# **Tokyo International Forum**

B2F (Exhibition Hall 2)

3-5-1 Marunouchi, Chiyoda-ku, Tokyo, Japan TEL: +81-3-5221-9000





23 minutes to Hamamatsucho Station by Monorail 4 minutes from JR Hamamatsucho Station to Yurakucho Station



5-minute walk from Tokyo Station connected by B1 concourse with Keiyo Line at Tokyo Station) 1-minute walk from Yurakucho Station

#### Subway

1-minute walk from Yurakucho Station (connected by B1 concourse)



### Keio Leading-edge Laboratory of Science and Technology (KLL)

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## www.kll.keio.ac.jp/ktm/



13<sup>th</sup> Annual **Keio Science and Technology Exhibition** 

TECHNO

**Enthusiasm for** 

**KEIO** 

MALL

2012

Science,

**Passion for** 

**Engineering** 

**7 Dec** (10:00 (18:00) Free **Tokyo International Forum B2F (Exhibition Hall 2)** 

# **Floor Map**



# KEIO TECHNO 2012

۱	1	KEIO TECHNO-MA	LL pro
	1	Encounters with researchers and subjects of research	You can be otherwise directly to of research
	2	Expanded scope and greater flexibility	By learning talking dire be able to regard to c requests fo
	3	Internal publicizing of research results	With the l academic j outcomes o R&D activ business ex
	4	Search for product / technology possibilities	Proposals helping res provides a j technologie

# **Program of Events Outline of Exhibits**

# ovides four platforms

sure of unexpected encounters and first-hand information unattainable on the internet. More than just topics related your own products or business, perhaps, you will find subjects with prospects for new business expansion.

g about the actual research at exhibition booths and seminars, ectly with the researchers and feeling actual objects, you will get a real feeling for the expanse of possibilities. Also, with collaboration with universities, KLL will respond flexibly to or advice about procedures and contractual aspects.

KEIO TECHNO-MALL being a venue for the objective, publication of research results, you can demonstrate the of industry-academia collaboration inhouse as part of your vities, and you can utilize it as a place for paving the way for xpansion.

for the utilization of your products and technologies in search are also very welcome. The KEIO TECHNO-MALL platform for linking to the development of new products and es amid the flow of people, objects, funds and information.

# **Program of Events**

### Main Event

# Keynote speech by writer, Mr. Hideaki Sena and talk session with researchers from the Faculty of Science and Technology



**Event Stage** 15:30 - 17:00

Even extremely logical, objective, rational, and innovative research results and developed technologies will not have an impact on the world unless they possess inspiring emotion. Mr. Hideaki Sena, who is both a doctor of pharmacology and a writer, will give a lecture about efforts for coexistence of the seemingly conflicting "logic" and "emotion" in his creative activities. In the second half of the event, in keeping with the theme of the exhibit, "Enthusiasm for Science, Passion for Engineering," Mr. Sena and researchers from the Faculty of Science and Technology will discuss how to convey innovative research and technology in an easy-to-understand manner and disseminate technology to society while retaining an earnest passion for research. We intend to make this event an opportunity to broadly reconsider the university's ways of thinking about science and technology, relationships with government policies and industry, and how to conduct research activities in the fields of science and engineering, while searching for ways to connect research and development with society. Please enjoy an information-filled 90 minutes.

### Keynote Speech 15:30 – 16:15 (45 min.)



#### [Biography]

Writer and doctor of pharmacology. After graduating from the Faculty of Pharmaceutical Sciences at Tohoku University in 1990, he entered Tohoku University's graduate school. While studying there, he won the 2nd Japan Horror Story Grand Prize for the novel he wrote titled "Parasite Eve." In 1996 he completed degree of PhD in biochemistry and molecular biology, Department of Pharmaceutical Sciences, Tohoku University, and in 1998 he won the 19th Japan SF Grand Prize for his novel "Brain Valley." From 2006 to 2009 he held a specially approved visiting professor, Mechanical Engineering, Tohoku University. Since October 2011 he has been serving as President of Science Fiction and Fantasy Writers of Japan.





