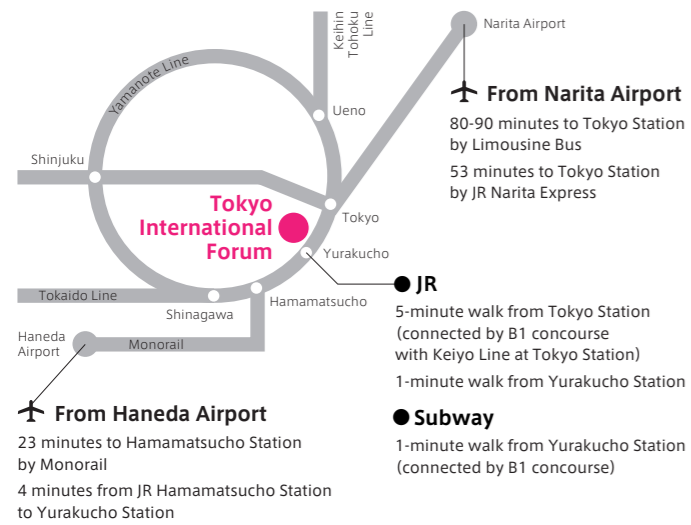


ACCESS

Tokyo International Forum Halls B7 and B5

3-5-1 Marunouchi, Chiyoda-ku, Tokyo 100-0005 Japan
TEL : 03-5221-9000



Keio Leading-edge Laboratory of Science and Technology [KLL]

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11th Annual
Keio Science and
Technology Exhibition

KEIO TECHNO MALL 2010

10 Dec fri 10:00 - 17:00
Tokyo International Forum
Halls B7 and B5

Admission
Free
No reservation
required

Power to transcend

Keio University Roles of KLL

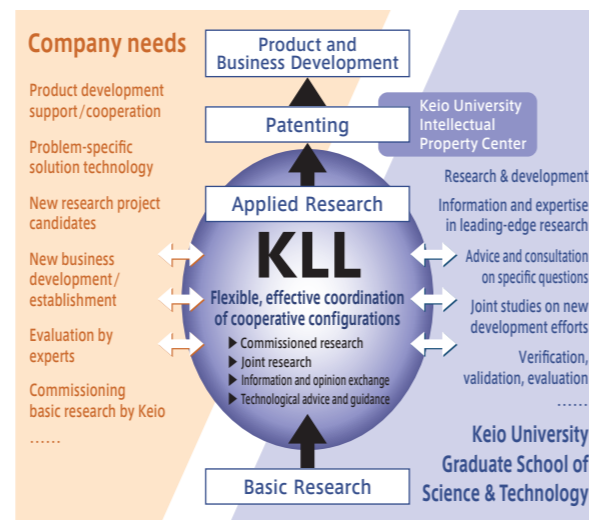
KLL, the Keio Leading-edge Laboratory of Science and Technology, is responsible for planning and organizing KEIO TECHNO-MALL as part of its central role in the advancement and support of interchange, cooperation, and collaboration between industry, government, and academia.



KLL – providing pathways to partnership in industrial and university research

KLL opens the way for advances through cooperation and collaboration in nascent, pre-patent stages of research and development.

- Advancement and support of commissioned, joint, and collaborative research projects between industry and public institutions.
- Liaison – contacts, coordination, and public relations – for commissioned and research efforts.
- Provision of research environments and social interfaces.
- Support of nascent, creative research and development.



To all who visit KEIO TECHNO-MALL 2010

Many KEIO TECHNO-MALL visitors seek the opportunity to discuss the possibilities of finding and forging partnerships through KLL – the opportunities, configurations, and potentials.

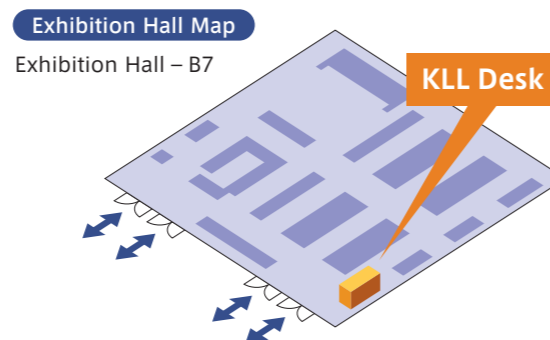
KEIO TECHNO-MALL is planned and designed by KLL to facilitate partnerships with researchers in public institutions and industry and its events, exhibits, and personnel are dedicated to this objective.

To discuss these possibilities or simply obtain information them, or on KEIO TECHNO-MALL or KLL, the best place to begin is the KLL Desk.

Visit the KLL Desk for information and discussion on:

- Resolving specific problems and needs
- Finding researchers working in a specific area
- Patents held by Keio University
- Industrial-academic seminars
- Currently envisioned cooperation or collaboration
- Exhibits at KEIO TECHNO-MALL

Please also let us know if you have any questions, problems, or suggestions concerning the Exhibition Hall or exhibits.



KEIO TECHNO-MALL 2010

Program of Events

Talk Session, Seminars, Round-table Sessions

Outline of Exhibits

Concepts and Advances in Research

KEIO TECHNO-MALL – Four Potential Effects

1 Stimulation of ideas and innovations

Direct, impromptu encounters with research efforts and those who perform them can stimulate new concepts and innovations in your own products and business, whether or not directly related – stimulation that cannot be obtained via the Internet and other channels of information.

2 Expanded scope and added flexibility

Appraising the research presented at the exhibits and seminars, meeting with the researchers, and hands-on contact with the products of their research can give rise to expanded possibilities, and KLL can provide new concepts and flexibility in project management and contractual configurations.

3 Internal recognition of research results

Presentation of research results at KEIO TECHNO-MALL, a venue for objective, academic discussion and appraisal, can broaden recognition of the accomplishments of your cooperative efforts within your organization and solidify the base for business development.

4 Identification of product and technology potentials

Exploration and proposals for utilization of your products and technologies in research are welcome at KEIO TECHNO-MALL, a venue dedicated to the effective flow of people, objects, funding, and information for new advances in products and society.








