近畿大学大学院
産業理工学研究科
KINDAI UNIVERSITY GRADUATE SCHOOL OF HUMANITY-ORIENTED SCIENCE AND ENGINEERING
ハードサイエンスとソフトサイエンスの調和をめざす新時代のスペシャリストを育成します。
WE ARE CULTIVATING SPECIALISTS FOR THE NEW ERA AIMING AT THE RECONCILIATION OF THE HARD AND SOFT SCIENCES.

The remarkable development of scientific technology in recent years is bringing about changes not only to industrial structure but also social form. At the same time, it is obvious that global environments are changing at the cost of humans’ social activities. “Engineering,” the knowledge and technology of pursuing economic efficiency and rationality, which has been supporting economic development up to the present date, is about to approach a transition phase. In order to meet the needs of the times to focus on a global concept that covers human factors across the whole earth in relation to technological activities, all the courses are aiming at characteristic education and research supporting the motto “Reconciliation of Hard Science and Soft Science.”

In 2013, Kinki University restarted the Graduate School of Humanity-Oriented Science and Engineering under the new system of “1 Major, 3 Courses” as one of its 11 graduate schools. In order to support Japan, a technology-oriented nation, under the increasingly intensifying international situation, an enormous responsibility has been imposed on graduate schools to cultivate high-level technical experts. This graduate school is aiming at cultivating human resources who acquired practical knowledge and technology, while meeting the needs of advanced industrial technology and having both international competing power and cooperativeness. We are looking forward to young people with rich creativity and spirit to pioneer the scientific technology of tomorrow to enter our university.

A MESSAGE FROM THE DEAN: Be Creative and Pioneering!

Under the severely competitive conditions of the world, Japanese industries have been requiring the highest level of scientists and engineers to innovate and sustain the highest level of technologies of Japan. Our graduate courses aim to educate the highest level of scientists and engineers who can create leading technologies and cooperate with scientists and engineers all over the world. Since our curricula are based on the latest and most advanced science and technology, students can master most updated and practical knowledges and technologies.

We look forward to welcoming young researchers full of creativity and ambitions for the future.

Graduate School of Humanity-Oriented Science and Engineering
Professor Masayuki FUJII, Dr. of Science
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Greeting of the Dean of Graduate School of Humanity-Oriented Science and Engineering

Professor Masayuki FUJII, Dr. of Science

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### Social Environmental Science Course

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Bioorganic Chemistry Laboratory

Prof. Masayuki Fujii, Doctor of Science

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[Keywords]
Nucleic Acid Therapeutics, Anti-Cancer Drug, Gene Delivery

Research Outline

We are developing artificial molecules which can bind to the specific gene and control its expression, especially, chemically modified and bio-conjugated oligonucleotides, antisense DNA and siRNA. We believe nucleic acid therapeutics will come true from chemical biology based on synthetic organic chemistry and cellular biology.

[1] Nucleic Acid Therapeutics for Mutant KRAS Dependent Cancer
Design and synthesis of chemically modified DNA/RNA and their conjugates with functional molecules which can selectively suppress mutant KRAS oncogene.

[2] Nucleic Acid Therapeutics for Mutant EGFR Dependent Cancer
Design and synthesis of chemically modified DNA/RNA and their conjugates with functional molecules which can selectively suppress mutant EGFR(T790M) gene.

[3] Non-Toxic Transfection of siRNA into Cells
Non-Toxic siRNA transfection into cells and specific gene silencing using designed peptides.

[4] Synthesis of Multiple DNA/RNA-Bioconjugates
Chemo-Enzymatic approach to multiple DNA/RNA-conjugates.

Latest publication and activity

[Book]

[Published Paper]

[Patent]
Analytical Chemistry Laboratory

Prof. Hirofumi Kawazumi, Doctor of Engineering (Kyushu University)

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[Keywords]
Laser Spectroscopy, Mechanical recycling of Plastics, μ-TAS (micro total analytical system), Chemometrics

Environmental and biological issues include complicated phenomena and require state of art technology to elucidate the mechanisms. We are developing the new and versatile analytical techniques based on laser spectroscopy for solving these problems.

[1]. Laser spectroscopy
Ultra sensitive and selective methods using laser-induced fluorescence and multi-photon ionization are used for monitoring molecular behavior at surface and interface where the important substance transport occurs. Techniques developed in these studies are applied for new apparatus development such as an endocrine disrupter detector and a compact DNA sequencer.

[2]. Mechanical recycling of Plastics
Raman Spectroscopy is able to identify plastic components, similar to infrared absorption. We developed a high-speed Raman apparatus of a less 1.5-millisecond cycle, and a precise analyzing methodology. This technique is successfully implemented into the online sorting in a shredded plastic recycling plant.

Latest publication and activity
[Book]

[Published Paper]

[Patent]
1) Japanese Patent No. 3854986
2) Japanese Patent No. 4203916
3) Japanese Patent No. 4260205
The page is a research outline for the Microbial Technology Laboratory at Kindai University. It highlights several research areas including:

1. **Microbial production of Green Plastics from CO₂**
   - Biodegradable plastics, polyhydroxyalkanotaes (PHAs) from CO₂ using hydrogen-oxidizing bacteria, especially for high cell density culture system using H₂/O₂/CO₂ gas mixture, isolation of CO₂-tolerant strain, genetic engineering for production of new type co-PHAs.