Mr. Hideaki Sena



OKA, Kotaro Professor Dept. of Biosciences and Informatics, Faculty of Science and Technology, Keio University

TAKAYAMA, Midori Associate Professor, Dept. of Foreign Languages and Liberal Arts, Faculty of Science and Technology, Keio University

### Event Stage (96 seats)



\* Please note that content, etc. of events or seminars are subject to change due to unavoidable circumstances on the day of the exhibit

### Seminar Stage (30 seats)



# **Outline of Exhibits**

Special symbols used in the following exhibition descriptions

by Keio University.

the KLL Desk.

Technology involving patent rights held

For more information, please inquire at

# **Biomedical** V

Keio Paten



**Innovative Non-thermal Laser Ablator** Launched from Keio University

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

We propose a novel non-thermal laser ablator to be used with photodynamic therapy (PDT) for treating heart diseases including arrhythmia. In this booth, we'll demonstrate the development of laser catheter devices and introduce new findings of the in vitro and in vivo study.



Innovation of new industry by laser therapy devices



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

In this booth, we will demonstrate you novel techniques employing laser for less-invasive and selective treatment. We will show novel therapeutic devices employing laser including those for arteriosclerosis lesions. Moreover, numerous effective patents will be introduced.

**e**.



photo-sensitive molecular targeted medicines

Technology Partnership Seminar;

schedule shown on Page 5.

Professor TOSHIMA, Kazunobu Department of Applied Chemistry

Development of new types of biofunctional molecules that selectively degrade disease-related proteins or oligosaccharides upon photoirradiation and the application of these molecules to photo-sensitive molecular targeted medicines will be presented.

Bio	me
воотн	
4	;

Novel methods for target-selective isolation and functionalization of proteins

> Assistant Professor TAKAHASHI, Daisuke Department of Applied Chemistry

Development of novel methods for target-selective isolation and functionalization of disease-related proteins, and their potential biomedical application will be presented.







Professor KOMOTORI, Jun Department of Mechanical Engineering

In recent years, metallic implants have been used for medical treatment, and these implants are placed inside a human body for a long time. To ensure safe long-term usage, several studies on such implant materials have been carried out. Herein, we discuss some of the recently developed surface-modification processes

Society & Environment

Functional thin-films fabricated using biomaterials



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

Recently, many application researches are being carried out using natural materials. We focused on biomaterials, for instance, chitin that is refined from crab shell and squid bone. Using biomaterials like chitin, we fabricated a functional thin-film, antireflection film, and antithrombotic film, by an all-wet process

Biomedical		Electronics
воотн	Modelli	ng of light propagation in
7	tissues	for diagnostic applications



Professor OKADA, Eiji Department of Electronics and Electrical Engineering

Light propagation in biological tissues, which cannot be measured by experiments, is analysed by simulations. The results are applied to non-invasive optical diagnostics such as functional near infrared optical brain imaging.

#### Information and Communication



Investigation of human motor function and rehabilitation by using BrainMachine Interface



Associate Professor USHIBA, Junichi Department of Biosciences and Informatics

We are studying the mechanisms by which the brain controls the human body by collaborating with medical faculty and hospitals. We expect our research to contribute to the development of rehabilitation devices or thought-controlled orthoses for functional motor recovery from hemiplegia caused by stroke.





Assistant Professor MIYATA, Shogo Department of Mechanical Engineering

Cell sorting and separation are important technologies for cell therapy. We developed damage-less and label-free cell sorting system based on dielectrophoresis. This booth exhibits a new on-chip cell sorting system.



**Computer Aided Diagnosis Based on** Image Analysis



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

Recently, a computer diagnosis by image analysis attracts the attention in medical field. We target on construction of system for a pathological diagnosis, a clinical diagnosis, nondestructive inspection and so on. Current candidates are a prostate cancer, a lung tumor, an uterus cancer, brain damage by stroke.