Program of Events

Talk Session with Industry, Government, and Academia

From Research to Business Creation – the Process Academic, Industrial, and Government Roles and Prospective

Exhibition Hall Event Stage, Hall B7 Time 14:30 to 16:30

As a meeting place for industry, government, and academia, as well as presentation and exploration of advances in research and technology, KEIO TECHNO-MALL convenes a special talk session each year that closely follows trends in industrial, government, and university collaboration. This year's session centers on the progression from research to commercialization, as illustrated by research on plastic optical fibers by Prof. Yasuhiro Koike of the Department of Applied Physics and Physico-informatics. The participants are from industry, a driver of growth in science and technology in Japan, and from governmental administration. The discussion will proceed from the perspectives of industry, government, and academia, based on observations of research and development projects and optimum configurations. It will no doubt be intense and informative on the present state and future outlook for cooperative efforts by industry, government, and academia. Be sure to attend.

| | | | |
|-------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 14:30-14:35 | Opening remarks | UEDA, Toshihisa Director, KLL |  |
| 14:35-14:55 | Speech | KOIKE, Yasuhiro Professor, Dept. of Applied Physics and Physico-informatics, Faculty of Science and Technology, Keio Univ. Director, Keio Photonics Research Institute |  |
| 14:55-15:05 | Speech | OKUBO, Naotake Chairman of the Board & Representative Director SEKISUI CHEMICAL CO., LTD. |  |
| 15:05-15:15 | Speech | KITAZAWA, Koichi President Japan Science and Technology Agency |  |
| 15:15-15:20 | Recess | | |
| 15:20-16:25 | Talk Session | OKUBO, Naotake KITAZAWA, Koichi MAKABE, Toshiaki Vice-President, Research, Keio University AOYAMA, Tojiro Chair, Graduate School of Science and Technology, Keio University KOIKE, Yasuhiro UEDA, Toshihisa Facilitator: TERASAKA, Koichi Deputy Director, KLL |    |
| 16:25-16:30 | Closing remarks | AOYAMA, Tojiro | |

Technology Partnership Seminars Round-table Sessions

| | Hall B5-A | Hall B5-B |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10:00 to 10:30 | A ThermoPower Technology that Can Convert Dream to Reality MATOBA, Masanori Professor, Dept. of Applied Physics and Physico-informatics  | 10:00 to 10:30 Simulation of Compressible Flow with High Temperature and Pressure MATSUO, Akiko Professor, Dept. of Mechanical Engineering  |
| 10:45 to 11:15 | Reproduction Technology of removal solution absorbed VOCs by vacuum evaporation with air flow TANAKA, Shigeru Professor, Dept. of Applied Chemistry  | 10:40 to 12:00 Round-table Session I Science & Technology and Biology |
| 11:30 to 12:00 | Hybrid-Surface Modification for Metals KOMOTORI, Jun Professor, Dept. of Mechanical Engineering  | |
| 12:30 to 13:00 | Nano Coating for Safety and Environment SHIRATORI, Seimei Associate Professor, Dept. of Applied Physics and Physico-informatics  | 12:30 to 13:50 Round-table Session II Promoting University-Launched Venture Activities |
| 13:15 to 13:45 | Photonic IC for Signal Processing at Low Energy TANABE, Takasumi Assistant Professor, Dept. of Electronics and Electrical Engineering  | |
| 14:00 to 14:30 | Studies on the Problems with <i>in vitro</i> Measurement of SPF of Sunscreen Formulations ASAKURA, Kouichi Professor, Dept. of Applied Chemistry  | 14:00 to 14:30 Electric Demand Prediction and Distributed and Predictive Control of Smart Grid NAMERIKAWA, Toru Associate Professor, Dept. of System Design Engineering  |
| 14:45 to 15:15 | Analysis of Product Strategy from a Game-Theoretic Approach MATSUBAYASHI, Nobuo Assistant Professor, Dept. of Administration Engineering  | 14:45 to 15:15 Innovations in Perception and Action by Spatiotemporal Sensory Transmission KATSURA, Seiichiro Assistant Professor, Dept. of System Design Engineering  |

Research Exhibits relating to Technology Partnership Seminars are marked with  from Page 6.

Outline of Exhibits

KEIO TECHNO-MALL – distinguishing features

Ease of exploration, discovery, and understanding

- Emphasis on actual demonstration and display of actual systems
- Continuous presence of university faculty members
- Ongoing related Technology Partnership Seminars* and Round-table Sessions*

*Schedules are shown in Program of Events on Page 5.

Special symbols used in the following exhibition descriptions



Technology involving patent rights held by Keio University. For information on its use, please inquire at the KLL Desk.



Related Technology Partnership Seminar; schedule shown on Page 5.


Drug Discovery, Regenerative Medicine and Medical Materials

Medical Engineering and Medical Welfare

Drug Discovery, Regenerative Medicine and Medical Materials Environment and Biology

BOOTH 1 **Tissue engineering with micro/macro culture devices**

Assistant Professor **SUDO, Ryo**
Department of System Design Engineering



The goal of our research is to contribute to regenerative medicine from an engineering standpoint. We utilize microfluidic devices and other micro/macro culture devices to develop original 3D culture methods. In particular, we deal with reconstruction of liver tissues and microvascular networks.

Drug Discovery, Regenerative Medicine and Medical Materials Environment and Biology

BOOTH 2 **Novel and innovative technology for controlling oligosaccharide functions**

Professor **TOSHIMA, Kazunobu**
Department of Applied Chemistry



Sugar chains are of considerable interest as the third chain of life. At this booth, we describe the molecular design of artificial biofunctional molecules that can selectively control certain oligosaccharide functions by irradiation with light of specific wavelength, and their usefulness as next-generation photosensitive molecularly targeted drugs.

Medical Engineering and Medical Welfare

BOOTH 3 **Medical image analysis for digital pathology**

Professor **TANAKA, Toshiyuki**
Department of Applied Physics and Physico-informatics




The ultimate determination of malignancy grade is highly dependent of the findings of pathologists; however, these professionals are in very short supply in Japan. Our goal is to establish a system for assessing tumor malignancy grade, thus supporting their diagnoses. Expectations are high for its use in tumor screening and in obtaining second opinions on final determinations.

Medical Engineering and Medical Welfare

BOOTH 4 **Understanding the brain, utilizing the brain -Development of Neuroscienc based Rehabilitation Devices-**

Assistant Professor **USHIBA, Junichi**
Department of Biosciences and Informatics




Research is being conducted on the mechanism by which the brain controls body motion in a collaborative medical engineering effort with the School of Medicine and the Rehabilitation Center, and research results are being applied to educational activities through archiving using refined and intricate CG animation that incorporates. "Prosthetic hands that move as you think" are currently under development for recovery of functions in cases of dysmotility.