2. **Microbial production of Green Plastics from xylose, a component sugar of hemicellulosic biomass**

3. **Acid tolerance lactic acid bacteria isolated from vinegar and its industrial application**

4. **Antimicrobial effect of novel visible light responsible photocatalyst on pathogenic bacteria, fungi, and virus**

5. **Development of high density culture system for mass production of marine zooplankton, rotifer as initial live food for larva and juvenile fishes in aquaculture and mariculture**

The research is focused on the industrial application of microorganisms to food, health, drug, chemicals, agriculture, and environmental protection, especially bioconversion of CO₂ and biomass to useful substances using bacteria.

**Keywords:** Green plastics, CO₂ fixation, Microbial control, Rotifer

**Latest publication and activity**

Identifying the biological and chemical functions of the material derived from green tide-forming chlorophyta is a possible way to achieve strategic goal B of “The Aichi Biodiversity Targets.” This goal is specifically designed to “reduce the direct pressures on biodiversity and promote sustainable use.”

[1]. Chemical Modification of Polysaccharide Derived from Green-Tide Forming Chlorophyta
The sulfated polysaccharide ulvan is an interesting compound for biomaterials, because many biological activities have been reported including antioxidative, anti-hypercholesterolemic, immunostimulating, and turbot phagocytes stimulation among others. We focused on ulvan for the utilization of the green tide-forming chlorophyta Ulva. We utilized chemically modified ulvan to generate urethane foam and demonstrated its utility in the removal of Cu^{2+} ions from an aqueous solution.

[2]. Environmental Education
To teach youths the importance of environment and encourage them to consider the sustainable use of ecosystem services, we ran experiments on how to efficiently use Ulva, an alga that has overgrown and results in green tide around the world.

[Latest publication and activity]
[Published Paper]
Laboratory of Environmental Biochemistry

Prof. Yasutaka MORITA, Ph. D.

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[Keywords]
Biotechnology, Enzyme Engineering, Peptide Engineering, Biosensor, Combinatorial Bioengineering

Research Outline

Living organisms and cells in extreme environments (high or low temperature, high or low pH, high salinity, and high pressure etc.) have adapted to their habitats in such a way that metabolic processes permit them to survive and function. Our research group focus on the screening, characterization, development and application of these useful and functional biomaterials for industrial application.

[1]. Screening and characterization of novel and useful biomaterial
The microorganisms which produce novel biological materials (enzyme, pigment, lipid, and nucleic acid etc.) were isolated and characterized. These studies include to elucidate the relationship between structure and function of biological materials using genetic engineering.

[2]. Development and application of functional peptide
The present study aim at the characterization, the binding mechanisms with the target, and the application to a biosensor and biodevice of peptide ligands which has high affinity to small molecules such as dioxin, endocrine disrupting chemicals and fullerene, or various living cells.

Latest publication and activity
[Published Paper]
Functional Polymer Chemistry Laboratory

Associate Prof. Kozo Matsumoto, Doctor of Engineering

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[Keywords]
Polymer synthesis, Functional polymer, Organic synthesis

We study on synthesis and property of novel functional polymers which can be applicable to ion-conductive materials, adhesives, and environmentally benign or biocompatible materials.

[1. Synthesis and Property of Ion-Conductive Materials]
Research about development of safe and reliable ion-conductive polymers which is inevitable to batteries, fuel cells, solar cells, sensors

[2. Synthesis and Property of Networked Polymers]
Research about networked polymers which exhibit high performance on thermal stability, high mechanical strength, adhesive properties, and gel-forming ability

[3. Synthesis and Property of Biocompatible Polymers]
Research about bio-related polymers such as γ-poly(glutamic acid) and sugar-based materials, which can be useful in biomedical applications

[4. Polymer Synthesis Using CO₂ as Key Resources]
Research about process converting CO₂ to valuable and useful materials such as adhesive, sealants, coatings, paints.

Latest publication and activity

[Published Paper]


[Patent and so on]
Our laboratory studies the mechanisms of cellular senescence and cancer development by combining genetic, cellular and biochemical approaches.

[1]. The regulation of cell cycle
Cell cycle-related genes contribute to various types of cell fate determination including cellular senescence and cancer development. Our current research in this area is focused on two issues: (1) Determining the regulation of cyclins, CDKs and CDK inhibitors, (2) Determining how DNA damage and oncogenic signal deregulate cell cycle, leading to cellular senescence and cancer development.

[2]. Search for functional long noncoding RNAs
Recent mass scale transcriptome analysis has revealed the existence of large numbers of long noncoding RNAs (lncRNAs) in mammals. However, the function of most lncRNAs remains unclear. Our current research in this area is focused on two issues: (1) Searching for novel lncRNAs involved in cellular senescence and cancer development, and (2) Developing the inhibition method of cancer-related lncRNAs.

Latest publication and activity
[Selected Paper]
Laboratory of Food Function

Associate Prof. Koichiro OHNUKI, Ph. D. (Agriculture)

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[Keywords]
functional food, mental disorder, obesity, metabolic syndrome

Our research group, including the researchers in Kyushu University and Kyushu Nutrition Welfare University, established the comprehensive research system for evaluating food function from gene, cell, and animal to human.

