GUNMA UNIVERSITY

School of Science and Technology Graduate School of Science and Technology

ur Future

Hand Crafting

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School of Science and Technology Graduate School of Science and Technology Gunma University

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Access



Materials and Bioscience Mechanical Science and Technology Environmental Engineering Science Electronics and Informatics, Mathematics and Physics

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Welcome to the School of Science and Technology of Gunma University

The School of Science and Technology celebrated its centenary in 2015. It was originally established as a private school by the citizens of Kiryu City in 1896. In those days, Kiryu City was a center of the textile industry, then a key industry of Japan. In 1915, the school was reestablished by the government as the Kiryu National Technical College of Textile Science to teach the latest textile science technologies. After the end of World War II, the college was rebuilt as a school of the Gunma University.

Over the following years, the school has developed advanced fields as a pathfinder of change in the world's key industries. Lately, interdisciplinary research projects have been developed in collaboration with other schools of the university. Examples include the "Adoption of NextGen Transportation Systems" project targeting automated driving for cars in the local area, the "Gunma University Medical Innovation" project for promoting collaboration between medical science and technology, and the "Element Innovation" project, which includes material science, machinery, electronics, and even medical science.

We now have departments in four fields: Chemistry and Chemical Biology, Mechanical Science and Technology, Environmental Engineering Science, and Electronics and Informatics. Through the above projects, the four departments provide our students with educational programs offering a balance between basic science and advanced technology in interdisciplinary fields. Furthermore, the school offers the Global Frontier Course educational program to nurture global leaders at the forefront of each domain.

In this rich, natural environment and warm, friendly town, we nurture engineers who will build a fertile future society and researchers who will make scientific discoveries that will amaze the world. Advanced academic programs and vibrant research projects await you.



Yoichi Seki Dean of Graduate School of Science and Technology

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Information

Great Reasons to Choose Gunma University

Here are five great reasons for you to consider studying at Gunma University while living in Japan.

Advanced technologies paving the way to the future

Gunma University is at the forefront of advanced technologies including the Element Innovation Project, and technologies related to low carbon, green innovation, disaster prevention research, and heavy ion radiotherapy.

Global Frontier Leadership Program

Gunma University conducts the Global Frontier Leadership (GFL) Program to nurture human resources to serve as leaders in their fields.

Student support services

Gunma University offers extensive support for international students to ensure they have a comfortable student experience. As well as initial moral support and language education, the university is also home to the center for international education research.

A safe location where industry is growing

Gunma Prefecture is situated in a safe area of Japan with firm ground and a very low disaster risk. Students can therefore focus on their studies with peace of mind.

Superb seasonal changes and activities

Japan's has four distinctly beautiful seasons, and with its abundant nature, Gunma Prefecture is the perfect place to experience them. With plenty of activities to try, life in Japan is a lot of fun.



There is so much

to learn

Reason

Advanced technologies paving the way to the future

Gunma University Medical Innovation



"Gunma University Medical Innovation Project" is a research project that started in 2014 with financial support from the Ministry of Education, Culture, Sports, Science and Technology of Japan. The main goals of the project are to develop new medical instruments, health monitoring devices, and diagnostic and cure medicines. Young students are educated to become a new type of global engineer with professional engineering skills as well as the ability to create new prospects comprehensively.

International Research and Topics2 **Education Center for Element Science**



This newly founded center investigates advanced carbon materials and high-quality silicon compounds.

For more information \gg P12

Disaster Prevention Research



Prof. Katada's research group had been conducting tsunami disaster prevention education in elementary and junior high schools for several years, which effectively saved many school-age children from the huge tsunami in the Great East Earthquake.

For more information >>> P14

An abundance of appealing research fields!









5 Great Reasons to Choose Gunma University

Global Frontier Leadership (GFL) Program



One of the pillars of Gunma University's educational philosophy is to cultivate students "who understand the culture, history, and tradition of their own country as well as other countries, who have communication skills in a foreign language, and who can assume a role of leadership in a global setting." For this reason, the Global Frontier Leadership Program, GFL, was created.

The program was established in 2013 through the cooperation of the Faculty of Medicine and the School of Science and Technology. Participants in the program can learn about many different cultures, hone their communication skills in both Japanese and a foreign language, and gain a broader international understanding. Finally, participants are required to study abroad at some time during their academic careers.

Purpose

The Global Frontier Leadership (GFL) Program develops the following five areas:

- ① Independent inquiry in a specific theme or topic
- 2 Broad knowledge supported by a deep understanding of areas of expertise
- 3 Ability to design a comprehensive plan with a clear purpose
- 4 Communication skills for international activity
- 5 Ability to carry out a plan as a team or an organization

Program

In order to support the five areas above, the program includes the following educational programs (Fig.1).

Iobal Frontier Leadership (GFL) Program

Admission by recommendation / General entrance examination



Fig.1 Conceptual diagram of the Global Frontier Leadership (GFL) Program











Student Support Services

Gunma University International Center

The Gunma University International Center (GUIC) promotes a comfortable living and studying environment for international students of Gunma University. GUIC offers the following services.

- 1. Japanese language, Japanese culture, and current affairs
- 2. Preliminary Intensive Japanese Language Course for Japanese Government Scholarship Students
- 3. Counseling on daily life and studies
- 4. Advice for Japanese students intending to study abroad
- 5. Research activities on the education of international students and educational materials

Japanese language courses



GUIC Website

Service 3 Student Support Section

The Student Support Section is committed to providing a supportive and positive environment for our students. We want all students to have a successful, fulfilling experience at Gunma University. We are responsible for providing services and opportunities for our students that will enhance their experiences here at Gunma University and support their efforts to engage in academic studies.

Services offered

- Comprehensive consultation
- Student activities
- Tuition fee exemption
- Scholarships
- Tutorial system
- Career exploration and preparation
- University housing (International House)
- · Immigration matters: Certificate of Eligibility / Extension of period / Part-time job permission
- Off-campus resources: Rental bicycles / Part-time jobs / Housing comprehensive security
- Healthcare







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http://www.guic.gunma-u.ac.jp/english



5 Great Reasons to Choose Gunma University

A safe location where industry is growing



Superb seasonal changes and activities



A leader in industry and innovation

Gunma Prefecture has a long history as a technology and innovation leader in Japan, starting with the Tomioka Silk Mill, which was established by the Japanese government in 1872 as Japan's first model silk-reeling factory. At the end of its Edo period in the mid-19th century, Japan opened its doors to the world, ending a long period of seclusion, and in 1859 began to trade with Western countries.



Full utilization of advanced technologies

Many well-known carmakers have production sites in Gunma, which has a widespread manufacturing sector. A number of other production plants also take advantage of the advanced technologies available in Gunma Prefecture.





Oze



Watarase Keikoku Railway

Gunma is a tourist destination full of charming hot springs, natural beauty and culture. It is gaining popularity as a convenient travel destination from the Tokyo Metropolitan Area.