Medical Engineering and Medical Welfare

BOOTH 5 **Product design from true intentions**

Professor **YAMAZAKI, Nobutoshi**
Department of Mechanical Engineering




Many ergonomic products will be demonstrated, including a multi-postural workstation, dental chair designed to accommodate women and the elderly, a custom pillow, a high-efficiency low-burden patient transfer lift, and other developmental systems characterized by body and posture conformal design. You can determine your own ideal pillow shape through personalized adjustments.

Medical Engineering and Medical Welfare

BOOTH 6 **Product design from true intentions**

Professor **YAMAZAKI, Nobutoshi**
Department of Mechanical Engineering



Many ergonomic products will be demonstrated, including a multi-postural workstation, dental chair designed to accommodate women and the elderly, a custom pillow, a high-efficiency low-burden patient transfer lift, and other developmental systems characterized by body and posture conformal design. You can determine your own ideal pillow shape through personalized adjustments.

Medical Engineering and Medical Welfare

BOOTH 7 **Screening of bioactive metabolites active on new disease signaling and application to chemotherapy**

Professor **UMEZAWA, Kazuo**
Department of Applied Chemistry



We select intrinsically important disease-related intracellular signals and search for their inhibitors in soil microorganisms and plants, and design and modify the inhibitors to obtain substances to better meet medical needs. The exhibit will include effective inflammation inhibitors, refractory carcinoma drugs, drugs for diabetes-related regenerative therapy, and new methods for identifying useful substances.

Medical Engineering and Medical Welfare Environment and Biology Machinery and Systems Information Communication

BOOTH 8 **Green, IT, and medical technologies enabled by nano/micro devices**

Assistant Professor **MIKI, Norihisa**
Department of Mechanical Engineering




At the Miki Research Laboratory, we are developing cutting-edge nano/micro devices based on microfabrication (MEMS) technology that will contribute to advances in environmental science, IT, and medicine. Our exhibit will include prototypes of a plant water-content sensor for high-level irrigational agriculture, a wearable transmission-type eye-gaze tracking system, and a small portable or embeddable dialysis system.

Medical Engineering and Medical Welfare

BOOTH 9 **Innovative arrhythmia laser treatment launched from Keio University**

Professor **ARAI, Tsunenori**
Department of Applied Physics and Physico-informatics



Our research laboratory has proposed and is conducting research on intervention therapies of atrial fibrillation and other arrhythmia by Photodynamic Therapy (PDT). We will provide a demonstration of a therapeutic device now under development and show a video describing our research efforts.

Medical Engineering and Medical Welfare

BOOTH 10 **Intra-vascular laser medical applications**

Professor **ARAI, Tsunenori**
Department of Applied Physics and Physico-informatics



Our research laboratory has proposed interventional diagnosis and therapy for stenotic vascular lesions. We will exhibit our progress in research on diagnostic and therapeutic technology for atheromatous plaques and a new method of laser irradiation therapy developed at our laboratory.

Medical Engineering and Medical Welfare Machinery and Systems Information Communication

BOOTH 11 **Motion-copying system**

Assistant Professor **KATSURA, Seiichiro**
Department of System Design Engineering



Our laboratory has succeeded in developing the world's first motion-copying system using a haptic device and digital data storage capable of "anytime, anywhere" reproduction of human motion, and are pursuing its industrial application in experts' skills acquisition and in skills training. We would like you to come to our exhibit and experience this motion-copy technology.

Medical Engineering and Medical Welfare Information Communication

BOOTH 12 **Application of olfactory display to medical care Scent Application for the Future**

Professor **OKADA, Kenichi**
Department of Information and Computer Science



Medical examinations generally include tests for eyesight and hearing, but none for the sense of smell. We have constructed a practical method of olfactory perception testing, based on a system we developed for precision olfactory display using a pulse ejector capable of short-interval odor presentation, and will use it to conduct smooth, easy, accurate measurement of the sense of smell.

Information Communication

Information Communication

BOOTH 13 **Generation of augmented images with tangible interaction**

Professor **OKADA, Kenichi**
Department of Information and Computer Science




In interactions using objects that can be touched, the user can perform intuitive operations, and in augmented reality the presentation of additional information in real space facilitates intuitive user operation. In our research, by presenting the movements of real objects on a table in virtual space, we are able to integrate the advantages of these two technologies, to support operating conceptualization and virtual image generation.

Information Communication

BOOTH 14 **Easy and economical supercomputing**

Professor **AMANO, Hideharu**
Department of Information and Computer Science




Using game machine and graphics processors and FPGAs, high-speed calculations can be performed at a cost that is two orders of magnitude below that of conventional computers.

Information Communication

BOOTH 15 **Visualization of environmental sound characteristics by text**

Associate Professor **SAITO, Hiroaki**
Department of Information and Computer Science



Humans intuitively understand the nature of their environment based on the sounds they hear around themselves, and they also express these sounds onomatopoeically to explain the situation to others. The objective of our research is to develop a system for the computer recognition of sounds in the environment, through onomatopoeic conversion of the sounds together with their representation in written characters. We will present the system and its capability for visual recognition of environmental sounds.

Information Communication

BOOTH 16 **Fractional sampling MIMO-OFDM system**

Associate Professor **SANADA, Yukitoshi**
Department of Electronics and Electrical Engineering



Many wireless communication systems nowadays use OFDM modulation, and conventional wireless LANs and broadband wireless systems employ MIMO techniques together with multiple antennas that tend to impede terminal downsizing. We have achieved path diversity using fractional sampling, which enables reduced terminal size together with heightened transmission rates.

Information Communication

BOOTH 17 Research on intelligent transport system and triage using ad-hoc networkAssociate Professor **SHIGENO, Hiroshi**
Department of Information and Computer Science

We are engaged in research on the applications of ad-hoc network technology to information exchange between vehicles in intelligent transport systems (ITS) and information gathering on injuries and disease from sensors, for triage at disaster sites.

Information Communication

BOOTH 18 Autonomous travel of robot motorbike with GPS receiverProfessor **TANAKA, Toshiyuki**
Department of Applied Physics and Physico-informatics

The past few years have seen considerable progress in research on four-wheel robot cars as part of the efforts to develop next-generation passenger vehicles; however, very little research has been conducted on two-wheel robot motorbikes, primarily because of problems relating to their inherent instability when stationary or travelling at low speeds. In our own research, as we have constructed a robot motorbike capable of autonomous movement by GPS navigation, we seek to develop new applications for such vehicles.