[1]. In vitro screening
For estimating and/or characterizing the function of foods, we demonstrate the effects of foods by evaluating lipase and glucosidase inhibition, anti-fungi, anti-virus, anti-cancer, and anti-oxidant activity.

[2]. Animal experiment
We established the comprehensive screening system for evaluating the effects of food in mice by analyzing the blood, tissues, behaviors, X-ray computed tomography.

[3]. Human clinical trial
We evaluate the effects of food comprehensively in human by using randomized clinical trial and physiological experiments. We also use psychological methods for screening the effects of food in mental function.

[Published Paper]

[Award]
Environment Materials Science Laboratory
Associate Prof. Nobuto OKA, Ph. D. (Engineering)
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[Keywords]
Conductive Ceramics, Photocatalysts, Water Decontamination, Rechargeable Batteries, Solar Cells, Computational Materials Design

Research Outline

We develop the novel functional materials for decreasing the energy usage and environmental load on the basis of "chemistry" and "computer science". We focus on the ceramics (e.g. glass and pottery) and polymer gels, which are familiar materials to our life, and design novel functionalities for these materials.

[1]. Highly Conductive Ceramics
In general, ceramics cannot carry electricity. However, the highly conductive ceramics, and even the transparent metal (transparent conductive oxide) can be designed using the knowledge of physics and chemistry. We develop the new functional materials, which is the technology indispensable for advanced devices (e.g. metal-air rechargeable battery and solar cell).

[2]. Visible-light-active Photocatalysts
Photocatalysts are expected as the environment purification materials since they can decompose organic materials under the light irradiation. We develop high performance photocatalysts, e.g. visible-light active thin film WO₃ loaded with Pt nanoparticles, which has quite excellent photocatalytic ability (Fig. 1).

[3]. Computational Materials Design
To expedite the materials development, we design novel functional materials using computer.

[Latest publication and activity]

[Published Papers]

[Awards]
1) Materials Research Society (USA): "the 1st annual JMR Paper of the Year Award” (2015).
2) Japan Society of Thermophysical Properties: Young Researcher Award of the JSTP (2012).
3) (Postgraduate student of this laboratory) Best Poster Award (silver): “The 10th International Symposium on Transparent Oxide and Related Materials for
Functional inorganic materials engineering laboratory aims to develop electrochemical devices by controlling the composition, size and shape of inorganic materials. In particular, we focus on metal-air batteries with very high energy density and chemical sensors.

[1]. Metal-air battery
Metal-air battery has the highest theoretical energy densities in chemical batteries because they utilize oxygen in atmospheric air as a cathode. Therefore, metal air battery is paid attention as one of the candidates for new power sources of electric vehicles. Our laboratory develops high performance electrode materials and electrolyte for metal-air batteries.

[2]. Chemical Sensor
Our laboratory investigates non-enzymatic type glucose sensors and gas detection sensors on the basis of size and shape control of metal oxide particles.

[3]. Fine-particle synthesis
Our laboratory investigates new synthesis methods for producing size-controlled and high surface area nanoparticles.

[Latest publication and activity]

[Published Paper]
I work on the subject of "Natural Disaster by GIS analysis". Disasters such as floods in the typhoon season cause severe damage in Japan every year. Several tools to analyze floods are developed based on a new Digital Elevation Model by GIS. Also, applications of X-band MP radar as a next generation radar are developed.

[1]. Application of X-band MP radar
X-band MP radar is a new radar system with high resolution X-band sensor, which can detect rainfall. The resolution is much higher compared with C-band radar. MLIT of Japan started operation of an X-band MP radar system in 2012. The accumulated rainfall amount monitoring system is developed in our laboratory. Previously, there was no rainfall amount monitoring system that could help develop GIS by integrating with the rainfall data by X-band MP radar.

[2]. Application of a new Digital Elevation Model
MLIT of Japan has started to provide a new DEM in 2012, with a spatial resolution of 5 meters and covering almost 70% of the land of Japan, which is highly accurate. We can precisely estimate flood area by GIS based on the new DEM. The new DEM is quite effective in constructing a 3D model.

[Published Paper]
Bioelectronics Laboratory

Prof. Shu EZAKI, Doctor of Engineering

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[Keywords]
Biosensor, Self-organization, Bioengineering, Lipid membrane

Research Outline

Bioelectronics is the field of the electronics which reproduces the feature of living things artificially. The reproduction of the human senses is aimed at through development of a taste sensor and various sensors. A study of a biological measurement is also advanced to develop the sensor which reproduces the human senses.

[1]. Taste sensor with lipid-polymer membranes
A taste sensor quantifies the taste of the food. The taste sensor has eight channel of lipid-polymer membrane. Membrane potentials of the lipid-polymer membranes change by the interaction with the lipid membrane and the taste substance in the food.

[2]. Data analysis of multichannel taste sensor
There are five kinds of basic taste such as salty. Each channel of a taste sensor responds by the sensitivity beyond human to the basic taste. It is aimed at to convert output signals of a taste sensor to information on the various tastes.

[3]. Monitoring of electric potential and movement from cultivated plant
Plant factory is drawing attention in recent years. In the factories, plants are cultivated under artificially environment such as light condition. Electric potential and movement of a plant are measured to monitor the grown-up activity.