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**Ultrafine Manipulation System** 



Associate Professor KATSURA, Seiichiro Department of System Design Engineering

We have developed an ultrafine manipulation system that transmits manipulated force sensation of nanoscale objects to an operator. Our objective is to apply this technology to medical treatment and production processes.

# Information and Communication

**Tele-Reality System** 





Associate Professor KATSURA, Seiichiro Department of System Design Engineering

Tele-Reality is a novel concept for the enhancement of "perception and action" in remote environments without physical transfer. We are developing a platform for the real-time transmission of visual, audio, and haptic information.

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Flectronics



#### Keio University's Human Sensing -An information environment space to sense people's circumstances and respond-



Associate Professor AOKI, Yoshimitsu / Associate Professor MITSUKURA, Yasue Department of Electronics and Electrical Engineering Department of System Design Engineerin

We propose a sensing system to detect people's mental and physical circumstances and actions in their daily environments, through integration of signal processing and pattern recognition technology, and an information environment space that makes appropriate reactions. We demonstrate the system in a space that simulates daily life, and you can experience Keio's human sensing.

ormation and Communication Biomedical



"Human signals" seen, known, and understood by a scouter



Associate Professor MITSUKURA, Yasue Department of System Design Engineering

We developed an objective evaluation device that uses EEG. In particular, an online evaluation system made it possible to learn the current state of interest levels, likes and dislikes, drowsiness, repulsion, stress, and immersion levels. You can experience "mental detection by simple EEG measuring equipment," or an EOG-actuated robot

**Photonics Polymer for** Face-to-Face Communication



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

We exhibit a Face-to-Face communication system realized using "photonics polymer" technologies, based on the principles of optics, photon, and polymer. Our Face-to-Face communication system, superseding the conventional system based on the Internet, is demonstrated using the fastest plastic optical fiber and high-resolution, large-size display.

Information and Communication Society & Environment Distributed storage



Assistant Professor KANEKO, Kunitake/Professor TERAOKA, Fumio Department of Information and Computer Science

Our research focuses on global distributed storage that brings secure and high speed access to anywhere on the earth.

nd Communication Society & Environment

#### Come on, content. Get by name. 17

Professor TERAOKA, Fumio/Assistant Professor KANEKO, Kunitake Department of Information and Computer Science

In today's Internet, when we want to retrieve content we need to specify the server that provides the content. However, we do not have to pay attention to the server's location. We're trying to realize a new content-centric network instead of machine-centric network.

ation Society & Enviro



The MiDORi self-organized energy-saving network



Professor 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

rmation and Communication Society & Environment

E3-DCN



consumption.

-Energy Efficient and Enhanced-type Data Centric Network-

Professor YAMANAKA, Naoaki Department of Information and Computer Science

We propose E3-DCN which includes mash-up service and DCN and transmission energy efficiency. Mash-up service is the cloud service which combines devices, softwares, and contents on network. In the DCN, users request contents names to the network and receive requested contents from the network.



C-C-

-Energy Virtual Network Operator-



Professor YAMANAKA, Naoaki Department of Information and Computer Science

We propose a new structure of electric power network whose generation and delivery systems are separated to each other. Third-party institution called EVNO (Energy Virtual Network Operator) manages multiple distributed energy sources comprehensively, and provides a virtual energy generation system. Efficient energy supply and demand system is achieved.

### n and Communication Society & Environment

Elastic Photonic Aggregation Network 21 Technology <u></u>

Professor YAMANAKA, Naoaki Department of Information and Computer Science

Our research group studies on the future photonic network, called "Elastic Photonic Aggregation Network". Elastic Photonic Aggregation Network integrates metropolitan and access network and allows aggregating traffics according to types of service. We propose some basic ideas and requirements of media access technology in the Elastic Photonic Aggregation Network.