Information Communication Machinery and Systems

BOOTH 19 Tele-reality systemAssistant Professor **KATSURA, Seiichiro**
Department of System Design Engineering

Development of haptic technology has been getting attention as the "third realm of multimedia information". At our laboratory, we are engaged in the development of a tele-reality system based on remote transmission of softness and warmth. We would like you to come to our exhibit and experience this new tele-reality firsthand.

Information Communication Medical Engineering and Medical Welfare

BOOTH 20 Wireless security and monitoring system based on radio wavesProfessor **OHTSUKI, Tomoaki**
Department of Information and Computer Science

We present a security and monitoring system using radio waves, capable of recognizing the state of individuals without the use of a camera. With the proposed system, it is possible to monitor home bathrooms, toilets, and other spaces where accidents are most likely to occur, without using a camera. It is also an effective security system for offices and vehicles, and can act as a power supply management system for energy conservation.

Information Communication

BOOTH 21 Information presentation by a robotAssociate Professor **IMAI, Michita**
Department of Information and Computer Science

The presentation of information by means of a portable robot/mobile robot, rather than a computer display, creates the potential to incorporate character traits, sociability modes (friendship or others), and body movement (gaze shifting, pointing, expression of emotion, and gesture) into presentations. Based on our research, we propose new possibilities for information presentation by a robot according to these three perspectives.

Information Communication

BOOTH 22 Providing high-speed trains with a fast and seamless Internet environmentProfessor **TERAOKA, Fumio**
Department of Information and Computer Science

Our objective is to provide a seamless high-speed environment (1 Gps or higher) in trains travelling at 300 km/h or more. We have developed a fast handover technology for an infrared communication system designed for high-speed communication. We will present the results of our initial experimental trial conducted on the Tokaido Line of the West Japan Railway Company.

Information Communication

BOOTH 23 DiamEAP: An open software authentication systemProfessor **TERAOKA, Fumio**
Department of Information and Computer Science

We will present open software of Diameter, a next generation AAA (Authentication, Authorization, and Accounting) protocol which has been adopted by 3GPP, NGN, and other systems, together with EAP-TLS, an authentication protocol running on Diameter. This open software makes it easy to support user roaming among multiple administrative domains.

Information Communication

BOOTH 24 Router CloudAssociate Professor **NISHI, Hiroaki**
Department of System Design Engineering

Large volumes of information flow through network for supporting marketing, management, and security. We will present new technology for building a router cloud that enables changing the Internet in an easier and more attractive way by enhancing its function and closely relating services to release the router from being hardware that merely delivers this information.

Information Communication

BOOTH 25 Light conversation with a computer prone to humorous adage adaptations – a step toward fluent verbal human-computer communicationProfessor **HAGIWARA, Masafumi**
Department of Information and Computer Science

With this light-conversation system, the computer manipulates various linguistic data converted to electronic form, in order to meet the challenge of maintaining a dialogue. In modifying adages and proverbs, it adds *sukashi* at the end, resulting in new, humor-laden coinages.

Information Communication

BOOTH 26 3D character forming systemProfessor **HAGIWARA, Masafumi**
Department of Information and Computer Science

The system on display produces a 3D character that reflects the sensibility of its user. Through a series of trial character productions and revision of the trial character based on its assessment by the user, a character favored by the user is created.

Information Communication

BOOTH 27 Responsive Multithreaded Processor for Distributed Real-Time SystemsAssociate Professor **YAMASAKI, Nobuyuki**
Department of Information and Computer Science

Responsive Multi-Threaded Processor (RMTP) is an SoC (System-on-Chip) that integrates a real-time processing core (RMT PU) that can execute eight threads simultaneously in priority order, a real-time communication link (Responsive Link), computer I/O peripherals including PCI, Ethernet, IEEE1394, PWM, etc., an IPC control mechanism, and a trace function into a VLSI chip.

Information Communication

BOOTH 28 The MiDORI self-organized energy-saving networkProfessor **YAMANAKA, Naoaki**
Department of Information and Computer Science

The MiDORI technology presented by the Yamanaka Laboratory is a network control approach for network-wide energy saving. It applies traffic engineering (TE) to aggregate traffic and power-off network links, thus reducing energy consumption.

Information Communication

BOOTH 29 Next-generation photonic network technology with ultrahigh-speed optical switchesProfessor **YAMANAKA, Naoaki**
Department of Information and Computer Science

The Yamanaka Laboratory has proposed an active optical access network (ActiON) employing high-speed optical switches which increases subscriber number and transmission distance over those of the conventional PON. We will describe a next-generation photonic cloud network as an expansion of ActiON for replacing the Today's Internet.

Information Communication

BOOTH 30 Next-generation service provisioning in cloud by ubiquitous grid networkProfessor **YAMANAKA, Naoaki**
Department of Information and Computer Science

The Yamanaka Laboratory has proposed a ubiquitous grid network environment (uGrid) as a means of next-generation service provisioning in cloud networking. uGrid enables new service provisioning, with assignment of IP addresses to devices throughout the world, extending to software functions or contents, and their mash-ups by optical paths.

Information Communication

BOOTH 31 EVNO -Energy Virtual Network OperatorProfessor **YAMANAKA, Naoaki**
Department of Information and Computer Science

In this research, we propose a means of providing a virtual electrical generating system based on the Mobile Virtual Network Operator (MVNO) concept. This concept named Energy Virtual Network Operators (EVNOs) organizes managing multiple distributed energy sources. For this concept, separation of the existing power network into an electrical generation system and an electrical transmission and distribution system are needed.

Materials

Materials

BOOTH 32 Studies on problems regarding *in vitro* measurement of SPF of sunscreen formulationsProfessor **ASAKURA, Kouichi**
Department of Applied Chemistry

In vitro processes for evaluating sunscreen formulations are being developed on a worldwide level. When SPF (Sun Protection Factor) is measured *in vitro*, it is necessary to apply the sunscreen formulation uniformly on a substrate. A spatially periodic stripe pattern parallel to the direction of coating, however, generally forms and is extremely difficult to eliminate.

Materials

BOOTH 33 Measurement of structure in disordered systems, liquids, glasses, and defects in crystalsResearch Associate **CHIBA, Ayano**
Department of Physics

In liquids, glasses, and crystal defects, there is no structural regularity in the atomic arrays. We are engaged in the measurement of structures while controlling their irregular atomic arrays through pressure and temperature. In our exhibit, we will provide examples of measurements performed with graphite as a model of crystal defects, as well as liquids and glasses. We also plan to perform a demonstration of magnetic levitation.