Latest publication and activity

[Book]
1) “What is the self-organization?” K.Toko,
   S.Ezaki, T.Ueda and M.Nishizwa, Kodansha
   Blue Bucks (2009) [in Japanese]

[Published Paper]
2) “Sensitivity-improvement of tastasensor by change of lipid concentration in membrane”,
Mathematical Sciences Laboratory

Prof. Haruo TSUKAKA, Ph.D.

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[Keywords]
Analytic Number Theory, Special Functions, Mathematical Physics

Research Outline

Mathematics, particularly analytic number theory, special functions and their applications to physics and chemistry

[1]. General Modular Relations
A systematic and unified treatment of many known equations derived from a functional equation between two Dirichlet series, as modular relations through the use of Fox H-functions and Meyer G-functions. These include Bochner’s formula, Riesz sums, K-Bessel expansions, incomplete gamma expansions, Hurwitz’s formula, Oppenheim’s formula, Wilton’s formula, in the case of Riemann zeta function. A thorough explanation is presented in “Contributions to the Theory of Zeta-Functions: The Modular Relation Supremacy.”

[2]. Zeta Functions
Applications of zeta-functions to physics and chemistry, for example, zeta-regularized products which allow assignments of finite limits to originally divergent infinite products. Refer to “Vistas of Special Functions II,” and “Crystal Symmetry Viewed as Zeta Symmetry.”

[3]. Miscellaneous
A study of the axiom of choice and its equivalents, Zorn’s lemma, well-ordering theorem and Tychonoff’s theorem, etc. A new and simplified proof of Tychonoff’s theorem is given in “Tychonoff’s Theorem as a Direct Application of Zorn’s Lemma.”

Latest publications and activities

[Books]

[Published Papers]
Yamasaki Laboratory
Prof. Shigeichiro YAMASAKI, Dr.
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[Keywords]
Electric money, Virtual Currency, Bitcon, Web privacy

Research Outline

The Block chain technology of Bitcoin is an innovation of electric money. We expect that this block chain technology become an information infrastructure of our society. Our laboratory has some research projects about the block chain technology and virtual currency technologies.

[1]. Virtual currency and its applications
We are developping a new virtual currency system based on "colored coin sysytem" which adds different meanings of transactons. We have a plan to apply this new virtual currency in a local economy in Kyushu area.

[2]. Web privacy and trust
The web pages are the most important infomation source of today. Search engines like Google or Yahoo! had been succeeded to provide accurate useful web pages. Social network has become another important infomation source. The purpose of our research is to develop a SNS based accurate trustable information system that keeps privacy.

Latest publication and activity

[Book]
1) “Virtual Currency-Technology, Low and Institution”


[Published Paper]

2) “An Electric Power Balancing Control by Air-Conditioner Controller with AC Power Frequency Sensor over the Social-Web” Shigeichiro Yamasaki, Applications and the Internet (SAINT), 2012, IEEE/IPSJ 11th International Symposium, 51,
I study "IC tag application system" using the IC tag which is one of the important key components in the global society and ubiquitous society, and "Exercise support system" that improves information exercise lesson, "Virtual trip system" using robots.

[1]. Research and development of the IC tag application system
As globalization progresses, the genuine of the products and goods is becoming increasingly important. In this study, we have studied the IC tag application system which ensures the genuine of the products and goods using the IC tag.

[2]. Research and Development of Exercise Support system
In the study of the information engineering, it is important to solve many problems in order to learn the technology. In this research, we are developing the exercises evaluation support system for evaluating the degree of concentration in the information exercise using PC.

[3]. Research of virtual travel system
In this Research, we are studying a system that can experience the virtually travel using robots.

Latest publication and activity

[Published Paper]
We have been studying new type of image sensors, with the aim of developing high-sensitivity compact cameras and high-picture-quality compact color cameras.

[1]. High-sensitivity Image Sensor

The sensor consisting of a field emitter array and an avalanche photoconductive film, can obtain clear images under dim lighting conditions such as moonlight.

[2]. Color Image Sensor with Organic Photoconductors

The sensor overlaid with three kinds of organic photoconductive films, can obtain color images without color separation optical systems.
System Engineering Laboratory
Prof. Naomi HARATANI, Doctor of Engineering

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[Keywords] system design, multi-dimensional system, wireless signal/energy transmission, informationization of electric power flows

Research Outline

Our system engineering objectives have three themes, which are “multi-dimensional system”, wireless transmission of signals and energy, and informationization of electric power flows.

[1]. Multi-Dimensional System
Which is applied to images, moves, 3-D moves, recognition of scenes and so on. We deal Multi-dimensional system theory or multi-dimensional data processing.

[2]. Wireless Transmission of Signals or Energy
We approach both Signals transmission and energy transmission which are different matters by means of a same method wireless transmission.

[3]. Informationization of Electric Power Flows
We investigate smart grid and transformation, storage, or on demand supply of energy in order to work effectively electric power flows.

