also themes relating to safety and security in daily life and business, such as a bicycle simulator design to reduce the risk of bicycle accidents, real-time chemical detection system, harmless plastic containers, and a mechanism to prevent industrial accidents. We also have a unique proposal how to instill a corporate image of a "safe and secure company".

The kick-off meeting was held on May 8, and representatives from proposers, the organizations which submitted project themes, were invited to Hiyoshi Campus. Various themes relating to safety and security were presented and discussed.

The first 2010 ALPS workshop was held on May 14 and 15, and a professor from TU Delft in the Netherlands joined it for the first time, in addition to the regular professors from MIT, Stanford University, and Keio University.

A total of five workshops are scheduled this year from May to November, and 17 teams (composed of five students each) work on the themes in cooperation with their proposers and SDM instructors.

Stanford Center for Design Research (CDR) / d.school Workshop



Dr. Larry Leifer

SDM hosted Stanford Center for Design Research (CDR, commonly known as d.school) Workshops for three days from May 10 to 12. The theme of the workshops is ideas for design, one of the most important tasks in system design. The workshops were regarded as preparation for ALPS, SDM's year-long design project course. In the workshops, the lecturers shared methods to come up with design ideas, and teams of students worked on the assignment; to design a pair of footwear as tall as possible made of cardboard

and packing tape in a limited time, and then run a footrace wearing their creations. Five teams of students enthusiastically worked on their designs, considering the height, functionality, and durability of the footwear. Dr. Larry Leifer and Mr. Sushi Suzuki from Stanford University, the world's leading experts in the field, joined Assistant Professor Sun Kim as lecturers. Many students felt the three-day workshop was a good experience to learn and then practice cutting-edge idea generation methods.

SDM Information Session

Graduate School of System Design and Management Information Sessions for possible future students were held on April 14 and May 15. Since the sessions were held either in the evening or on Saturday, more than 90 people, including working people (31% of total), attended. Of all attendees, 81% returned questionnaire sheets. Of those, 98% said the session was either "very good" (60%) or "generally good" (38%). The contents were partly changed from previous sessions. Instead of taking time to introduce each laboratory, collaborations between professors, such as joint research laboratories, were introduced to show that SDM is

not vertically segmented. Comments by current students shown in the video was received well, as it "was straightforward and from the students' viewpoint", "explained how study at SDM helps in future career", and "accurately explained the information needed (by the attendee)". Because ALPS was held around the same period, the lecturers for ALPS (professors from Stanford University, MIT, and TU Delft) joined the session held on May 15. This showed how an education at SDM is truly international. An SDM information session in English was filmed and will be uploaded on SDM's website for people overseas who are interested in SDM.



Lecturers for ALPS introduced at the information session

Crash Course by Dr. James Martin "System Engineering and Architecture Framework"

Dr. James Martin (The Aerospace Corporation), who is internationally renowned in system engineering process and architecture framework areas was invited to teach a five-day crash course held May 17-21, 2010. Participants studied basic thinking and process of systems engineering as well as US Department of Defense Architecture Framework (DoDAF). They also covered topics that are not yet published anywhere in the world, including enterprise systems engineering and PICARD theory (analyzing systems from the standpoint of Parts, Interactions, Context, Actions, Relationships

and Destiny). The participants found the crash course to be quite beneficial. The course, opened to the public on the first day, attracted a total of 76 participants.



Dr. James Martin



Dr. Martin giving a lecture

Special Lectures by Prof. Duncan Moore "Entrepreneurship"

A new SDM course "Entrepreneurship I" started in 2010. It is taught by SDM Professor Shinichiro Haruyama and Dr. Hiroshi Fujiwara. Dr. Fujiwara is president and CEO of Internet Research Institute, Inc., and the benefactor of Fujiwara Hiroshi Hall in the Collaboration Complex, Hiyoshi Campus. In the course, Dr. Fujiwara speaks about his experience of starting a company which eventually went public, the industrial revolution, and the digital information revolution.

As a part of the course, Professor Duncan Moore from the University of Rochester was invited to

give a series of special lectures on May 24, 26 and 28. He is a professor in business administration, an optical engineering researcher, and like Dr. Fujiwara, he is an entrepreneur and is still involved in managing his company. He was appointed Director for the Center for Entrepreneurship in the University of Rochester in 2007. In Professor Moore's highly concentrated lectures titled "Technical Entrepreneurship & Management", he covered entrepreneurship, legal issues surrounding engineering firms, issues on intellectual properties, finance, and marketing.