Check! Useful search keywords for discovering the attractions of Gunma

Gunma Prefecture, "Gunmachan", Kusatsu, Himokawa, Daruma, Yaki-manjyu, Kita-Karuizawa, Ikaho, Akagi Myougi, Harunako, Sauce-Katsu, Karakkaze, Asama, Shima-Onsen, Minakami, Sauce-Yakisoba



Fukiware falls



Photo courtesy of visual Gunma



Gunma University Medical Innovation



Gunma University Medical Innovation Project Point 1

"Gunma University Medical Innovation Project" is a multi-disciplinary five-year research project started in 2014 with financial support from the Ministry of Education, Culture, Sports, Science and Technology of Japan.

A number of researchers belonging to different organizations in Gunma University, such as the Graduate School of Science and Technology, the Graduate School of Medicine, and the University Hospital, are participating in the project. The main goals of the project are to develop new medical instruments, health monitoring devices, diagnostic and cure medicines, and so on, through tight collaboration among professionals from a variety of fields. Another important mission of the project is to educate young students to be a new type of global engineer who has professional engineering skills as well as an ability to create new prospects comprehensively in the field of medical engineering from a wide variety of knowledge.



Micro-dosimeter for heavy ion dose monitoring

Accurate dose distribution monitoring is a critical issue for the quality control of radiation cancer treatment. Therefore, there is a need to develop dosimetry at the micrometer scale (micro-dosimetry) with high special resolution and radiation sensitivity.

In this study we have successfully controlled the shape of a radio-photoluminescence (RPL) glass dosimeter with different types of activators for ionized particle detection. An RPL response around 500 - 600 nm was obtained under different radiation exposures. Moreover, dose distribution imaging was successfully visualized with a fabricated RPL glass dosimeter irradiated with a focused proton microbeam. The typical spatial resolution recorded was better than 10 µm². We were also the first to succeed in fabricating glass elements with micrometer-size. These R&D

achievements will enable us to obtain three dimensional dose distribution with quite a convenient procedure.

Luminescent probes for in vivo oxygen imaging



Identification and production of biologically active compounds

Screening and design of novel drugs is one of our most exciting efforts to support drug development. We have established in vivo, in vitro, and in silico drug characterization systems and successfully identified new drug candidates, such as analgesics and antidiabetic drugs. We are also trying to express cancer vaccines using transgenic silkworms. The purified vaccines were shown to activate human T-cells and hold potential for cancer immunotherapy.

Silicon nanowire based high-sensitivity biosensor



Intuitive hands free interface

Facial orientation is one form of body language that can be used to ask someone to move something. It is enough to indicate the intention by upward, downward, right, and left facing actions. Here, we applied these intuitive actions for auto-wheelchair operations. We focused on the change nostril shape to recognize the facial orientation on the grounds that it can be regarded as a more stable shape than any other facial feature points. In addition, the gazing action was also inputted to a computer to operate a communication-aid for input characters. The eyelid shape was approximated by the Bezier curve and its curvature was reflected on input operation.









Fluorescence proteins were expressed in a transgenic silk worm embrvo

- A portable sensor with high sensitivity is needed for the detection of chemical or biological molecules in the fields of biotechnology and medical science. A silicon nanowire (SiNW)-based field effect transistor device has the potential to detect small quantities of biomolecules.
- To realize high sensitivity for negatively charged biomolecules such as antigens, antibodies, and DNA, it is effective to use an n-type SiNW and to reduce the wire width. In this project, we fabricated an n-type SiNW using electron beam lithography, and evaluated its sensitivity for biomolecule detection. Currently, we have succeeded in fabricating an n-type SiNW with 100 nm width and detecting IgG antibodies with the extremely low concentration of fM(10-15 mol/L).



Checkit

Check it!

Check it

Check it !

Check it



International Research and Education Center for Element Science



Hand Crafting Our Future

Low-Carbon

About the Center

The International Research and Education Center for Element Science was founded in April 2015, based on the Element Innovation Project team. The faculty of Science and Technology at Gunma University has a long history of materials innovation based on carbon and silicon. The newly founded center mainly investigates advanced carbon materials and high-quality silicon compounds for use in dye-sensitized solar cells, non-precious catalysts for use in fuel cells, electrochemical double layer capacitors, and new active materials for lithium ion batteries and other applications. It also covers the areas of graphene physics and chemistry, as well as plasma chemistry to produce novel functional materials. The center has three faculty members and other members from other departments of the faculty. The laboratories of the center are well equipped with the latest instruments for nano-material science.





Fascinating carbon materials

Have you ever heard of "carbon materials"? You can find the materials around you in your everyday life: pencil lead, bikes, rackets, refrigerator deodorizers, and so forth. I have been fascinated by this material for over thirty years because of its versatile properties, which can be tuned easily by preparation. Can you imagine ten-orders of magnitude changes? You can see such a big change when you carbonize organic molecules and measure their electrical conductivity. I was so excited by this fact when I was a masters student. Now my colleagues and I are interested in carbon catalysts that will replace precious metal catalysts, for example in fuel cells and chemical syntheses.

Professor Jun-ichi Ozaki

Nanoscale exploration of graphene and silicon surfaces

Our research is focused on understanding the fundamentals of molecule-surface interaction and properties of the resulting interfaces, leading to the development of an entirely new class of materials and sub-nanometer structures on surfaces. While silicon is the cornerstone of modern semiconductor technology, carbon materials such as graphene have emerged as the most promising materials for next-generation technology. We are investigating two technologically important materials: (1) graphene and (2) silicon surfaces. Our fundamental study will develop basic principles that will guide us in exploiting the findings in numerous socially pervasive applications, such as information technology, biotechnology, and renewable energy.



Associate Professor Zakir Md. Hossain



Assistant Professor

Takafumi Ishii

Surface chemistry of nano carbonsurface

Nano carbons, such as carbon nanotubes, fullerenes, and graphenes, are expected as high-performance electrode materials used in sensors and batteries due to their high surface areas, chemical stability, and electric conductivity. It is well known that the surface state of nano carbons strongly affects their performance as does the structural morphology at the nano scale. Thus analyzing and designing the surface and morphology are important issues for enhancing performance. My research subject is to develop useful techniques for preparing nano carbon materials

Aiming to Realize a Low-Carbon Society by Using Carbon Materials!



The fuel cell is a central part of the technology for using hydrogen. It is a power generation system that uses oxygen and hydrogen, and differs from conventional disposable batteries and rechargeable batteries as well as secondary batteries such as the ones used in mobile phones and digital cameras. It is able to generate electricity almost permanently as long as we continue to supply its fuel, which is of course hydrogen.

Replacing Platinum in Fuel Cells with Carbon-a Cheap and Abundant Resource

Although platinum is the most common and active catalyst for proton exchange membrane fuel cells (PEMFC) to produce electricity, it is an extremely rare and expensive metal that is usually found only in parts of South Africa and Russia. This has hindered the spread of fuel cells, mainly because of unstable prices due to limited reserves and lack of political stability in the regions it is found.

That is why we are now focusing our research on technology using the element carbon. Carbon enables a significant cost reduction without any concern for resource depletion or unstable prices. Carbon atoms are almost limitless in nature and are found in abundance all over the planet.

Gunma University has been researching carbon materials for 60 years. Carbon Alloy Catalysts are carbon based materials that have been developed at Gunma University after many years of research.