Latest publication and activity

[Published Paper]
Electromagnetic Energy Engineering Laboratory

Prof. Hiroshi MUTA, Doctor of Engineering

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[Keywords]
Plasma, Ion Beam, Microwave, Thin Film, Computer Simulation

Research Outline

Our research is directed to effective use of the electromagnetic energy in accordance with environment. For example, we develop new plasma and ion beam sources for nanotechnology in a low-carbon society. In addition, we study high-efficient wireless power transfer using high-frequency waves for the next electric power system.

[1]. Ultrafast Deposition of DLC Films by Plasma CVD
DLC films are widely used in hard coating technology. Recently, the deposition rate has been increasingly required for cost reduction. We develop a new method using plasma CVD with supersonic jet and have succeeded in ultrafast DLC film deposition.

[2]. Effective Production and Control of the Cluster Ion Beam
Cluster ion beam has much possibility for large area deposition with a high speed and high quality. Then, control of the cluster growth rate is important because the cluster complexly grows from nano-particles and charged in the plasma. We have mainly investigated the controllability of cluster ion beam by the plasma parameters.

[3]. Optimal Design of Wireless Power Transfer System
Wireless power transfer has attracted much attention as a near-future power feeding system. In our laboratory, the modeling as a design tool has been performed through the comparison between the experiments and electromagnetic field analysis.

Latest publication and activity

[Published Paper]
Research topics are in the field of information theory, especially error correcting codes, sequences and computational complexity. Our research group are investigating them and publishing some results for conferences and journals on domestic and international research communities.

[1]. **Pseudo-Random Sequence and its Evaluation**
- Constructing method of sequence
- Constant-weight sequence and its property
- Linear complexity and k-error linear complexity
- Non-linear code and sequence from cyclic difference set

[2]. **Linear Code and its Evaluation**
- Constructing method of linear code and algebraic geometry code (AGC)
- Designed distances for cyclic code and AGC
- Decoding methods for linear codes and AGC
- Codeword and weight distributions of cyclic code
- Non-linear code and its property

[3]. **Source Code Readability and Complexity**
- Code readability by information amount
- T-complexity and stochastic complexity

**Latest publication and activity**

**[Published Paper]**


Intelligent Information System Laboratory

Assoc. prof. Hiroshi SHIRATSUCHI, Dr. of Information Engineering

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[Keywords]
Neural networks, Open Source Software, Wireless Communication

We are conducting research on the internal structure analysis of neural networks based on a fusion of information theoretical point of view and the geometric point of view. In addition, we are researching on the software development using open source technology and wireless communication systems.

[1]. Neural Networks
From analyzing of the internal structure of the neural network (N.N) which modeling the brain functions, we aim to improve performance in region such as “recognition” and “association”. Furthermore, we have developed structural learning algorithms to facilitate the analysis of the internal structure of N.N.

[2]. Development Open Source Software
It is a research and development of the system with an emulation environment by utilizing the integrated management and the virtual network a variety of open source.

[3]. Wireless Communication System
For high-speed communications in a wireless communication system, simultaneous transmitting and receiving in parallel by multiple antennas. We have a research and development for the communication method of separating the correctly received signal from the signal such complex radio interference is present.

[Latest publication and activity]

[Published Paper]


High Voltage Pulse Power Laboratory

Associate Prof. Tsuyoshi Kiyan, Doctor of Sci. and Eng.

e-mail kiyana@fuk.kindai.ac.jp

[Keywords]
Pulsed Power, Discharge Plasma, High Voltage, Reaction Process

Research Outline

Researches on pulse power technology for generating discharge plasma in the range of several tens to several hundreds of nanoseconds, and its application study are researching in order to apply to an environmental purification, reaction process and material synthesis.

[1]. Research of high functionality pulse power source
Aiming at industrial application of pulse power technology, which generates the high voltage and large electric power with several hundred nanoseconds time scale, the investigations of a high voltage pulse power supply capable to generation and control of electric discharge plasma are advanced.

[2]. Application to Environmental purification technology and materials synthesis of discharge plasma
Environmental cleanup and improvement related to polluted water, sterilization and agricultural products are conducted by the applied research of discharge plasma with a pulse power technology. And processes of new materials synthesis by fusion of a supercritical fluid with discharge plasma are researched.

Latest publication and activity

[Published Paper]
2) Z.B. Yang, et al., Post-breakdown dielectric recovery characteristics of high-pressure liquid CO$_2$ including supercritical phase. IEEE Trans. on Dielectrics and Electrical Insulation, 21 (3) pp. 1089-1094, (2014)
3) T. Ihara et al., Initiation mechanism of a positive streamer in pressurized carbon dioxide up to liquid and supercritical phases with nanosecond pulsed voltages, J. Phys. D: Appl. Phys. 45 (2012) 075204
Our Laboratory is researching fine grain processor architectures, multi-agent and signal processing. We think that implementing in the hardware is important, so we are researching a real machine by using the FPGA.

[1]. Fine grain multi thread processor: Fuce processor
We are developing the Fuce processor based on the dataflow computing-model. We are taking another approach to develop the Fuce processor, a multithreading processor, which is dedicated to TLP.

We want to model the movement of each part of the robot that realize a flexible control of the robot by using the reuse technology based on multi-agent models.

[3]. Real-time signal processing using FPGA
We are implementing signal processing system for noise removal in a concurrent parallel algorithms way using the FPGA. Then, we will research whether it is possible to noise removal in real-time using this systems.