**Responsive Multithreaded Processor** 



Keio Patent

Associate Professor YAMASAKI, Nobuyuki Department of Information and Computer Science

RMT Processor integrates a processor core (RMT PU), which executes eight threads simultaneously based on their priority. It supports four real-time communication links (Responsive Links), various I/O devices (e.g., Space Wire, PCI-X, IEEE1394, and PWM), an IPC controller, and a run-time execution tracing



Image Information Sensing for Understanding and Predicting human behavior

> Associate Professor AOKI, Yoshimitsu Department of Electronics and Electrical Engineering

We demonstrate a fast robust human detection/tracking system using an a priori statistical human model. Furthermore, detailed analysis and prediction of human behavior is presented in this booth.





Action Print : Functional understanding of objects and space from information on

Associate Professor AOKI, Yoshimitsu Department of Electronics and Electrical Engineering

In contrast with the conventional image recognition approach, we introduce the new concept of Action Print, which understands the functions and meanings of objects and space based on the history and spatial distribution of information on people's actions. We demonstrate the visualization of Action Print, based on real-time sensing of people's actions.





**Respiration Monitoring System for** 



Associate Professor AOKI, Yoshimitsu Department of Electronics and Electrical Engineering

It is very important to monitoring breathing status for premature infants. We develop a novel vision-based system that monitors breathing status of an infant. The system can not only detect serious situation but also evaluate improvement of breath function

#### and Communication Society & Environment



Human Activity Sensing Using **Radio Waves for Safe and Secure Life** 



Professor OTSUKI, Tomoaki Department of Information and Computer Science

We introduce our proposed human activity sensing systems using radio waves. First we introduce the array sensor that can classify and localize human's activity and its position. We also introduce the falling detection system based on Doppler sensor that can detect falling.

#### mation and Communication Other Fields



Development of ad-hoc network for intelligent transport systems



Professor SHIGENO, Hiroshi Department of Information and Computer Science

We can collect a large amount of information in real time by using vehicular ad-hoc networks. We focus on the collection of traffic information, which can be used to determine vehicular topology. Our objective is to present drivers with the shortest vehicular route to their destination.



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Communication Robots supporting humans' communication / The Communication Strategy of the Anthropomorphic Agent



Associate Professor IMAI, Michita Department of Information and Computer Science

When you talk with long-distance people, you will use smartphone and/or video phone. Although these media are lacking of the "embodiment", which is one of the important element in communication. Our laboratory shows the significance of the "embodiment" through our lab's robot's demonstration.

Information and Communication		Biomedical	
	Innovative	microdevice	





Associate Professor MIKI, Norihisa Department of Mechanical Engineering

Advanced ICT exploiting our five senses mandates development of innovative hardwares that seamlessly connect our senses with the environment. Our group is developing innovative micro devices that include a wearable line-of-sight detection system and a tactile display by MEMS technology.



### **Polymer Photonic Devices for** 30 Exa-Scale Computing



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

Optical interconnect technologies are drawing much attention for realizing exa-scale high-performance computing systems. In this research, polymer optical devices for high-density and high-speed interconnects are designed and fabricated in order to demonstrate their outstanding performances.

### **Reliability Improvement of WLAN System** with Spectrum Sensing Technology



Professor SANADA, Yukitoshi Department of Electronics and Electrical Engineering

Spectrum sensing is a key to realize dependable wireless communications as it prevents interference from the users and improves the reliability of the communication link. An energy detection based spectrum sensing algorithm that is applicable to IEEE802.11 wireless LAN receivers is presented.

formation and Communication Electronics



### Fragrance TV Broadcasting with **Closed Captioning**



Professor OKADA, Kenichi Department of Information and Computer Science

Olfaction largely influences human emotions; hence, olfaction is suitable for displaying presence and expression. Fragrance TV broadcasting uses closed captioning; therefore, a special device is not required for the transmission and reception of control data. Further, a small olfactory device enables enjoying fragrance TV at home.



Professor OHNISHI, Kouhei Department of System Design Engineering

Transmission of force sensation between remote areas is realized by bilateral control with master-slave robots. In this control, position tracking and the action-reaction law achievement are realized. In our study, the technology is applied to medical robots, and we aim to support the operators with transmission of force sensation.