Carbon Alloy Catalysts can be prepared by carbonizing mixtures of metal compounds and polymers. They also display high activity for oxygen reduction reaction, which is the cathode reaction of a PEMFC. Therefore the Carbon Alloy Catalysts are now expected to replace platinum as catalysts. Joint research with a chemical company is already under way to make this technology practical.



Aiming for a Hydrogen Energy-Based Society

Although we need to minimize the load we place on the environment, we must also maintain our quality of the life. This presents a significant challenge. To make this possible, society needs to derive clean energy from hydrogen, and it is therefore desirable to build a hydrogen energy-based society. In order to achieve this goal, we need to establish an efficient system to produce hydrogen gas with carbon and store it for use as an energy source.





Challenges for Construction of Social Technology for Achieving Zero Victims in a Disaster



The Research Center for Disaster in the Extended Tokyo Metropolitan Area was established to research mechanisms of natural disasters and methodologies for disaster prevention and mitigation, utilizing regional and geographical characteristics of Gunma Prefecture, which is located in the Extended Tokyo Metropolitan Area. The main research themes are as follows:

Risk management for a safe and secure society

Disaster prevention education

Improvement of disaster prevention in the geosphere and hydrosphere

Practice of disaster prevention strategies

On 11 March 2011, the tsunami that followed the Great East Earthquake caused massive widespread damage to the eastern coastal regions in Japan, claiming approximately 19,000 lives.

In the city of Kamaishi, which also suffered serious damage with more than 1,000 lives lost, Prof. Katada's research group had been conducting tsunami disaster prevention education in elementary and junior high schools for several years, which effectively saved many school-age children from this tsunami. The story of the successful evacuation due to disaster prevention education, keeping the number of victims among the students to almost zero, came to be known as "the miracle of Kamaishi."



Research1

Effects of Lessons in Tsunami Survival and Actual Conditions during the Great East Japan Earthquake in Kamaishi

The Tohoku District has suffered heavy damage by tsunami many times in the past, and there were lessons on how to survive tsunami based on residents' experiences. We examined the effect of these lessons during the Great East Japan Earthquake with the following focuses: 1) How many residents were able to evacuate from the tsunami according to past lessons? 2) Could residents who had evacuated according to the lessons survive the tsunami?

Research2

Study on Risk Image of Floods and Its Effect on **Evacuation Behavior**

When the water level of a river rises and evacuation is deemed necessary, the authorities issue an evacuation order. However, the evacuation rate of residents is said to be fairly low. Probably, residents think that a flood will not be dangerous, so they don't evacuate in spite of the hazardous situation. In this study, we carried out a questionnaire survey among residents of the city of Kiryu, which suffered heavy damage from flooding caused by Typhoon Kathleen In 1947, and we analyzed the actual status of residents' image of flood risk and its effect on their evacuation behavior.

Research3

Effect Measurement of Landslides and Slope Failure **Prevention Work by the Finite Element Method**

In order to achieve a reduction in landslide and slope failures, local governments should construct countermeasure structures in particularly high risk areas beforehand. We are developing a computer simulation methodology with an elasto-plastic constitutive model for measuring the effect of disaster prevention works

The Gender Equality **Promotion** Activities

The Mayudama Plan



personnel, lifestyle support counseling, and various

seminars that foster the advancement of research. These efforts have led to an increase in the ratio of female researchers, from 14.7% in FY2012 to 16.8% in FY2015. Especially, in the School of Science and Technology, under the leadership of Dean Shinozuka, of the four new female researchers, one was also employed as a professor were employed in FY2014, doubling the ratio, which is regarded as a notable result. Also, activities in the School of Science and Technology, have included some unique events such as lunch meetings on special topics, a seminar to encourage female students to go to graduate school, and a special program for female high school students in the Open Campus event.

As a part of the Mayudama plan, Mayudama spaces have been opened in each campus in response to requests to provide a central location with easy access to a variety of information not only for female researchers but also all members of the university. Consulting services provided by senior researchers (mentors), a professional coordinator, and a work-life balance advisor are available there. The space also offers related books and data for public viewing. There is a crib too. Furthermore, Mayudama lunch meetings and Mayudama café events have been held regularly for faculty members and students. Kiryu Mayudama place is a relaxation room on the 5th floor of the Sougo-kenkyu building open from 1:00 p.m. to 4:00 p.m. Monday to Friday. Work-life balance advisor Harumi Nakamura is available for consultation from 10:00 a.m. to 4:00 p.m. on the 1st, 3rd and 5th Thursday of every month, and on one of these days, the Mayudama café is held from 11:30 a.m. to 1:00 p.m.





In Gunma University, the Mayudama Plan, which has a project period of three years, was adopted in FY2013 as a Program to Support the Activities of Female Researchers (General) under the authority of the Ministry of Education, Culture, Sports, Science and Technology. The aim of the program is to realize a gender-equal society and support the major life events of female researchers, such as giving birth, raising children, and caring for family. Since then, various activities to promote the project have been vigorously carried out in each campus by the Gender Equality Office. The Gender Equality Office was established under the University President and plays a crucial role in the support of female researchers experiencing major life events by providing research support



A Human Resources Education System for Those Who Will Take Up the Baton of State-of-the-Art Technology, Backed by the Full Potential of the University



Roots of Engineering Excellence

Although Gunma University was only established in 1949, the engineering, education and medical faculties that amalgamated to form the university date back to the beginning of the 20th century. The Faculty of Engineering's Kiryu location is a reflection of its roots as a school to educate the craftsmen needed for the textile industry that flourished in Kiryu at the time. The Kiryu School of Textiles was established in 1915. Later it expanded and the name was changed in 1920 to the Kiryu School of Technology. In 1944, the school became the Kiryu College of Technology on its promotion to college status. Finally, it joined with the medical and education colleges located in Maebashi to form Gunma University in 1949.

Expansion & Renewal: The New Graduate School of Engineering

In 2013, the faculty instituted major reforms to meet the ever-changing demands of a modern technological society, and its seven existing departments were reorganized into four interdisciplinary departments. These departments offer students balanced educational programs of both basic science and advanced technology in interdisciplinary fields. Through this new system, we nurture engineers with a solid grounding in the natural sciences as well as a broad knowledge of modern technology.

Doctoral	Doctoral	Materials and Bioscience	Master's	Materials and Bioscience
	Program	Mechanical Science and Technology	Program	Mechanical Science and Technology
		Environmental Engineering Science		Environmental Engineering Science
		Electronics and Informatics, Mathematics and Physics		Electronics and Informatics, Mathematics and Physics

Each department has a Cooperative Graduate School System or contributed laboratories that are responsible for managing the advanced educational activities and collaborative research carried out by staff specialists utilizing advanced technology in collaboration with other institutes and/or companies. Through these programs, our research activities as a Center of Excellence (COE) continue to advance to higher levels.



Increased Educational Opportunities

Entrance examinations for the Graduate School of Science and Technology are held three times a year. The administrative examination is offered in the beginning of July, the summer examination at the end of August, and the winter examination at the end of December. In addition, special examinations are available for working students and international students. In order to help you achieve your dreams, we have prepared many programs, facilities and systems for education, campus life and the graduate school community. Furthermore, our programs also allow students to obtain a doctoral diploma if they have graduated from a university, a college of technology, or other institution of higher learning without a master's diploma. These openings are for those individuals who have been recognized as possessing advanced knowledge, research achievements, and/or other special abilities. The Graduate School of Science and Technology aims to carry out to research and develop advanced science and technology as a world-leading university. We look forward to seeing you on the Kiryu and Ota campuses.