Materials Medical Engineering and Medical Welfare

BOOTH 34 Surface engineering for biomaterialsProfessor **KOMOTORI, Jun**
Department of Mechanical Engineering

Therapies involving long-term implantation of metal devices in patients have increased in recent years, and widespread efforts have recently focused on obtain highly safe materials that withstand long-term use. In this exhibit, we present a new surface modification process that we have recently developed.

Materials Machinery and Systems

BOOTH 35 Surface engineering for structural steelProfessor **KOMOTORI, Jun**
Department of Mechanical Engineering

Various surface modification processes are used to increase the fatigue strength, corrosion resistance, abrasion resistance, and other properties of metal in order to obtain heightened performance for machines and structural objects. In this exhibit, we present a new surface modification process developed during the past several years in our laboratory for metal with heightened performance characteristics.

Materials

BOOTH 36 Soiling-resistant high-release coating through repellence to both water and oilAssociate Professor **SHIRATORI, Seimei**
Department of Applied Physics and Physico-informatics

The coating presented in this exhibit imbues substrate surfaces with both water and oil resistance. It imparts excellent liquid release from vessels, thus leaving no residue of expensive liquids on the vessel interior surfaces. The coating adds a soiling-resistant function to fibers, fabrics, wood, metals, and resins. On agitator surfaces, it reduces flow resistance, thus reducing power consumption and increasing fuel efficiency.

Materials

BOOTH 37 Functional nanocoating using layer-by-layer self assemblyAssociate Professor **SHIRATORI, Seimei**
Department of Applied Physics and Physico-informatics

In our research, we create functional thin films using nanocoating technology with aqueous solutions as the main material. We will present a number of special films, such as multilayer optical films obtained through control of film refractive index and thickness, super-hydrophilic films with anti-fogging effect, high-transparency electroconductive films, and antithrombogenic films for medical instruments.

Materials

BOOTH 38 Synthesis of bioactive substances by environmentally benign methodologyProfessor **NISHIYAMA, Shigeru**
Department of Chemistry

Despite the many advances that have been achieved in medical technology, serious diseases continue to pose major challenges to effective therapy. Current advances in organic chemistry enables the synthesis of virtually any organic compound; however, their use of toxic reagents and other problems remain. Today, we report on our research on the production of useful leads of medicinal drugs through effective utilization of clean electrical energy.

Materials


BOOTH 39 Photoswitchable nanomaterialsResearch Associate **YAMAMOTO, Takashi**/Associate Professor **EINAGA, Yasuaki**
Department of Chemistry

Our research focuses on development of photoswitchable nanomaterials. These types of materials can potentially be utilized as a next-generation electronics components such as high-speed and high-density recording media. At our exhibition booth, we demonstrate an optical control on magnetic and superconductive properties.

Materials Machinery and Systems

BOOTH 40 **Flame synthesis of functional nanomaterials**

Assistant Professor **YOKOMORI, Takeshi**
Department of Mechanical Engineering




Combustion essentially consists of high-temperature thermal decomposition and oxidation reactions, which can be applied to synthesize oxidized materials and many other substances. In our exhibit, we will present a method of utilizing gas combustion reactions (flame) for synthesis of phosphor nanoparticles, hollow porous particles and nanotubes, and other functional nanomaterials.

Electronic and Optical Devices

Electronic and Optical Devices

BOOTH 41 **Modeling for optical systems – methodology and implementation**

Assistant Professor **YAMAMOTO, Naoki**
Department of Applied Physics and Physico-informatics



From basic research to applied development facilities, it is essential to construct systems for highly reproducible and robust generation of "useful" light. This inevitably requires effective simulation and properties assessment by accurate mathematical modeling. We will present methodology, in terms of both logic and implementation, for the construction of such models.

Electronic and Optical Devices Information Communication

BOOTH 42 **Face-to-face communication by ultrahigh-speed plastic optical fiber – 1**

Professor **KOIKE, Yasuhiro**
Department of Applied Physics and Physico-informatics



We will exhibit a Face-to-Face communication system that is able to produce a highly realistic "presence" effect that is unattainable by conventional Internet extension. This system is based on the development of the world's fastest plastic optical fiber and a high-definition large-screen display.

Electronic and Optical Devices Information Communication

BOOTH 43 **Face-to-face communication by ultrahigh-speed plastic optical fiber – 2**

Professor **KOIKE, Yasuhiro**
Department of Applied Physics and Physico-informatics




We will exhibit a Face-to-Face communication system that is able to produce a highly realistic "presence" effect that is unattainable by conventional Internet extension. This system is based on the development of the world's fastest plastic optical fiber and a high-definition large-screen display.

Electronic and Optical Devices

BOOTH 44 **Terabit polymer optical interconnection**

Associate Professor **ISHIGURE, Takaaki**
Department of Applied Physics and Physico-informatics





Graded-index polymer parallel optical waveguides that will enable terabit-order throughput for board-level optical interconnections in high-end server will be on display. We will also exhibit polymer optical devices (passive mode-lock devices) which incorporate carbon nanotubes for femtosecond-pulsed lasers.

Machinery and Systems

Machinery and Systems

BOOTH 45 **Application Device of Electro-Adhesive Sheet**

Professor **AOYAMA, Tojiro**/Assistant Professor **KAKINUMA, Yasuhiro**
Department of System Design Engineering





We have developed a functional material with a surface adhesive property that surface can be changed according to applied electric field. In light of theoretical elucidation of the electro-adhesive mechanism and the performance evaluation in vacuum, we are currently engaged in a broad-based effort that ranges from basic research to its applications, such as use in tactile displays.

Machinery and Systems

BOOTH 46 **Intelligent machining**

Assistant Professor **KAKINUMA, Yasuhiro**
Department of System Design Engineering




To add intelligence to machine tools, a sensor-less machining force monitoring method is developed. Based on this method, a novel machining technology is also proposed. We will present the technology together with actual demonstrations.

Machinery and Systems Medical Engineering and Medical Welfare Electronic and Optical Devices

BOOTH 47 **Haptic interface**

Professor **OHNISHI, Kouhei**
Department of System Design Engineering




Master-slave teleoperation robots have been developed for operation in extreme environments inaccessible to humans. Bilateral control is one of the control methods for teleoperation robots, and using bilateral control, these robots can transmit force sensation from the slave side to the master side. Therefore, bilateral control has a variety of applications, such as medical robots, which require micro-sized movement.