### Thermal-aware Nanoscale Device **Engineering for Green LSI**



Professor UCHIDA, Ken Department of Electronics and Electrical Engineering

Self-heating effects in nanoscale devices are serious issues in modern LSIs. We investigate heat generation mechanisms in nanoscale devices and develop novel techniques to effectively dissipate the generated heats or to utilize them for power generation in order to realize environment-conscious green LSIs.

### Other Fields

### A Study of 3-D Stacked Architecture using Inductive Coupling



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

Cube-1: We propose a low-power heterogeneous 3-D stacked architecture using inductive coupling. A low-power MIPS R3000 host CPU with fine-grained power gating is connected with a number of low-power reconfigurable accelerators. A ring-based NoC with vertical bubble flow control using inductive coupling is used for interconnection.

#### Information and Communication

#### **Development of advanced photonic** 36 applications by use of extended nanospace processing Œ

Associate Professor TANABE, Takasumi Department of Electronics and Electrical Engineering

Associate Professor KAKINUMA, Yasuhiro Department of System Design Engineering / Research Associate TERAKAWA, Mitsuhiro Department of Electronics and Electrical Engineering

In order to achieve efficient sensing with light, we need to confine photons in a small area. We have commenced fundamental research on the fabrication of such a photonic cage by ultraprecision machining for using in biosensors.



Physics on Spin Dynamics and Its Application to Information Device

> Associate Professor NOZAKI, Yukio Department of Physics

Spin angular momentum in ferromagnetic materials has an eigen frequency of GHz order. In our laboratory, novel information devices with non-volatile, field-programmable, and high-speed operations are investigated using electron spin. We will introduce you to the next-generation magnetic recording and a logic device using the phase control of electron spin.

Society & Environment





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

Counter electrodes of dye-sensitized solar cells are generally fabricated with rare metals and a conventional drying process, making them expensive. We fabricated rare-metal-free counter electrodes under normal temperature and pressure by combining a conducting polymer and a nano-Ag-network and indicated the possibility of flexible and low-cost solar cells.



39 superhydrophobic and superoleophobic properties 

Associate Professor SHIRATORI, Seimei

Department of Applied Physics and Physico-informatics

An antifouling coating film with superhydrophobic and superoleophobic properties was fabricated. The film cannot be soiled by liquids with various surface energies and viscosities, including cooking oil, soy source, mayonnaise, and ketchup. Further, the transparency and durability of the coating film was improved for practical use.

#### Society & Environment Materials



Keio Paten

Development of wavelength converters using nanophosphors

> Research Associate TAKESHITA, Satoru Department of Applied Chemistry

We focus on wet chemical synthesis and applications of the fluorescent nanoparticles, i.e., nanophosphors. Our nanophosphors have unique physicochemical properties in comparison to micron-sized phosphors, and in the near future, the former can be applied as novel wavelength conversion materials in the fields of solar cells, lighting, and bioimaging.

Society & Environment Materials New Superconducting Materials and



Associate Professor KAMIHARA, Yoichi/Professor MATOBA, Masanori Department of Applied Physics and Physico-informatics

Several metals, alloys, and compounds exhibit a superconducting phase at low temperatures. Our primary and secondary purposes are, respectively, the discovery of new high-Tc superconducting materials and the development of superconducting cables using a powder-in-tube process.





Professor ITOH, Kohei Department of Applied Physics and Physico-informatics

Making small structures with silicon is investigated. Very narrow silicon wires are produced and their applications are being explored.





High-sensitive nanoscale magnetometry using diamond crystals



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

A nitrogen-vacancy center in a diamond is an attractive candidate for high-sensitive nanoscale magnetometry, i.e., nanoscale imaging of living cells and magnetic materials. We show the investigation in collaboration with AIST for realizing high-sensitive nanoscale magnetometry using a high-quality diamond ultrathin film.