Organization Chart



Campus Photo



Chemistry and Chemical Biology Mechanical Science and Technology Environmental Engineering Science Electronics and Informatics Integrated Science and Technology

Education Program of Materials and Bioscience Domain of Materials and Bioscience

Department of Chemistry and Chemical Biology





Materials and Bioscience

joint research projects with other groups.

In order to confront the complicated problems that contemporary society faces, the integration of science and technology in harmony with a broad range of fields has become increasingly important. The disciplines of chemistry and biology have contributed in this endeavor and it is certain that synergy between these branches of science will produce further breakthroughs by combining their common perspectives of "molecular transformation" and "functional organization of interactions."

To promote these developments, a new department was established in 2007 that

fused chemistry and chemical biology, which has grown into the Division of

Molecular Science. We are home to more than 30 research groups in major

research areas of Molecular Science, Material Science and Chemical Biology.

Each research group pursues its own research mission as well as collaborating on





New functional bio-based plastics and clarifying the biodegradation mechanism of plastics

Ken-ichi Kasuya leads the Green Polymer research group at Gunma University. Research in his group focuses on the development of new functional bio-based plastics and clarifying the biodegradation mechanism of plastics. Recently his group has succeeded in synthesizing a fully bio-based plastic from a plant. In addition, he has been addressing the development of novel biodegradable plastics in order to solve profound problems caused by microplastics in the ocean.

Professor Ken-ichi Kasuya

Toward understanding the biological function of carbohydrate through chemical synthesis

The main research focus in Professor Matsuo's laboratory is carbohydrate chemistry. Carbohydrates play various biological roles such as cell-cell recognition, differentiation, malignant transformation, bacterial infection

and glycoprotein quality control. Our research group is working on synthesis of glycoconjugates (e.g. N-linked and O-linked glycoprotein glycans, glycolipids, and glycosylated natural products) and chemically modified glycans, with the aim of clarifying the biological roles of carbohydrates, developing diagnosis systems for carbohydrate-related disorders, performing functional analysis of glycosyltransferases/ glycosidases, and developing glycosylated new materials.

Professor Ichiro Matsuo

Faculty Members and Fields of Specialization

Fields of Specialization

Motoko S. Asano Hideki Amii Keiji Ueno Hiroki Uehara Masafumi Unno Kenii Oosawa Tetsuo Okutsu Hiroaki Ozaki Ken-ichi Kasuva Soichiro Kyushin Toru Kvomen Takako Kudo Kazuo Shinozuka * Soshi Shiraishi Yoshihiro Sumiyoshi Masashi Sonoyama Hiroshi Takahashi Shigeki Takeda Kin-ichi Tsunoda * Toshiaki Dobashi Seiii Tobita Yosuke Nakamura Minoru Hanaya Mitsuhiro Hirai Ichiro Matsuo Takeshi Yamanobe Takao Yamamoto Kaori Wakamatsu Naoki Asakawa Yusuke Inoue Shinji Iwamoto Atsushi Enomoto Md. Zakir Hossain Hiroyuki Oku Ken-ichiro Kanno Masayasu Kuwahara Kiichi Sato Hiroshi Sano Tsuvoshi Takahashi Nobuhiro Takeda Hirovuki Takeno Yoshiharu Toyama Nobukazu Nameki Jun-ichi Fujisawa Hiroaki Horiuchi Takako Muraoka Tomohisa Moriguchi Minoru Yamaji Keiichi Yamada Toshitada Yoshihara Masaru Yoneyama Hideki Abe Masavuki Ikeno Maki Ito Takahumi Ima Takayuki Kawashima Takeshi Saito Toshiyuki Suzawa

Faculty Members

Noriaki Seko Mitumasa Taguchi Masahiko Numata Yasunari Maekawa Atsushi Miwa Tetsuya Yamaki Masaki Sugimoto Rvoii Tanaka Eiichi Tabei Naoko Nonose Keiji Numata Akihiro Hiroki

Shigehiro Yanagihara

OICE



Development of synthetic organic reactions and their applications Syntheses, structures, and reactivities of organo- and inorganometallic complexes Development of property and functionality of nano-structured polymeric materials Organosilicon and organic heteroatom chemistry: molecular design, synthesis, and application Structural and functional analyses of bacterial flagella and chemotaxis receptors, and genome informatics Physical chemistry, photochemistry and crystal growth Development of modified nucleic acids and its application Structure and function of polyester-degrading enzymes, screening of microorganisms involved in the environmental cleanup Structures and properties of organosilicon compounds Solid state chemistry and design of functional oxides Molecular orbital study of silicon or transition metal compou Chemistry of functional oligonucleotides such as antisense DNA, nonradioisotope labeled oligonucleotide probes, and the artificial nuclease system Development of carbon-based nanoporous materials and electrochemical capacitors Studies on molecular structures of transient species and complexes consisting of radio Biomolecular science, Biophysical chemistry of proteins, Biospectroscopy, Bioinformatics Structural analysis and thermal study of model biomembranes Functional analysis of receptors, characterization and application of protein self-assembly Opto-chemical sensors, liquid chromatography of metal chelates and atomic spectrometry Phase equilibrium of multicomponent solutions, structure of microcapsules and physical chemistry of biological materials Photochemical and photophysical processes of aromatic compounds Construction and properties of novel π -conjugated systems including fullerene chemistry and supramolecular chemistry Development and characterization of functional solid-state materials Study of nano-structure, dynamics and functions of proteins/membrane signaling systems using neutrons and synchrotron X-ray Glycoscience, Glycotechnology, Synthetic study of glycoconjugates Structure of polymers and solid state NMR Statistical physics

Structural biology of proteins involved in signal transduction, prevention of protein aggregation, and development of epileptic rat Bio-inspired devices using emergent property found in polymers Functional analysis of the liver-enriched nuclear receptors using gene-targeted mice Solvothermal synthesis of inorganic materials and their performance as catalysts Suppression of antibody and T cell responses against allergens and autoantigens, advanced functional foods for prevention of diseases Chemical modification of epitaxial graphene on SiC substrate Malaria vaccine and diagnosis material; biofunctional chemistry; biomedical and functional polymers Synthesis and properties of novel organosilicon compounds using transition-metal complexes Creations of new nanobiomaterials based on functionalized nucleic acids Development of micro bioanalysis systems

Exploration of new synthetic methods based on organometallic chemistry, particularly for asymmetric synthesis and natural product synthesis Construction and application of functional molecules using peptide and protein engineering Synthesis of metal complexes bearing new ligands for the purpose of activating small molecules Self-assembling structure and dynamics of multicomponent polymer system Blood rheology, blood coagulation, and effects of high pressure on living organisms and biomaterial Analyses of novel translation regulation mechanisms, and structural bioinformatics Studies of organic-inorganic hybrid materials for light energy conversions Study of photofunctional materials based on photo-physical chemistry Studies on unique ligands with heavier typical elements and their transition metal complexes Development of functional oligonucleotides, chemistry of natural products Photophysics and photochemistry of organic and organometallic compounds Development of novel bioactive peptides utilizing molecular imaging technique Photophysical and photochemical studies of aromatic compounds and its application for bioimaging Transition metal-catalyzed polymerization, polymerization in specific environments, and synthesis of polymers with specific structures Studies on molecular and material design of polymers from biomass organic chemicals Development of silicone elastomers