[Keywords]
FPGA, Computer Architecture, Fine grain multithread, Multi-agent

[Latest publication and activity]

[Book]

[Published Paper]

[Patent]
Our laboratory is conducting research in the field of optical communication technologies and their applications, i.e. next generation optical transmission systems, optical fiber sensor, and positioning systems based on optical wireless links.

[1]. Next Generation Optical Transmission Systems
Our laboratory investigates low-noise optical transmission schemes based on optical parametric amplifiers with the combination of new optical modulation formats. Specifically, our research laboratory studies the reduction of optical quantum noise via nonlinear parametric processes in fibers and crystals.

[2]. Optical Fiber Sensor
Optical fiber sensor can realize the distributed measurement of temperature and stress for buildings. We are conducting research on more sensitive and economical fiber sensor based on Brillouin scattering process.

Optical wireless link based positioning technology is promising one for future high resolution positioning systems. Our laboratory investigates code based detection systems for its purpose.

[Keywords]
Optical fiber transmission, Fiber sensor, Positioning systems

[Research Outline]

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[Latest publication and activity]

[Published Paper]

[Patent and so on]
1) Device and method for correcting a path trouble in a communication network, US Patent 8134920.
Human Informatics Laboratory

Associate Prof. Hitoshi TERAI, Ph.D. (Information Science)
e-mail terai@fuk.kindai.ac.jp

[Keywords] Creativity, Insight, Problem Solving, Scientific Discovery

Research Outline

Our research interests is in higher-order cognitive process, especially the process of insight problem solving, scientific discovery, and creative activity. We are investigating these process by conducting psychological experiment and constructing cognitive models.

[1]. Insight

We are investigating bifacial characteristics (suddenness and gradualness) of the insight process from the viewpoint of a hypothesis search process by psychological experiments, and trying to explain how these characteristics arise using a computer simulation model.

[2]. Scientific Discovery

Emergent patterns arise in a wide variety of situations (physical and social situations). We are focusing on the effects of emergent patterns on discovering local rules as basic principles underlying phenomena by using Conway’s Game of Life (Fig. 1).

[3]. Creativity

The manner of assessing creative products is one of the central issues when evaluating creative process. We are investigating the nature of creative assessment (Fig. 2).

Latest publication and activity

[Book]


[Published Paper]


I would like to develop the design guideline for earthquake resistant reinforced concrete buildings based on the study on the evaluation methods for elastic and inelastic behavior of main structural members.

[1]. The calculation method for the shear strength of RC structural members
On the existing design guideline for the shear strength of RC structural members, the real phenomenon is not considered. So, the design guideline based on the real phenomenon is studied.

[2]. The calculation method for the shear behavior of RC shear walls
The shear behavior of RC shear walls is occupied with shear behavior. So, the behavior is very complex. The evaluation method for the shear behavior is studied.

[3]. The calculation method for the flexural behavior of RC shear walls with openings
On the existing design guideline for shear walls, the influence of openings is considered only on the shear behavior. So, the flexural behavior of RC shear walls with openings is studied.

Latest publication and activity

[Book]


[Published Paper]

To improve a current environment, the environment-friendly and human-friendly building and city planning are promoted.

[1]. Surveying of Building/Urban Environment
The current state of the environment is understood by measuring physical elements such as sound, thermal, light, and air of building/urban spaces, and we propose to attempt the comfort.

[2]. Research on Urban Energy and Urban Infrastructure
We propose the how should be the facilities and the infrastructure maintenance related to the city metabolism: energy, water, and waste that are considered regional characteristics. For its practice, we examine the system construction technique for the practice and the evaluation technique. Under that, we aim at the city/community where the small load to environment planning.

[3]. Investigation/Design of Eco-friendly Building
We design the eco-friendly housing through the questionnaire of residence condition and living act against residents, and measurement survey of the energy consumption. Moreover, we propose the technology for the building design that aims at the decrease of the environmental load from both sides of an environmental engineering and equipment technology, and executes the experimental study.

[4]. Research for Eco-friendly Municipality/City Planning
We support the eco-friendly approach by local governments and the offices positively. Moreover, we support the planning of safety and can relievable city.

[5]. Practicing Environmental Education and Participating in Environmental Volunteer Works
We work on the solution of environmental problems through helping study of environment, practicing the environmental preservation activity intended for all generation.

Latest publication and activity

[Book]

[Published Paper]

[*] Encouragement Prize of Architectural Institute of Japan (AIJ), Apr. 2002

[Patent and so on]
Joint production process of natural capital is key issue of my research. The process produces many ecological services, which support local and global sustainability. I evaluate sustainability of local policies such as the forest management, waste management, fair trade and climate change using economic foundation.

[1]. Forest Management
Sustainable management of forest are growing concern in the world. While urbanization draws local population to cities, villages in the mountain face severe population loss. My research focuses on the sustainable forest management including local life, based on the Payment for Ecological Services.

[2]. Fair Trade
Every woman in the local villages can engage in handicraft project. My research is to evaluate the effects of handicraft projects in fair trade activity. My research is the projects for the hill tribe in Northern Thailand.

[3]. Waste Management
Econometric analysis of Municipal Solid Waste Management. I evaluated the policy effect of curve side recycling and user charge policy.