Keio Patent

Development of long wavelength light emission based on firefly luminescence



Professor NISHIYAMA, Shigeru Department of Chemistry

Red light emission, which may have the potential for use in new medical tools, was investigated by mimicking firefly emission. Further, new luciferin derivatives were produced by means of an organic synthetic procedure.

#### Mechanics



**Development of Actual Devices** Using Electro-adhesive Sheet



Professor AOYAMA, Tojiro Department of System Design Engineering

We have developed the functional material of "electro-adhesive sheet" whose adhesive property of the surface can be changed according to applied electric field. The EA sheet is possible to be applied to the brake, clutch, fixture mechanism and so on. We will exhibit the practical application devices in our booth.



Department of Mechanical Engineering

Many surface-modification treatments are performed on metal surfaces used in machines and constructions, with the aim to functionalize and improve the metal properties, including fatigue strength, corrosion resistance, and wear resistance. Herein, we discuss some of the surface-modification processes developed recently to improve such properties.



Professor YAN, Jiwang Department of Mechanical Engineering

To create new products with high added value, we are conducting research and development on high-accuracy, high-efficiency, and resource-saving manufacturing technologies throughmicro/nanometer level material removal, deformation and property control. Our recent research focuses include ultraprecision mechanical fabrication, micro-nano forming/imprinting, electricalmachining, laser machining, laser Raman spectroscopy, and laser defect-repairing.













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#### Influence of phase separation of sunscreens on the evaluation of their UV shielding property



Professor ASAKURA, Kouichi Department of Applied Chemistry

The effectiveness of sunscreens is due to their UV shielding property. Sunscreens are generally composed of many ingredients. Herein, we present a problem with the evaluation of the UV shielding property of sunscreens when they undergo phase separation or when there is a change in the phase-separation structure.



Associate Professor KATSURA, Seiichiro Department of System Design Engineering

We have developed a motion-copying system that can preserve human motions as digital data and reproduce them anytime and anywhere. We investigate the industrial applications of this technology for skill acquisition of experts and skill training



Society & Environment



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Human-Machine Interface and Advanced **Control System for Human Support Motion** 



Professor MURAKAMI, Toshivuki Department of System Design Engineering

New system design strategies that take advanced human operational capabilities and safety into full consideration are required for designing control systems for devices and equipment that support human body motion, and that have attracted considerable and increasing interest. We propose a new design concept for the human support devices.

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Two-Wheel Robot Car with Gyro



Department of Applied Physics and Physico-info

Recently, an autonomous robot car has been studied, but most of researches target on four-wheel vehicles. We construct an autonomous robot bike that stably moves during rest and at the low-speed running. The robot bike targets on the entertainment such as a leading car of marathon and so on.

**Society & Environment** 

Information and Communication

**Networked Environment Sensing** 

A New Technology of the Recycle of

the Waste Solvent Removed VOC by

Vacuum Evaporation with Air Flow

This booth exhibits the system which measures the weather or radiation

information including position information by using low power sensor and

integrated circuit technologies. The data transmits by the mobile or sensor

network, and indicates with a map or photograph after the collection and

# 56



C/

Keio Patent

Professor TANAKA, Toshiyuki

Keio Paten

Inkjet Printed Chemical Sensors for Healthcare and Environmental Analysis

> Associate Professor CITTERIO, Daniel Department of Applied Chemistry

Standard inkjet printing technology has become an important tool for industrial mass production. We demonstrate that this technology is applicable to produce low-cost paper and plastic substrate-based chemical sensing devices for healthcare and environmental analysis.

### ociety & Environment Biomedical

Chemical Sensors and Probes for Healthcare, 57 **Environmental Analysis and Bioimaging** 



Professor SUZUKI, Koji Department of Applied Chemistry

Our laboratory's research goal is the development of highly sensitive and selective chemical sensors and bioimaging probes. Here, we present (1) novel bright fluorescent and chemiluminescent dyes for various target analytes, (2) functional MRI contrast agents for specific target detection, and (3) fluorescent probes for selective bioimaging.