Synthesis and structure analysis of silsesquioxanes Polyorganosiloxanes: preparation, characteristics and industrial applications Creation of new functional molecules utilizing main group elements Preparation and evaluation of organic standard reference materials Process development of biopharmaceuticals R&D of the polymer modification technique by radiation processing

Reactions of radiation-induced reactive species and their applications in water environment conservation Preparation and evaluation of organic standard reference materials Synthesis of thermally stable polymeric functional materials Research of the activity enhancement and DDS of oligonucleotide drug Nanotechnology Research and Material Development for Applications to Next-Generation Energy Devices Synthesis of functional SiC ceramics from Si-based precursor polymers Exploration of new synthesis methods in organosilicon chemistry Decomposition mechanisms of organosilicon compounds Chemical standards for inorganic materials and plasma spectrometry Studies on structure-function relationship of spider dragline silk and artificial silk materials Radiation modification technologies for environment-friendly polymer materials Development of test method and quality control of biopharmaceuticals

chemistry. I am thoroughly enjoying my time here at beautiful. the university and have come to love not only the





Photophysics and design of photofunctional composite molecular systems including coordination compounds

* will retire in March. 2019

Graduate Student / Chowdhury Jakir Ahmed

Professor Shinozuka's Laboratory, Gunma University Faculty of Engineering

At Professor Shinozuka's Laboratory, I was plunged university, but also the local people here in Gunma. straight into advanced research in oligonucleotide The local environment here is also extremely **Education Program of** Mechanical Science and Technology Domain of Mechanical Science and Technology

Department of Mechanical Science and Technology



Mechanical Science and Technology

The university's Division of Mechanical Science and Technology has four fields for education and research: 1) intelligent systems, which covers the theories of control of mechanical systems, 2) energy systems, which includes aerospace and aeronautical propulsion, multiphase fluid dynamics, and combustion in internal combustion engines, 3) materials systems, where we explore new materials such as lead-free solder and perforated metals, and 4) mechatronics, which studies the mechanical dynamics of non-linear vibration, noise harshness, and the application of image processing to mechanical systems.

The division has received the JABEE accreditation for undergraduate education since

2003. The undergraduate program has nine educational objectives: to educate students in engineering ethics, to cover the fundamentals of social, cultural and natural science, to provide education in the four major mechanical engineering fields listed

above, to nurture creativity through problem-based learning and research, to equip

students with presentation and communication skills enable them to work with people

all over the world, and to provide enough opportunity of team-working.





New Arithmetic Circuits and Signal Processing

Computing systems are playing important roles in our daily lives. VLSI chips implementing controlling and computing units are used for real-time processing operations. A cell phone, for example, has high performance not only for communication, but also for viewing video and photo operations. In our laboratory, we are trying to find new VLSI algorithms to implement high-speed computing and controlling systems.

> Specifically, we present new methods for arithmetic operations using efficient number systems.

We also aim to develop and design VLSI chips for self-driving vehicles.

Professor Shugang Wei

Application of Fluid Mechanics, Cleaning of Semiconductor Wafers, Visualization and Measurement of Flow Behaviors

Fluid mechanics is a fundamental research field in mechanical science and technology with a wide range of applications, including the aircraft technology, car engineering, cleaning of electronics devices, and control of air pollution. Our laboratory studies a wide range of problems concerned with the cleaning process of semiconductor wafers based on experimental and modeling methods of fluid mechanics. We have also developed quantitative visualization and measurement techniques for fluid flows and some chemical substances. As application themes of fluid mechanics, we also study micro-bubble flow and liquid atomization phenomena.

Professor Kenji Amagai

Faculty Members and Fields of Specialization >>> Eaculty Members Fields of S

Professors	
Kenji Amagai	Thermo-fluid engineering, Interfacial flow, Atomization, Environmental
Tsuneaki Ishima	The experimental elucidation for flow, heat and mass transfer and lase
Shugang Wei	High-speed arithmetic circuits, VLSI systems, and digital audio signal
Seiichi Shiga	Mixture formation and combustion in internal combustion engines, liqu
Ikuo Shohji	Heterophase interface science, micro joining, electronics packaging ma
Yusaku Fujii	Precision measurement, Optical measurement, Electrical-mechanical measurement
Tomohiko Furuhata	Combustion, spray flow and gas turbines
Masaaki Matsubara	Strength evaluation of new material and structural integrity estimation
Takao Yamaguchi	Numerical analysis for dynamics of cars etc., wave dynamics, vibration
Ko Yamada	System control theory and its application, control of machine and robo
Weimin Lin	Developing a high efficiency ultra-precision polishing machine. Resear
Associate Professors	
Tomoyasu Aihara	Microscopic evaluation of metal strength and destruction, and charact
Mikiya Araki	Jet engines, Jet noise, Combustion, Spray
Yoshinori Ando	Robust control theory and its application to the machine motion control
Masahiro Inoue	Development and characterization of organic/metal/inorganic hybrid m
Atsushi Iwasaki	Structural health monitoring and composite material
Shinji Koyama	Precision bonding, surface hardening, corrosion resistance, wear resist
Yoichi Shiraishi	Design automation algorithms, combinatorial optimization algorithms,
Takaaki Suzuki	Micro-Nano Systems and Control, Bio-applications
Nobuaki Nakazawa	Human interface, biomedical motion control, and motion planning for a
Yoshihiko Hangai	Fabrication and mechanical evaluation of porous metals
Masato Funatsu	Hypersonic and high-temperature gas dynamics, Thermal protection s
Toshikazu Matsui	Human vision and its signal processing, Human robotics, Visual interfa
Tsutomu Matsuura	Mathematical engineering, multivariate analysis, inverse problem, neura
Shinichi Maruyama	Vibration analysis and measurements of machines and structures, Nor
Iwanori Murakami	Applied electromagnetics, Actuator, Applied of superconducting levitat
Visiting Professors	
Makoto Kaneko	Thermohydrodynamic measurement and simulation
Shuii Matsumura	Numerical simulation of linear and nonlinear vibration noise and its an



- Fig. A mathematical technique called Independent Component Analysis (ICA)
- can restore original signals from the mixed signals.
- (a) Four mixed images that have different mixed ratios of four original images (hand, cat, zebra and noise)
- (b) Four restored images computed by ICA (20 iterations).
- (c) Four restored images computed by ICA (50 iterations).
- (d) Four restored images computed by ICA (3000 iterations), which are almost the same as the original images

Students Voice



My experience in Gunma University In 2011, I came to Gunma University as an exchange of my professor, my expertise has been further

student. In a totally new environment, I expanded my improved. Meanwhile, I have met some Japanese horizons and enriched my experience. Now I am studying in the Department of Mechanical helped me understand Japanese culture more Science and Technology. Under the patient guidance deeply.