Machinery and Systems Information Communication Architecture and Urban Design

BOOTH 48 **Tele-mobility system**

Assistant Professor **KATSURA, Seiichiro**
Department of System Design Engineering




Supporting heightened human activity and reducing energy consumption are typically held to be mutually conflicting goals. As a means of achieving both simultaneously, we have developed a spatiotemporal sensory transmission technology and system for real-time transmission of combined visual, audio, touch and other sensory information from the real world. We would like you to come to our exhibit and directly experience sensory perceptions and actions via this new Tele-mobility system.

Machinery and Systems

BOOTH 49 **Advanced control systems for human motion support**

Professor **MURAKAMI, Toshiyuki**
Department of System Design Engineering




Control systems for devices and equipment that support human body motion, which have become a strong and growing focus of interest, require new system design strategies that take advanced human operational capabilities and safety into full consideration. From this perspective, we propose a new design concept for the control systems of electrical wheelchair power assists, safe driving support systems for electric vehicles, and remote assistance systems.

Machinery and Systems

BOOTH 50 **Development of four-wheel omnidirectional vehicles**

Associate Professor **NAKAZAWA, Kazuo**
Department of System Design Engineering




We have achieved agile four-wheel maneuverability through the combination of four wheel modules, characterized by independent movement and cooperative operation, which are capable of spot rotation and other omnidirectional maneuvers. It is expected to bring heightened and unprecedented mobility as well as improved capability for maneuvers involving direction change and transverse movement in constricted spaces, not only in passenger cars but also in mobility scooters, wheelchairs, and other types of vehicles.

Environment and Biology

Environment and Biology Machinery and Systems

BOOTH 51 **New mixer-reactor based on chaotic dynamics**

Professor **UEDA, Toshihisa**
Department of Mechanical Engineering




We propose a new mixer-reactor based on chaotic principles. Unlike static mixers, the new mixer-reactor contains no mixing implements, or "elements", and therefore eliminates the need for frequent cleaning. It is expected to be particularly effective for food, pharmaceutical, and other production processes requiring a high degree of cleanliness and sanitation.

Environment and Biology Machinery and Systems

BOOTH 52 **High-purity hydrogen production unit**

Professor **UEDA, Toshihisa**
Department of Mechanical Engineering



We will present our proposed unit for the production and supply of high-purity hydrogen to fuel cells and other applications, with its core-component reformer for generation of hydrogen from liquid-fuel methanol. We are currently engaged in downsizing the unit for use with mobile-device fuel cells. We are also working on a system for recovering heat from low-temperature exhaust gases, through the combination of endothermic and exothermic reactions.

Environment and Biology Machinery and Systems Architecture and Urban Design

BOOTH 53 **Symbiotic system design**

Professor **SATO, Haruki**
Department of System Design Engineering




Looking thirty years into the future, we study technology development from a viewpoint of exergy in thermodynamic assessment to achieve an advanced energy utilization society for cities that are in harmony with the natural environment. The energy supply that optimally utilizes natural energy, would be possible using smart energy management and advanced heat pump technologies including the thermophysical properties of working fluids.

Environment and Biology

BOOTH 54 **Air cleaning and trace gas generation by diffusion scrubber**

Professor **TANAKA, Shigeru**
Department of Applied Chemistry



We have developed a simple, convenient, high-efficiency technology for air cleaning by diffusion scrubber. TiO₂ nonwoven and activated charcoal fiber sheets are arrayed as parallel slit plates, and air is simply passed through their interstices to diffuse hazardous gases and remove them from the air by adsorption. The nonwoven and carbon fiber sheets are both capable of regeneration and circulatory utilization.

Environment and Biology

BOOTH 55 **A circulatory and efficient technology for removal of VOC in exhaust gas**

Professor **TANAKA, Shigeru**
Department of Applied Chemistry



We have developed technology for efficient circulatory removal of volatile organic compounds (VOCs) emitted from printing, coating, and other facilities. The lightweight, low-cost porous polyurethane foam is used as a filter media VOC removal liquid is sprayed on the foam surface, where it absorbs and removes VOCs. The removal liquid absorbed VOC is regenerated by vacuum evaporation with airflow for circulatory utilization.

Environment and Biology Drug Discovery, Regenerative Medicine and Medical Materials

BOOTH 56 **Easily attachable nanofilms and nanofiber sheets**

Associate Professor **SHIRATORI, Seimei**
Department of Applied Physics and Physico-informatics



We are engaged in research on production of large functional nanosheets by nanofiber and nanofilm process technology. The nanofiber technology enables fiber diameter control on the order of several tens of nanometers, for use in applications ranging from filters to cosmetics. The nanofilm technology enables the production of large functional nanosheets in thicknesses ranging from several hundred nanometers to several tens of micrometers.

Environment and Biology

BOOTH 57 **Smart taste-sensor applications**

Professor **SUZUKI, Koji**
Department of Applied Chemistry



The taste sensor system we have developed can quantify taste. It is a new system that mimics human gustation and enables food and beverage analysis and food evaluation that reflects the human sense of taste. We will demonstrate the analysis and present examples of sales increases actually obtained through the use of this system in collaboration with local businesses.

Environment and Biology

BOOTH 58 **Chemical sensors for healthcare and environmental analysis**

Professor **SUZUKI, Koji**/Associate Professor **CITTERIO, Daniel**
Department of Applied Chemistry




We are engaged in the development of simpler, faster, higher-performance chemical sensors for the healthcare, environmental, and medical fields. In this exhibit, we will describe the development of (1) bright fluorescent and luminescent probes that enable multianalyte analysis, (2) paper-substrate sensors using inkjet printing technology, and (3) contrast agents for lesion-targeting MRI.

Environment and Biology

BOOTH 59 **Enzymatic synthesis of green polymer**

Professor **MATSUMURA, Shuichi**
Department of Applied Chemistry



Utilization of renewable resources and sustainable chemical recycling are highly desirable properties for next-generation plastics. We will describe the enzymatic synthesis of green polymers incorporating these properties and the resulting polymer characteristics. Polyester-type thermoplastic elastomers, crosslinkable epoxide-type biobased polyesters, and novel polyester-type urethanes will be on display.

Panel Presentations

Presentations in panel form to be made at KEIO TECHNO-MALL by university research laboratories


Administrative Engineering

Other Fields

Administrative Engineering

BOOTH 63 **A study on the methodology for quality management: The use of process control, experimental design, response surface method and principal points**

Associate Professor **SUZUKI, Hideo**
Department of Administration Engineering



Statistical methods are effective tools for quality management, but the need has emerged for higher-level methods that are compatible with the current environment. We will present our research on quality management methods, such as detection of process unnatural patterns using SVM, response surface methodology based on split-plot and supersaturated experimental designs, applications of principal points to quality management, etc.