Prof. Duncan Moore

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6**University-wide Partnership Agreement with Istanbul Technical University**

A signing ceremony of the University-wide Partnership Agreement between Istanbul Technical University and Keio University was held at Mita Campus on May 24, 2010. Three representatives from Istanbul Technical University, including Rector Muhammed Sahin, President Atsushi Seike and Vice-President Naoyuki Agawa from Keio University, and Dean Yoshiaki Ohkami and Professor Hidekazu Nishimura of SDM attended the ceremony. Rector Sahin's visit to Japan was a part of the events surrounding 2010 Japan Year in Turkey

to mark 120th anniversary of rescuing the crews of Turkey's navy vessel (Ertuğrul Firkateyni) that had shipwrecked off the coast of Kishu. The two universities are planning faculty and student exchanges and joint research, and since Rector Sahin has a deep interest in research on reducing the damage caused by natural disasters, SDM will be actively involved in the partnership. The guests from Istanbul Technical University visited Hiyoshi Campus after the ceremony, and saw a research demonstration conducted at SDM. SDM professors introduced ALPS, a

practical project in cooperation with international universities, and discussed the research on reducing natural disaster damage with them.



Rector Muhammed Sahin and President Atsushi Seike

TOPIC
7**The Second Joint Workshop with TU Delft TPM and the 13th Economics of Infrastructures Conference**

The Graduate School of System Design and Management signed a comprehensive bilateral agreement with the TU Delft TPM (Faculty of Technology, Policy and Management of Delft University of Technology) in the Netherlands last year, and three students from each institution participated in a student exchange program. The number of students involved in the program is expected to increase this year. The second joint workshop between the two organizations was held on May 26 at TU Delft to review the accomplishments and discuss future collaboration plans. From SDM, Dean Professor Yoshiaki Ohkami, Professor Masaru Nakano, Professor Toshiyuki Yasui, Associate Professor Naohiko Kohtake, Associate Professor Seiko Shirasaka, and Assistant Professor Sun Kim traveled to the Netherlands to attend the workshop. More than 20 professors from TU Delft, including Prof. Toonen, Dean of TPM, joined the discussions on various topics including the student exchange,

joint research, and collaboration for international contributions regarding education and research of systems engineering. On this occasion, SDM faculty members interviewed the five TU Delft TPM students who are scheduled to visit SDM in August on this year's exchange program. The project for the alliance has been named "Kompas", the Dutch word for compass.

The Economics of Infrastructure Conference was held on May 27 and 28 at TU Delft, at which economic issues regarding next-generation infrastructures were academically discussed. 2009 Nobel Prize winners Professor Elinor Ostrom (Indiana University) and Professor Oliver Williamson (UC Berkeley) were invited to the conference at which governance of next-generation infrastructures was discussed from various angles. Professor Ostrom is the founder of research on governance of resources that can provide benefits to everyone without negatively impacting its long-term sustainability, so-called

"Commons Pool Resources". Professor Williamson is an authority on transaction cost economics called New Institutional Economics. In section meetings and lectures held during the conference, many topics relating to research at SDM were discussed, including the environmental economic systems frontier, right of commons, and the Keiretsu system in Japanese car industry. Six SDM professors invited to the conference by TU Delft were actively involved in the discussion.



The joint workshop

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8**Special Lecture to Commemorate the Launch of "Keio System Management Course"**

The Special Lecture by SDM Dean Professor Yoshiaki Ohkami and Professor Takashi Maeno held on May 20, 2010 to mark the start of the Keio System Management Course, which is co-hosted by SDM and Nikkan Kogyo Simbun, attracted more than 50 people, including business people.



Prof. Ohkami and Prof. Maeno at the special lecture

Professor Yoshiaki Ohkami's speech titled "Strategic Systems Engineering" was about the latest trends, and the approach SDM takes to find solutions for problems associated with large-scale and complex systems. He discussed the importance of strategic thinking and requirements analysis, and many participants agreed with him.

Professor Maeno gave a speech titled "New Development in System Design and Management" and introduced the features of SDM; the academic integration of art and science, and the recognition of the importance of both education

and research. Some professors' research topics and master thesis topics were also introduced. He explained how SDM emphasizes "visualization from multiple-perspectives", and explained systems thinking.

Many open lectures are scheduled in the Keio System Management Course. In June, Professor Toshiyuki Yasui will give a lecture titled "The New Monetary System: Electronic Money and Enterprise Currencies". In July, Professor Shoichi Sasaki will give a lecture titled "Technology, Climate, and the Future of Hybrid Gas-electric Car Prius".