[Book]

[Published Paper]
Building Construction Laboratory

Prof. Yoshihito KAWAKAMI, Doctor of Engineering

e-mail ykawa@fuk.kindai.ac.jp

[Keywords]
Concrete, Strength, Industrial waste, Recycled aggregate class L

We have a study on mainly building materials science. For example we have done basic research related to concrete strength, recycling of industrial waste discharged accompanying the demolition of buildings, and so on.

[1]. A study on the method for estimating of concrete strength
Usually, strength of concrete is estimated by day-degree method.
It is determined by Integral of product of curing temperature and time. In this study, we will be propose the further practical formula for estimation of concrete strength, which is applicable for wide range age of concrete.

[2]. A study on the temperature dependence of concrete strength
In general, the strength of the material is dependent on temperature, that the temperature is lower the strength becomes higher. Concrete is no exception. However, in Japanese Industrial Standards there is no provision regarding the temperature of the concrete specimen at the time of strength test. We are conducting research to solve this problem.

[3]. A study on the new uses of recycled aggregate class L
Recycled aggregate class L's uses is limited because of its poor quality. However, recycled aggregate class L is less cost and energy required for production. Furthermore, the amount of fine powder generated when manufacturing the recycled aggregate class L is smaller than the class M or H. Therefore, performing the application development of recycled aggregate is significant. We have done research on the new uses of recycled aggregate class L.

Latest publication and activity

[Book]
2) “Applicability of various types of industrial waste for concrete material” Takehiro Yamasaki et al, Japan Concrete Institute Kyushu Branch, (1999)
4) “Standards and performance evaluation of concrete admixtures” Yoshiaki Sato et al, Japan Concrete Institute Kyushu Branch, (2000)
Ergonomics in Daily Living Laboratory

Prof. Jun-ya Ohashi, Ph.D. (Design)

e-mail  johashi@fuk.kindai.ac.jp

[Keywords] Surface EMG, Muscle fatigue, Low-level, Motion space

Research Outline

All of the studies are related to daily living and moderate work conditions. The main subjects are muscle cost, enjoy our life, energy expenditure of the equipment, and dietary management. These subjects don’t relate to each other. I just want to offer some aids to improve daily living with them.

[1]. Evaluation of muscle cost in daily activities with EMG
Surface EMG has been studied to evaluate muscle fatigue in many studies. Many of the studies, however, did not consider light activities. I have tried to evaluate muscle cost in daily activities with surface EMG and fatigue sensation.

[2]. Development of the applications of pictures by a local painter Hiroyuki Morofuji
The pictures of the local artist show various aspects of daily living in this area and common humanity. Although the value is not high as the world arts, they are precious resources in this area. They make us find lovely scenes around us. Data base, panels, digital museum have been developed as the applications of them to enjoy our life.

[3]. Promotion of the reduction of energy expenditure of daily equipment
Much energy is used in present living. Information to user for the reduction of the energy has been studied. The information is a list of energy expenditure of various usage of equipment in daily living such as TV, air-conditioner, computer, car, illumination, oven, boiler, and so on. The values are shown to be compared among them easily. So we can understand what activities expend energy much. The list gives help to choose actions in daily living under restriction of energy expenditure.

[Latest publication and activity]

[Published Paper]


Architecture Planning Laboratory

Prof. Toru IHARA, Dr.

e-mail ihara@fuk.kindai.ac.jp

[Keywords]
Architecture planning, Remodeling, Community center

Research Outline

Current Japan entered the population decrease world already. The Japanese local-government made a building corresponding to a demand till now become redundant now. I study a method of reorganization of the community stock by making a redundant state of the community institution in the population decrease world clear.

[1]. A study of planned technique by preparation process analysis of the self-government center
It is to develop a method a study of plan technique builds a the community institution corresponding to a formation process of community, and to arrange

[2]. A study of remodeling method of a the community institution
Development of method to plan a the community institution to needing it corresponding to other functions except an original purpose again

[3]. Arrangement system of the Korean self-government center and a change of institution function
I examine a change system of Korean institution function to have a system I function, and to switch a the community institution

Latest publication and activity

[Book]

[Published Paper]


Management Strategy Laboratory

Prof. Jeeyeon HA, Ph.D. in Economics

e-mail ha@fuk.kindai.ac.jp

[Keywords]
Strategy, Global Companies, Innovation, Asian Companies, Culture

For the progress of globalization, hyper-competition, and innovation, the environment surrounding Japanese companies has rapidly changed. The purpose of my research is to analyze the strategy, competition, and competitive advantage of those companies.

[1]. Competitive advantages in global companies
Recently not only Western and Japanese companies but East Asian i.e. Korean, Chinese, and Taiwanese companies have rapidly developed and have accelerated their global activities. In our laboratory it is researched that the source of competitive advantage in East Asian companies has been built by the unique method using human network.

[2]. Role of the government in the innovation cluster
Formation of the innovation cluster is currently one of the most important issues for the East Asian countries including Japan. In this study we researched that the role of the government was important in those countries unlike Silicon Valley.

[3]. The impact of divergent cultures in consumer activities
In our research, cross cultural survey are conducted to figure out how divergent cultures influence consumer cognition, decision, and behavior differently.