Administrative Engineering

BOOTH 64 **Cause and effect analysis and quantification of customer satisfaction and service quality**

Associate Professor **SUZUKI, Hideo**
Department of Administration Engineering




Service is intangible, yet the need is crucial for causal analysis and quantification of service and their application to problem discovery and solution. We will present actual examples taken from professional sports services, drama, and other activities, in which we quantify service quality and degree of customer satisfaction, conduct relational analysis with business performance indicators, and propose improvements based on stadium field surveys.

Administrative Engineering Information Communication

BOOTH 65 **Human robot interaction based on Wikipedia ontology and action ontology**

Professor **YAMAGUCHI, Takahira**
Department of Administration Engineering




With the human-form robot NAO as the platform, we present an ontological robot that answers simple questions and teaches movement patterns with gestures, utilizing ontology expressing connection to linguistic hierarchy as the knowledge source.

Administrative Engineering Information Communication

BOOTH 66 **Learning a large-scale ontology from the Japanese Wikipedia**

Professor **YAMAGUCHI, Takahira**
Department of Administration Engineering



An ontology is a knowledge source that describes semantic relations between hierarchical relationships of concepts (abstract terms) and interfaces (concrete terms). Ontologies are deemed vital to the development of next-generation Web applications, such as advancing from search to intelligent processing and database integration, but the development costs for large-scale ontologies are extremely high and progress has been slow. In the display of our research, we present a method for semiautomated construction of a large-scale ontology from Wikipedia.

Administrative Engineering

BOOTH 67 **Human factor design for products and services that induce interest and impart satisfaction**

Assistant Professor **NAKANISHI, Miwa**
Department of Administration Engineering



Imparting a sense of satisfaction is a key factor in the design of successful products and services. We are engaged in the scientific pursuit of a design process for products and services that go beyond the ease of use and satisfaction of existing designs, with a focus on the nature of the psychological impact on both existing and potential users and the actions and behaviors thereby promoted.

Other Fields Information Communication Electronic and Optical Devices Machinery and Systems

BOOTH 60 **Global Center of Excellence program: High-Level Global Cooperation for Leading-Edge Platform on Access Spaces**

Professor **OHNISHI, Kouhei**
Department of System Design Engineering



- Basic engineering physics for innovative photonic/electronic device creation
 - Environment-embedded device technology
 - Real-world real-time network for multi-dimensional processing and communication
 - Perception and expression technology
- * Selected for adoption in the Global COE Program (information, electricity, electronics), a competitive research fund initiated by the Japan Ministry of Education, Culture, Sports, Science and Technology in 2007.

Other Fields Information Communication Electronic and Optical Devices Machinery and Systems

BOOTH 61 **Global Center of Excellence program: High-Level Global Cooperation for Leading-Edge Platform on Access Spaces**

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Other Fields Machinery and Systems Environment and Biology Architecture and Urban Design

BOOTH 62 **Global Center of Excellence program: Center for Education and Research of Symbiotic, Safe, and Secure System Design**

Professor **UEDA, Toshihisa**
Department of Mechanical Engineering




We will describe the basic concepts of the COE *Center for Education and Research on Symbiotic, Safe, and Secure System Design* relating to education, research, and other areas. This COE is engaged in research and systems design for complex technological systems involving the environment, safety and many other elements, from both engineering science and systems engineering perspectives.

Drug Discovery, Regenerative Medicine and Medical Materials

PANEL 68 **Synthesis of cyclobutane compound libraries for anticancer lead generation**

Associate professor **TAKAO, Ken-ichi**
Department of Applied Chemistry




Cyclobutane compounds are thought to hold great potential value as medicinal drugs because of their four-membered ring structure that is found in β -lactam antibiotics such as penicillin. In our research, we are engaged in a search for anticancer lead compounds from among many cyclobutane derivatives synthesized by methodology developed in total synthesis of natural products.

Environment and Biology

PANEL 69 **Development of a novel microbubble aerator for biochemical wastewater treatment**

Professor **TERASAKA, Koichi**
Department of Applied Chemistry




We have developed a novel microbubble aerator for reducing the size and increasing the efficiency of biochemical wastewater treatment facilities. The microbubble aerator provides substantially higher oxygen supply performance than conventional equipment, with an increased rate of organic waste decomposition by aerobic activated sludge.

Environment and Biology

PANEL 70 **Novel CO₂ separation and recovery technology using high-temperature molten salt slurry**

Professor **TERASAKA, Koichi**
Department of Applied Chemistry




Much of the CO₂ implicated in global warming originates from the combustion of fossil fuels. If high-purity CO₂ can be recovered while maintaining its high thermal energy, it would be extremely high in added value. In our research, we propose a novel slurry bubble column that utilizes a lithium composite oxide particle slurry and is capable of high-temperature operation.

Environment and Biology Other Fields

PANEL 71 **Electric Demand Prediction and Distributed and Predictive Control of Smart Grid**

Associate Professor **NAMERIKAWA, Toru**
Department of System Design Engineering




With the emergence of energy and environmental issues and electric utility deregulation, smart grids are of strong and growing interest. We propose an electric energy demand prediction method and construct a control algorithm for the quantity of electricity generation in order to achieve the demand and environmental requirements through safe, effective cooperation among large-scale power networks.

Environment and Biology Information Communication Machinery and Systems

PANEL 72 **Multi-agent systems and optimal sensor scheduling**

Associate Professor **NAMERIKAWA, Toru**
Department of System Design Engineering





The goal of our research is to construct an innovative sensor network control system by using an integrative approach of control theory, state estimation theory, and communication technology. We develop a decentralized optimal sensor scheduling algorithm and apply it to the construction of multiple sensor agent systems.

Materials

PANEL 73 **New high-T_c superconducting materials and fabrication of superconducting cables**

Assistant Professor **KAMIHARA, Yoichi**/Professor **MATOKA, Masanori**
Department of Applied Physics and Physico-informatics






Superconductivity is an electrical resistance of perfect zero which occurs in certain materials below a critical temperature. Development of transmission cables using these materials will minimize transmission loss and optimize energy saving. Our primary and secondary purposes are discovery of new high-T_c superconducting materials, and development of superconducting cables using a powder-in-tube process.