#### Society & Environment Other Fields

Simulation of the optimal hedging **58** strategy in the financial market



Associate Professor IMAI, Junichi Department of Administration Engineering

The crashes have recently occurred in the financial market. Levy process has been proposed as the stochastic process to describe the crashes. Using simulation, our laboratory is trying to show the differences between Levy process model and the traditional model and to research new hedging methodologies in Levy process model.

**Building Agent-based Simulation Environment** 

The goal of this research is to build a geo-simulation environment for evacuation

with Geographical/Spatial Information for

Evacuation Planning

planning by using an agent-based simulation technique.



Professor TANAKA, Shigeru Department of Applied Chemistry

Professor MATSUMOTO, Yoshinori

Department of Applied Physics and Physico-informatics

The recycle of the waste solvent removed VOC is necessary to reduce its treatment cost and environmental load. A new technology of the recycle of the waste solvent was developed by Vacuum Evaporation with Air Flow to evaporate efficiently VOC from the waste solvent in real time.

Society & Environment Other Fields



Removal Technology for IPA(Iso Propyl Alcohol) in the Exhaust Gas



Professor TANAKA, Shigeru Department of Applied Chemistry

We have developed the removal technology for IPA in the exhaust gas emitted by the production process of semiconductor. The lightweight, low-cost, porous poly urethane foam is used as a filter media. The removal solution is sprayed on its surface and IPA is absorbed.

tiety & Environment Information and Communication







Assistant Professor IIIIMA, Tadashi Department of Administration Engineering

Assistant Professor IIJIMA, Tadashi

Department of Administration Engineering

The aim of this research is building an environment and tools for Business Rule/Process Management with various kinds of Roles and Fine-Grained Information Access Control Policies.

#### Society & Environment



**Building Human Behavior Recognition and Cooperative Working Support Environment** using Various Sensors



Assistant Professor IIJIMA, Tadashi Department of Administration Engineering

The aim of this research is building support environment for human actions by estimating some kind of situations, such as position, pose, intention of user from observation by various sensors.

### ety & Environment Mechanics



Keio Patent

Challenge of thermal and reactive fluid dynamics for energy and environmental issues



Professor UEDA, Toshihisa Department of Mechanical Engineering

Research on Combustion, hydrogen reformer, and chaotic mixing has been doing to solve energy and environmental issues from the viewpoint of thermal and reactive fluid dynamics.

#### ociety & Environment Information and Communication



**Control Theoretic Approach for** Smart Energy Management Systems



Associate Professor NAMERIKAWA, Toru Department of System Design Engineering

Presently, distributed energy systems, including renewable energy generators such as photovoltaic (PV) cells and wind turbines, are drawing attention. We propose safe and reliable cooperative distributed control, as well as estimation and prediction methodologies, for smart electrical power network management systems, including renewable energy generators.





**Global Center of Excellence Program** -Center for Education and Research of Symbiotic, Safe and Secure System Design-



Professor UEDA, Toshihisa Department of Mechanical Engineering

The Global COE "Center for Education and Research of Symbiotic, Safe and Secure System Design" aims to develop system design in engineering for complex engineering systems based on engineering science and systems engineering and to educate PhD students who can solve issues with actual systems

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System

analysis by cooperating with a server.

Society & Environment

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**E** 

<sup>воотн</sup>

66

#### **Cause and Effect Structure Analysis and** Quantification for Customer Satisfaction and Service Quality



Professor SUZUKI, Hideo Department of Administration Engineering

Service is intangible, yet it is crucial to conduct causal analysis, quantification of service, and their application to problem discovery and solution. We will present case studies of professional sports services, etc., in which we quantify service quality and customer satisfaction, and conduct relational analysis with business performance.

Othor Fields	Society & Environment
Uner rielus	

**Ouality Management and Its Statistical Methods:** the Use of Process Control, Experimental Design, **Response Surface Method and Principal Points** 



Professor SUZUKI, Hideo/Research Associate MATSUURA, Shun 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 present researches on quality management methods, such as detection of unnatural processes using multivariate analysis, response surface methodology based on supersaturated experimental designs, principal points, etc.