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fluid engineering

- application for flow including small particle
- processing
- d atomization
- aterials.brazing, surface treatment and corrosion of metals asuremen
- using fracture mechanics
- damping, sound proof
- t. and intelligent control of the machine
- h for the application of ELID process. Creating a desktop processing machine and test.
- er of fluid bysimulation
- ol and safety of the man-machine system
- aterials, and their application to novel electronic systems

- vstem for space vehicle. Plasma diagnoses by spectroscopy
- e (optimal design of information display
- I network, reproducing kernel theory
- inear phenomenon
- ion, Jumping robot

Numerical simulation of linear and nonlinear vibration noise and its application to the automobile



Fig. Beyond the sonic barrier: supersonic jet from a test nozzle, (top) turbulence structure, and (bottom) operation of a hydrogen afterburner.

Graduate Student / Hefeng Liang

friends in my extra-curricular activities, which has

Education Program of Environmental Engineering Science Domain of **Environmental Engineering Science**

Department of **Environmental Engineering Science**





Environmental Engineering Science

Environmental challenges such as climate change, natural disasters, growth of energy consumption, shortage of natural resources, are affecting people both globally and locally. This situation is creating demand for human resources who can resolve these challenges. The university's Environmental Engineering Science program aims to educate engineers and researchers who can contribute to establish safe and sustainable society in harmony with the environment through collaboration between Chemical & Environmental Engineering and Civil & Environmental Engineering.

The program conducts academic activities from two aspects: 1) environmental/energy conservation and 2) infrastructure management/disaster prevention. From the environmental and energy perspectives, the program develops engineering knowledge and skills in environmental, energy, material, and biological fields for realizing a sustainable society based on chemical engineering. From the infrastructure and disaster prevention perspectives, the program develops human resources for planning, design, construction, and maintenance of safe and sustainable infrastructure and social systems.



Numerical Simulation for Earthquake-Induced Landslides

Development of effective procedures to predict earthquake-induced landslides accompanying catastrophic slope failure is one of the important issues to be resolved in our ongoing efforts for improvement of disaster prevention. We have proposed a new elasto-plastic constitutive model to simulate strain-softening behaviors of sensitive soils under cyclic loading, which has been applied to the finite element simulation of a lot of past catastrophic landslides caused by each earthquake motion. We are trying to analyze the mechanism of catastrophic failure in detail with clarifying the relationships between the slope stability and the strain-softening characteristics of contained soils.

Professor Akihiko Wakai

Associate Professor Reiji Noda

Hisao M Visiting Kenji Tanno

Students Voice



like my laboratory life. That is because being busy fish and you feed them for a lifetime'





Yoshihiko Shimizu	Mechanics of sediment transp
Shin-ichi Tobishima	Study of new materials for ad
Nobuyoshi Nakagawa	Development of an efficient li
Akihiko Wakai	Numerical simulation of slope
Tamahida Wataraha	Distantiant weather the stores

Faculty Members Fields of Specialization

Hideyuki Itabashi

Takayuki Ohshima

Jun-ichi Ozaki

Shinji Katsura

Yutaka Kawahara Shin-ichi Kuroda

Associate Professors Tsukasa Ito

Ken-icł

Masahik Mitsuo (

Masano

Takahiro

Fei Cai

Kazuvos Reiii No

Azuchi ŀ

Hidevuł

Visiting

Hiromi S

microbial and physicochemical degradation of water pollutants, Advanced water / wastewater treatment , resource recovery

vanced high energy batteries and new energy conversion technology

Uzaki	Three-dimensional structure of wind-driven currents accompanied with river in
Oshige	Development of bio-molecular manipulation methods and application of
zawa	Fire resistance of concrete, Control of cracking due to volume change i
u Kanai	Risk communication, Community activity for disaster prevention, Disaster
Saitoh	Applied mechanics, computational mechanics and non-destructive evaluation
	Geotechnical numerical analysis, liquefaction, landslides and slope failur
ni Sato	Advanced ceramics, Nanoparticles and nanostructures, Solid oxide fuel
a	Development and evaluation of waste/biomass energy utilization process
lakoda *	Application of electrostatics on bio-separation and micro-chemical syst
arano	Reaction mechanisms of aerosols with air pollutants and development of
Morimoto	Mechanochemical synthesis and electrochemical properties of battery r
Professors	
nirai	Environmental combustion engineering, clean energy conversion engineer
kino	Aerosol engineering, clean coal technology
Associate Professor	
ino	Numerical combustion simulation, Energy control

Faculty Members and Fields of Specialization

Speciation of metal ions, complexing capacity of natural water samples, and solvent extraction of r

Applications of pulsed electric field in biotechnology. Development of water treatment system with H

Design and preparation of catalytic carbon materials, particularly used in the applications of fuel cel Development of manipulation technologies for biological molecules and their industry applications

Biomass science, development of bio-based materials and utilization of natural fibrous resources



Development of Steam/Hydrogenation Hybrid Process

Biomass resources such as agricultural wastes or animal mature

costs and hindering efforts to establish their large scale utilization.

are widely spread, causing high collection and transportation

for High-Grade Oil Production from Biomass

To utilize this biomass requires the development of

small-scale plants with high economic efficiency.

We are working to establish an economically

efficient plant by developing a small-scale

process for unutilized biomass, which

produces high-grade oil and electricity

matching with local demand.

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etal ions based on the HSAB principle		
igh-voltage devices.		
and biomass conversion.		

Development of functional and high performance materials through the surface and interface control

oort, fluvial process in stream with vegetation, and river management

quid fuel cell by means of catalyst preparation and by optimizing the electrode structure

Water environment, water treatment, microbial activation/inactivation, biofilm, environmental, Pollutants, finebubble

cluding the coastal zone secondary circulations, regional sediment transport process in the Tone

reaction process analysis by using molecule design techniques

n concrete at early age

ter education

ation for civil engineering structures

cells, Catalysts

ses, Evaluation and design of a local society based on energy/mass flow analysis

ems, development of bio-micro-electromechanical system

f a preservation technology of the environment

naterials

* will retire in March, 2019

Graduate Student / Sun Yan (China)

Education program of environmental engineering science, graduate school of science and technology

Daily life in my laboratory is very busy, because we also leads to my own growth. Whenever I failed and must organize everything from research planning to felt down, my supervisor and lab members always design, construction and operation of experimental cheered me up. They also let me know "give someone setups and summarization of experimental results. But, a fish and you feed them for a day; teach someone to

Education Program of Electronics and Informatics, Mathematics and Physics Domain of Electronics and Informatics, **Mathematics and Physics**

Department of Integrated Science and Technology





Electronics and Informatics, Mathematics and Physics

Division of Electronics and Informatics covers information and communication technology areas and it consists of two courses: electronics course and informatics course. Each course has three major areas.

(1) Electronics course is hardware and physics oriented. Our target is to contribute electronics, communication and computer as well as power electronics areas. We provide students education of fundamental and advanced electronics, electronic devices, semiconductor, electromagnetic wave theory, communication, power & energy electronics, control, measurement, computer hardware & software, circuits & systems and signal processing algorithm as well as their related research activities

(2) Informatics course is software and mathematics oriented. Our target is to contribute computer software & hardware, multi-media, communication and network areas. We provide students education of fundamental and advanced electronics, electronic devices, semiconductor, electromagnetic wave, communication, power & energy electronics, control, measurement, computer hardware & software, circuit & systems and signal processing algorithm as well as their related research activities.