Materials

PANEL 74 **A thermopower technology that can convert dreams to reality**

Professor **MATOKA, Masanori**/Assistant Professor **KAMIHARA, Yoichi**
Department of Applied Physics and Physico-informatics

For the realization of a sustainable society, it is essential to find and develop next-generation electrical energy conversion materials with extremely high electrical generation efficiencies for recycling waste energy at high efficiency. We are engaged in finding and developing high-efficiency thermoelectric materials, with the focus on layered mixed-anion compounds, a previously unexplored area in energy conversion materials.

Electronic and Optical Devices

PANEL 75 **Nanocarbon electronics as an emerging technology**

Professor **AWANO, Yuji**
Department of Electronics and Electrical Engineering



Carbon nanotubes, graphenes, and other nanocarbons possess properties that are orders of magnitude superior to other substances (e.g., 1,000 times in electric conductivity, 10 times in thermal conduction). In our exhibit, we describe our research on carbon nanotubes and graphenes, directed toward the full utilization of these new materials in emerging electronic technologies.

Electronic and Optical Devices

PANEL 76 **Spectrometer system for small aperture submillimeter/terahertz range telescope**

Research Associate **TANAKA, Kunihiko**
Department of Physics




Gathering light from space and learning the structure of the Galaxy and the universe are an expression of humankind's most basic scientific curiosity. Observation in the submillimeter/terahertz range represents the forefront of this curiosity, and devices and systems for this purpose are under development worldwide in an intensely competitive effort. In our research, we are engaged in developing a small-aperture submillimeter/terahertz telescope, with particular emphasis on a related spectrometer system.

Electronic and Optical Devices

PANEL 77 **Research on magnetization dynamics in microfabricated ferromagnets for GHz applications**

Associate Professor **NOZAKI, Yukio**
Department of Physics




Magnetization precession becomes conspicuous at the recording speeds of once per nanosecond or higher expected for next-generation hard disks. It will therefore be essential, for the successful development of highly functional high-performance hard disks, to gain an understanding of the magnetization dynamics. At our exhibit, we will present new ultrahigh-density recording technology that actively utilizes magnetization precession in the form of microwave-assisted magnetization reversal.

Machinery and Systems

PANEL 78 **Practical support for gas-liquid reactor design using commercial CFD**

Research Associate (Non-tenured) **FUJIOKA, Satoko**
Department of Applied Chemistry




We have simulated the gas-liquid flow states in bubble columns, a key type of gas-liquid reactor. Based on data from large bench-scale experimentation, we have optimized configuration parameters, a process which is generally problematic for effective utilization of commercial computational fluid dynamics (CFD) software, and present a practical simulation method.

Machinery and Systems Electronic and Optical Devices

PANEL 79 **AFM micro-cantilever probe actuated by nonlinear feedback control**

Professor **YABUNO, Hiroshi**
Department of Mechanical Engineering



Observation of biological samples with atomic force microscopes in noncontact configurations requires noncontact observation in a high-viscosity environment. In our research, we have resolved the related problem of cantilever probe oscillation damping, and present a new method (incorporating van der Pol oscillator nonlinear dynamics) for the achievement of stable small-amplitude oscillatory response.

KEIO TECHNO-MALL floor guide

Information Communication

PANEL 80 Broadband wireless and mobile ad-hoc networks

Professor **SASASE, Iwao**
Department of Information and Computer Science



We will present an overview of the most recent advances in research not only on high speed and large capacity, but also on flexible response to multifaceted product quality requirements for user personalization and customization, secure high-reliability broadband wireless communication methods, and mobile ad-hoc networks.

Information Communication

Electronic and Optical Devices

PANEL 81 High-sensitivity measurement of fluorescence lifetimes in the telecommunications wavelength range

Associate Professor **HAYASE, Junko**
Department of Applied Physics and Physico-informatics



Devices and systems for measurements of fluorescent lifetimes are widely used in fields of optical electronics, material science, bioscience, and life science. We present a new technique, utilizing high-efficiency wavelength conversion and ultrafast spectroscopic technique, for high-sensitivity, high time-resolution measurement of fluorescent spectra in the telecommunications wavelength range.

Architecture and Urban Design

PANEL 82 Collaborative methods for architecture design based on scale models

Research Associate **ALMAZAN, Jorge**
Department of System Design Engineering



We are engaged in elucidating the mechanisms of the design process with scale models. We have schematized and analyzed two typical cases, and delineated the workflows. The results of the analysis indicate that the process of model construction and selection affects the interrelationships of the design team members, and suggest new possibilities for heightening teamwork and creativity.

Architecture and Urban Design

PANEL 83 The morphology of urban intensification: An investigation of the new methods for exploring the eco-urbanity potential of access space

Professor **RADOVIC, Darko**
Department of System Design Engineering



We are conducting urban surveys and analyses in Tokyo and Melbourne. Tokyo and Melbourne students collaborate in the analysis of the cities from their respective points of view and summarize the results schematically. We are also conducting redevelopment planning for Melbourne from the perspective of eco-urbanity, based on the results of the survey analysis.

Architecture and Urban Design

PANEL 84 Technique for evaluation and communication of earthquake damage risk: Toward performance-based house design

Associate Professor **KOHIYAMA, Masayuki**
Department of System Design Engineering



We will describe our research on methods for performance-based design, which achieve a structural performance satisfying owners and residents. These methodologies include: evaluating earthquake damage risk with the consideration of subsurface layers, risk evaluation of collision between a base-isolated building and retaining wall, and explanation of earthquake resistant capacity using probability.

Administrative Engineering

Environment and Biology

PANEL 85 Robust optimization model for installing photovoltaic systems

Assistant Professor **TAKEDA, Akiko**
Department of Administration Engineering



We present a new optimization model that incorporates consideration of a new feed-in tariff system and reduction of CO₂ emissions. The model is designed to reduce the cost and the environmental burden of electric power procurement, by determining the optimum size of photovoltaic arrays for given districts. Robust optimization is applied for uncertainty in solar irradiation quantity, including worst-case conditions within a certain range.

Other Fields

PANEL 86 Light beam with spiral phase structure and its huge transverse shift in multiple critical reflections

Professor **SASADA, Hiroyuki**
Department of Physics



The equiphase planes of an ordinary light beam are aligned in countless numbers perpendicular to the light axis, but interest has recently emerged in light having a spiral phase structure. Like polarized light, the spiral direction of such light may be either clockwise or counterclockwise. It is independent freedom from polarization, and applications research is in progress. The research presented in this exhibit shows that a huge transverse shift occurs in clockwise (or counterclockwise) spiraling light at the glass-air interface under repeated critical reflection.

Hall B7 ▶



University-Launched Venture Zone

Hall B5 ▶