# **Panel Presentations**

dical Electronics







Research Associate TERAKAWA, Mitsuhiro Department of Electronics and Electrical Engineering

The research focuses on high throughput and non-invasive laser-cell surgery. Selective disruption or inactivation of a cell and targeted molecular delivery by using ultrashort laser pulse will be presented which will contribute to future drug delivery, gene therapy, and regenerative medicine.



**Conformational changes of proteins** in neurodegenerative diseases



Associate Professor FURUKAWA, Yoshiaki Department of Chemistr

Proteins have unique three-dimensional structures and perform physiological functions. It is notable that abnormal protein conformations have been observed in neurodegenerative diseases such as Alzheimer's disease. We attempt to reveal the mechanisms regulating protein structures and thereby, contribute to the development of a cure for the disease.





**Novel Bioactive Substances** from Marine Organisms 🜱 🔍



Associate Professor SUENAGA, Kivotake Department of Chemistry

We seek to isolate bioactive substances from marine organism. We have carried out chemical synthesis and bioorganic studies on bioactive substances to elucidate their mode of action. Unique bioactive substances of marine origin are highly significant for drug candidate and probe for life science.

#### rmation and Communication Society & Environment



Highly Efficient and Secure Mobile Ad-hoc Network



Professor SASASE, Iwao Department of Information and Computer Science

Secure routing and multi-hop communication are required in mobile ad-hoc networks. We investigate routing and media-access control schemes to reduce power consumption and to ensure high real-time network reliability and throughput.

inication Society & Environment



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Keio Paten





Professor YAMANAKA, Naoaki Department of Information and Computer Science

The Yamanaka Laboratory has proposed an OpenFlow based Energy-Efficient network and implemented an original traffic engineering method in OpenFlow controller. We will describe the control system of our network and effect of power reducing in our network.

Information and Communication



Associate Professor WATANABE, Shinichi Department of Physics

We recently developed a method to quickly and precisely determine the polarization direction of coherent terahertz electromagnetic waves and demonstrated a novel terahertz topography sensing system with unprecedented axial resolution. We would like to discuss potential applications using such an extremely precise terahertz polarization sensing system.



Fabrication of optical microcavity by laser-heated pedestral growth



Associate Professor TANABE, Takasumi Department of Electronics and Electrical Engineering

Optical microcavities are attractive because they allow optical wavelength filtering at ultranarrow bandwidth, which enables us to achieve ultranarrow linewidth laser light. Such light can be used for digital coherent optical communications and ultraprecise spectroscopy measurements. We will introduce a new method for fabricating a crystalline optical microcavity.



Assistant Professor SEKIGUCHI, Koji Department of Physics

We study novel spin dynamics in nano-scaled magnets. Utilizing the ultrafine-patterning (EBL) technique and RF measurements, we seek the novel phenomena applicable to the data processing device.

Materials



Assistant Professor ANDO, Keita Department of Mechanical Engineering

Liquids can sustain their state, without rupturing, under tension owing to the cohesion between neighboring molecules; the extent of such cohesion can be defined as the tensile strength of liquids. We herein propose a microfluidic approach to measure the dynamic tensile strength of liquids with homogeneous nucleation of vapor bubbles.

N	laterials	Society & Environment
PANEL <b>76</b>	Electrocl Boron-de	nemical Application of oped Diamond Electrodes
C Retent		



Professor EINAGA, Yasuaki Department of Chemistr

We introduce several electrochemical applications of boron-doped diamond electrodes such as electrochemical sensors, waste water treatment, CO2 reduction, novel organic synthesis.

Materials	Other Fields	
77 Struc by Pr	tural Control of Polymer Mel essure	ts
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Research Associate CHIBA, Ayano Department of Physics

There are atomic-level structures in crystals such as base-center cubic, and likewise for liquids. For polymer melts (of bulk homopolymer), we discovered that the structure is controllable by applying relatively low pressure, by changing the packing of the molecules. Here we introduce this discovery and possible applications.