Visit the websites below for more information:

▶ <http://www.kibanken.jp/keio/>

▶ <http://www.sdm.keio.ac.jp/news/2010/05/31-104404.html>

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9**SDM Visited Yokohama Rise Facility for the Disabled**

A total of 13 SDM students and faculty members visited a facility for the disabled called Yokohama Rise in Shinyoshida-cho, Kohoku-ku, Yokohama on May 23, 2010. The visit was organized by Masaki Hokari (second year in SDM master's course) in the Universal Design Labora-

tory and the Human System Design Laboratory. Mr. Okuda, the facility coordinator, deepened the participants' understanding of the importance of facilities for the disabled and of universal design, and also explained about the care equipment, facilities, and about managing such a facility.



Students visiting Yokohama Rise

Lab profile

Control Systems Design and Dynamics Lab

Professor Hidekazu Nishimura

The specialties of Professor Hidekazu Nishimura are control systems design, dynamical systems, mobility systems design, and universal design. He is the co-author of "Control System Design Using MATLAB" and "Frontiers of Motion and Vibration Control" and the author of other published works.

► <http://lab.sdm.keio.ac.jp/nismmlab/>



1 Laboratory profile and its collaborations with other laboratories and centers

In addition to Professor Hidekazu Nishimura and Assistant Professor Terumasa Narukawa, eight doctoral students (including Assistant Professor Keiichi Yamamoto), 15 master's students and Assistant Professor Zhu Shaopeng, who earned a doctoral degree in systems engineering in March this year, are working in Control Systems Design and Dynamics Lab. A researcher from Hitachi joined them in April. Around a half of the lab members are working students, and the other half are full-time students who are new graduates. Three are international students. Since the students' research subjects are broad, the lab works in collaboration with other organizations including Mobility System Management Center, Universal Design Lab, Model-Driven Systems Development Lab, Visual Simulation Lab, and Aerospace and Intelligent Systems Lab.



Prof. Nishimura in front of driving simulator, with Prof. Ogi (right)

2 Supporting safe and comfortable lives

The lab develops various systems to support safe and comfortable lives. Lab members think outside the box and grasp what is really needed in system design and management. The main research topics are as follows:

- » Integrated control system design for safety and passenger protection in vehicle collision
 - » Motion and safety controls for moving vehicles (personal mobility, two-wheel and four-wheel vehicles)
 - » Integrated driving and braking control system design for hybrid/electric car
 - » 3D immersive driving simulator for maintaining safe driving by the elderly
 - » System management and universal design of public transportation
 - » Development of anomaly detection system to secure safety
 - » Development of product model-driven collaborative and distributed system
 - » Development of model-driven system for small artificial satellites
 - » Analysis of bipedal movement and walk control system design
- Many other research projects are jointly conducted with various corporations. Tools used for the research are SysML, MATLAB/Simulink, MADYMO and others.



3D immersive driving simulator. Joint research with Prof. Tetsuro Ogi



System design for passenger protection

3 Activities at centers and labs

Mobility System Management Center

Public transportation is influential in compact cities and regions, and it will be increasingly important in view of environment-friendliness. In addition to public transportation such as LRT, road maintenance and improvement becomes a critical issue for promotion of personal mobility, including the bicycle. This Center is working with the Study Group of Public Transportation (chaired by Professor Hidekazu Nishimura) and researching urban mobility systems and their operations along with Dean Yoshiaki Ohkami, Professor Shoichi Sasaki, and Professor Masaru Nakano.

Universal Design Lab

Research on universal design is conducted to provide a barrier-free environment for all the people at Universal Design Lab. The lab is analyzing the needs of the disabled and social requirements in perspective of the environment surrounding the mobility, and accurately designing the systems (products / services) required in such a society. The lab is run along with Professor Yasushi Nakano of the Faculty of Economics and Professor Takashi Maeno, also in collaboration with outside corporations.

Model-Driven Systems Development Lab

The aims of the lab is to systematize model-driven systems development (MDS), and apply it to the entire process of system design including requirement analysis, concept design, architecture, component design, procure/build/code, verification, and validation so that a system can be developed without redoing a previous phase. Using System Modeling Language (SysML) to integrate software as well as hardware, such as mechanical and electronic parts, into a system, the Lab drives concurrent design in various fields including the development of increasingly integrated electronic devices, automobile assembly with complex control systems, and small satellites which require a huge number of components. In cooperation with Guest Professor Laurent Balmelli (IBM), a developer of SysML, the Lab has been offering systems engineering education and research using SysML since SDM was established in 2008.

In research on motorcycle drive stabilization control using SysML, we identified the required control systems functions during the motorcyclists' various actions and developed the function architecture. The designed control system was verified in the test case based on the use case analysis.



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