Producing next generation media technology

Rapid progress of high-speed image processing and image projection technologies is increasing demand for, high-speed, adaptive image acquisition and projection. Our laboratory proposes a new media technology named Dynamic Image Control(DIC) that refers to a technical concept of dynamic and adaptive control of image acquisition and/or projection depending on the scene. DIC requires optimization of all components of imaging and projection systems, including imagers, optics, and illumination. Thus, both devices and system/application are studied in this laboratory. Envisaged application fields of DIC are image industries such as film and advertising, medicine and biology requiring microscopic measurement, factory automation,



and human-machine interfaces requiring comprehensible images.

Associate Professor Hiromasa Oku

Measurement technologies visualizing invisible information

In medical diagnostics, various measurement technologies have been developed to look inside the human body non-invasively. One of the typical examples is X-ray CT. These technologies commonly utilize image reconstruction algorithms, which estimate indirectly the inner image of the object under measurement by using the data directly observed and enable visualization of internal information that we cannot directly observe. Similar measurement technologies are widely needed not only in medical diagnostics but also in industry for nondestructive inspection. New measurement technologies adapted for individual purposes and applications are expected. In our laboratory, we are developing measurement technologies of this kind, such as electrical impedance CT for healthcare, which visualizes body fat

distribution in the body from impedance data observed on the body surface.



Associate Professor Tadashi Ito



Protessors	
Kazuyuki Amano	Computational complexity, theory of algorithms, machine learnig
Masaaki Amou	Transcendental number theory, Diophantine approximations
Takeo Ishikawa	Electrical machines, power electronics, optimal design, and computer s
Naoya Ohta	Image processing, computer vision, and pattern recognition
Tomihiro Kamiya	High energy ion beam, microbeam, radiation detector, ion beam therap
Haruo Kobayashi	Analog and digital integrated circuit design and signal processing algor
Hiroshi Sakurai	Magnetic nano device, measurement using x-rays

Tsuyoshi Kato	Bioinformatics, machine learning, and statistical analysis
Ken-ichi Kawanishi	Information and communication systems, performance evaluation, que
Nobuyuki Kurita	Magnetic bearing, maglev motor, automatic control engineering, power
Tamihiro Gotoh	Material science for optical devices
Morihiko Sato	Production of pulsed power generation system with MOSFETs and uno
Nobukazu Takai	CMOS analog integrated circuit design and its automated design algori
Toshiki Takahashi	Physics of compact torus plasmas for thermonuclear fusion reactors
Yoshitaka Takahashi	Optoelectronics and quantum electronics
Tatsuya Nagao	Theory of strongly correlated electron system
Hirofumi Nagoshi	Analytic number theory, value-distribution of arithmetic functions
Toshiya Hikihara	low-dimensional strongly correlated electron systems, quantum spin sy
Ken-etsu Fujita	Logic of programming, programming languages
Shin-ichi Furusawa	Physics of solid state ionics, nanoionics, ionic device.
Akio Matsuoka *	The production and electrical properties of Fullerenes
Kenta Miura	Light-emitting materials and devices, Photoelectric devices
Takashi Miwa	Applied measurement for electromagnetic and ultrasonic wave
Yoshifumi Morita	Theoretical study on low dimensional quantum systems and supercond
Tomoyuki Morimae	Quantum computing, Quantum security
Ushio Yamamoto	Human interfaces, computer networks, and multi-agent systems
Yasushi Yuminaka	Multiple-valued logic and new-paradigm analog/digital integrated circu
Hirofumi Yokouchi	Logic of programs and its applications to programming languages
Lecturer	
Takeshi Ohtsuka	Geometric surface evolution equation, Singular limit of reaction diffusion
Toshimitsu Takaesu	Spectral Analysis and Scattering Theory for Relativistic Quantum Field
Visiting Professors	
Koji Asami	Measuring and testing techniques for RF, analog and mixed-signal LSIs
Masahiro Ishida	Testing methodologies for LSI circuits
Teruo Kohashi	Magnetic metrology, Spin polarized scanning electron microscopy

Students Voice



My current research is about developing and applying accuracy of data analysis. Finding patterns and machine learning techniques for data analysis. Data structures from big, complex data is now of particular obtained nowadays are not only big, but also interest among computer scientists and complex and unstructured; thus extracting knowledge mathematicians alike, and combining various data from such data has become a difficult task. One of might lead us to new and exciting insights about data my interests includes data fusion, in which different analysis. data types are integrated in an effort to improve the





Faculty Memb	ers and Fields of Specialization >>>
Ecoulty Momboro	Fields of Specialization
Faculty Members	
Kozuwuki Amono	Computational complexity theory of algorithms machine learning
Kazuyuki Amano	Computational complexity, theory of algorithms, machine learning
Masaaki Amou	Flactical machines power electronics estimal design and computer simulation by magnetic differentian coefficients and characterize and charact
Nacua Obta	Liectrical machines, power electronics, optimal design, and computer simulation by magnetic diffraction, scattering and absorption of synchrotron radiation
Naoya Onta	linde processing, computer vision, and pattern recognition
Tominiro Namiya	High energy ion beam, microbeam, radiation detector, ion beam therapy
Haruo Kobayashi	Analog and digital integrated circuit design and signal processing algorithms
	Magnetic nano device, measurement using x-rays
	Data mining, statistical learning theory and applied data analysis
Hayato Sone	Nanometer measurement and tabrication, nanoelectronic devices, nigh-sensitive biosensor for medical use, crystal growth
Kazumasa Takada	Design and characterization of optical fiber and WDM devices, Optical sensing
Manabu Takanashi	I neoretical study on electronic properties and magnetism in transition metal compounds
	Liasticity equations, inverse problems
Shin-ichi Nakano	Graph algorithm, and Information visualization
Seyi Hashimoto	Motion control, system identification, vibration control, precision control, renewable energy
Usamu Hanaizumi	Devices for optical communication, Microphotonics
Kuniyuki Motojima	Radio wave propagation, wireless measurement, Electromagnetic wave simulation
	ourrasonic imaging systems for medical diagnoses, and measurement using ultrasonic waves
Koichi Yamazaki	Combinatorial optimization, approximation and randomized algorithms, computational complexity
Hidetoshi Yokoo	Data compression, data structures, and information theory
Shuji Watanabe	Integral transforms of Fourier type, commutation relations in quantum mechanics and their applications
Associate Professors	Que la de cara Que la decidada da la calculación de calculación de calculación de calculación de calculación de
Toru Araki	Graph theory, Graph algorithm, Combinatorial optimization
l adashi Ito	Computed tomography and its applications, inverse problems in measurement
Hiromasa Uku	Dynamic image control, High-speed image processing, High-speed optical devices
Syun-ji Ozaki	The optical properties and electronic energy-band structures of nanostructured semiconductors and ternary compound semiconductors
I suyoshi Kato	Bioinformatics, machine learning, and statistical analysis
Ken-ichi Kawanishi	Information and communication systems, performance evaluation, queueing theory
Nobuyuki Kurita	Magnetic bearing, magiev motor, automatic control engineering, power electronics
Taminiro Goton	Material science for optical devices
Moriniko Sato	Production of pulsed power generation system with MOSFETS and underwater pulsed electric discharge
	CMUS analog integrated circuit design and its automated design algorithm.
Toshiki Takanashi	Physics of compact torus plasmas for thermonuclear fusion reactors
Yoshitaka Takahashi	Uptoelectronics and quantum electronics
Tatsuya Nagao	Theory of strongly correlated electron system
	Analytic number theory, value-distribution of arithmetic functions
Toshiya Hikihara	low-dimensional strongly correlated electron systems, quantum spin systems, numerical calculation
Ken-etsu Fujita	Logic of programming, programming languages
Shin-ichi Furusawa	Physics of solid state ionics, nanoionics, ionic device.
Akio Matsuoka *	The production and electrical properties of Fullerenes
Kenta Miura	Light-emitting materials and devices, Photoelectric devices
	Applied measurement for electromagnetic and ultrasonic wave
	Theoretical study on low dimensional quantum systems and superconductors
Tomoyuki Morimae	Quantum computing, Quantum security
Usnio ramamoto	numan internaces, computer networks, and multi-agent systems
Yasushi Yuminaka	Multiple-valued logic and new-paradigm analog/digital integrated circuits
Hirofumi Yokouchi	Logic of programs and its applications to programming languages
Lecturer	Connected and the equation Connection limit of months of the incomention
	Separtral Analysis and September Theony for Delativistic Quentum Field Medale
Visiting Profession	Spectral Analysis and Scattering Theory for Relativistic Quantum Field Models
Koji Asami	Measuring and testing techniques for RE analog and mixed-signal I Sis
Masahiro Ishida	Testing methodologies for I SL circuits
Teruo Kobashi	Mamatic metrology. Spin polarized scenning electron microscopy
Kazuo Saito	Advanced electronic engineering
Nazuo Sano	Molecule dynamic simulation Nanometer dynamics of lubrication and wearing
Takahiro Miki	Analog integrated circuit design