Latest publication and activity

[Book]

[Published Paper]

[Works]
1) “Personal-Spirituality across Cultures,” Anil Mathur et al. and Jeeyeon Ha, Western Decisions Sciences Institute Conference (2015)
My research interests are comparative analyses between Japan and Korea on financial system, corporate system, and the relations among the government, financial institutions and corporations.

[1]. Comparative Institutional Analysis on the Economic System of Japan and Korea
Theoretically analyze why and how Japan and Korea have different economic system even though they have a lot of similarities in the economic environments.

[2]. Directions of Financial System Reform in Japan
Research on obstructive factors in lumbering structural reform in Japan’s financial system and its future directions.

[3]. Regional Revitalization through relationships with Asian Economy
Research on regional revitalization in Kyushu through relationships with growing Asian economy.

Latest publication and activity

[Book]

[Published Paper]
1) “Current situation and policy evaluation on the transformation of the industrial structure in Japan,” Takao Iijima, Reports of Faculty of Humanity-Oriented Science and Engineering, 21, pp. 8-13 (2014) in Japanese
Sport Management Laboratory

Associate Prof. Jiro KURODA, Master of Arts

e-mail jkuroda@fuk.kindai.ac.jp

[Keywords]
Sport Management, Draft System, Global Human Resource Development

Research Outline

My research interests are professional sport business such as team front management, player draft system, lifetime wage, and post-professional second career. I study the human resources which can play an active part in sports industries, as well as international exchange and cooperation through sport.

[1]. Player Draft System
Analyzing the careers of over 1000 players, I found that the later a player is selected in the draft process, the shorter his career in baseball. Players selected in the first three rounds tend to have longer careers than those selected in later rounds.

[2]. League Management Policy
The cycle of success in baseball gives an advantage to successful teams: winning teams have greater attendance, providing more funds, which then allows them to acquire better players. For the league, however, a competitive balance between teams creates a successful league. Therefore, some regulation in NPB that transferred funds to less-successful teams is recommended.

Young people participating in the Japan Overseas Cooperation Volunteers can learn a lot through the experience, such as language skills, intercultural skills and understanding, and problem-solving.

Latest publication and activity

[Book]

[Published Paper]
Research Outline

Various kinds of information are embedded in the urban scenes of modern cities. It should be very important to precisely grasp and analyze these hidden information for human activities. I try to visualize these information with computer simulations, and support urban life using these information with ubiquitous technology and GIS.

[1]. Research on Urban Analysis with Computer Simulations
The analysis of urban scenes such as; 1) 3D model simulations, 2) exchange test of the urban elements, 3) urban analysis with walk-through models, and so on.

[2]. Basic Research on Information Infrastructures
The ways of supporting urban life with ubiquitous computing technology are examined through demonstration experiments.

Based on the master’s researches using GIS and GIS lectures in the Graduate School of Meiji University, the effectiveness of GIS in the architectural and urban design fields are discussed.

[4]. Research on Visualizing Factors influencing Living Environment
Visualizing the influences to human activities of; 1) color effects, 2) urban scenes, 3) greens, 4) space syntax, 5) open spaces and so on.

Latest publication and activity

[Book]

[Published Paper]

[Works]
1) Tagawa-Ita Station Renewal Project (2016)
2) RoboCup Competition Field (2014)
3) Renovation of S Junior High-school (2013)
In this laboratory, we are conducting research on disaster-resistant building facilities, mainly for building energy supply systems such as in-house power generating station, in order to increase the number of buildings that can continue necessary activities even in the event of a disaster.

[1]. Disaster-Resilient Building Facilities and Urban Infrastructure
Even when infrastructure such as electricity and water supply and sewer stops in the event of a disaster, we are studying building facilities to maintain building function.

[2]. Research on Smart Energy System
Research about desirable situation of building facilities and local energy system in the era of urban environmental management using ICT (Information and Communication Technology).

[3]. Research on Utilization of Underground Mall
Research on the possibility of underground mall as a staying space for people who are unable to return home after disasters.

[4]. Environmental architectural Design Rooted in Communities, Culture and Climate
Study of elemental technologies for environmental architectural design based on characteristics of community, culture and climate.

Latest publication and activity

[Book]

[Published Paper]

[Work]
ハードサイエンスとソフトサイエンスの調和をめざす新時代のスペシャリストを育成します。
The list of tuition fees and other expenses for students enrolling for 2015

(1) First-half doctorate and master’s courses

<table>
<thead>
<tr>
<th>Graduate School of Humanity-Oriented Science and Engineering</th>
<th>Enrollment fee</th>
<th>Tuition fee (first semester)</th>
<th>Student health insurance fee</th>
<th>Year total</th>
<th>Total at enrollment</th>
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<tr>
<td>First year</td>
<td>200,000</td>
<td>950,000</td>
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<td>1,154,500</td>
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(2) Second-half doctorate courses

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Remarks

- Total upon enrollment is the total amount of enrollment fee, tuition fee (first semester), and student health insurance fee.
- Tuition fee, etc. (second semester) should be paid in October.
- In addition to the above, the Alumni association lifetime member fee (10,000 Yen, only in the final year) is required.
ハードサイエンスとソフトサイエンスの調和をめざす新時代のスペシャリストを育成します。