* will retire in March. 2019

Graduate Student / Electronics and Computing / Rivero Rachelle Alvarez

Procedures for Entering Japan



Students admitted to Gunma University as an "International Student (Ryugakusei)" should have a Certificate of Eligibility as a student. If a foreign student does not possess this status, services to international students, including scholarship applications, will not be available.

Procedures for Entering Japan

All future international students need to hold a valid passport issued by their home countries and a corresponding Student Visa issued by the Japanese Embassy or Consulate. In order to receive a Student Visa, you must first obtain a Certificate of Admission from Gunma University and then a Certificate of Eligibility from the Tokyo Immigration Office. Once you decide to enter Gunma University, we recommend that you apply as soon as possible for a Certificate of Eligibility through Gunma University. It takes one to two months. Should you have any questions regarding the application procedures, please contact the supervisor.

Flow Chart of Immigration and Admission Procedures



See if you need a visa for entering Japan. The visa applications are different according to countries or regions. Please refer to the website of the Ministry of Foreign Affairs of Japan. Also contact the Japanese diplomatic mission in the country of your nationality for more details regarding required documentation. Engaging in paid activities in Japan is not allowed.

References

Temporary Visitor's Visa (Ministry of Foreign Affairs of Japan) Countries/Regions with visa exemption agreements (Ministry of Foreign Affairs of Japan) Regional affairs (Ministry of Foreign Affairs of Japan)

http://www.mofa.go.jp/j_info/visit/visa/ http://www.mofa.go.jp/j_info/visit/visa/short/novisa.html http://www.mofa.go.jp/region/

Procedures for Foreign Nationals Currently Residing in Japan

After completing the procedures for admission to Gunma University, you need to apply for a "Change of Residence Status" at the local immigration office. This is only necessary if your current status is not "Student." If you will be moving to or near the campus from another city or town, you should go to your new town or city office to apply for resident's registration and for a change in your National Health Insurance status.



4 April 5 May 6 June June 1 University Foundation 7 July 8 August Summer vacation(Aug. through Sep.) 9 September



Student Life and Expenses

Tuition and Fees

Studying in Japan inevitably requires a certain amount of financial re confirm a sufficient preparation of funds before enrolling at Gunma Univ

	Entrance Examination Fee	Admission Fee	Tuition
Graduate Student	30,000 yen	282,000 yen	535,800 yen (per annum)
Research student	9,800 yen	84,600 yen	29,700 yen (per month)

※ Additional charges such as a faculty membership fee and an insurance fee are required to paid. If tuition is revised, the new tuition fee is applied from the time of the revision

Exemptions from Tuition Fees

Students enrolled in graduate and undergraduate courses are eligible for a 50 % or 100 % remission of fees if they are facing financial difficulties and are maintaining a record of excellent scholastic achievement, subject to their performance on a strict examination. The free tuition system applies to exchange students from sister schools based on inter-university exchange agreements.

Living Conditions and Accommodation

Private Housing

Rental apartment fees in Gunma are as follows: April, 2013)

Gunma University International House Keishin Dormitory

The Gunma University International House is an Private apartments and lodging houses (as of international student residence facility located in University International House Kirvu, Residency is limited to one year

	Apartment Features	Rent per Month		Room Fee	Number of Rooms		Facilities	Rent (Monthly)		
	Six tatami mats			5,900 yen Single	33	A Type	Private kitchen, toilet,	25,000 yen		
Apartment	Kitchen	20,000 to 30,000 yen	International House	11,900 yen Couple	2		snower, and bath			
	With lavatory, shower and bath			14,200 yen Family	1	В Туре	Shared kitchen, toilet, shower, and bath	15,000 yen		

Other Expenses

In addition, expenses for food (approx. 30,000 to 50,000 yen a month), textbooks and materials, as well as other miscellaneous costs should be taken into account.

International Student Housing Comprehensive Security

Gunma University cooperates with the "International Student Housing Comprehensive Security" program. When international students are covered by this insurance program, Gunma University becomes the guarantor, and the student can then rent a private apartment by signing an occupancy contact. Under this scheme, if a fire caused by negligence occurs in an occupied housing unit of an international student and the student is forced to pay damage compensation to the owner of the apartment, or if the occupant falls into arrears on rental payments and the guarantor is requested to assume responsibility for paying these guaranteed liabilities to the owner, the guarantor can pay the compensation directly to the owner.

Scholarship

The following scholarships are available for international students studying in Japan.

JASSO Honors Scholarship

This scholarship is available to highly qualified international students studying in Japanese universities at their own expense. The monthly stipends are 65,000 yen for graduates and 48,000 yen for undergraduates. In 2013, 12 students from Gunma University qualified for this scholarship.

Other Scholarships Private organizations provide scholarships for highly qualified international students studying in Japanese universities at their own expense. The stipends range from 20,000 yen to 150,000 yen depending on the organization. In 2013, 17 students from Gunma University qualified for these scholarships.

Tutorial system

International students often run into difficulties studying or conducting their research after they start their student life in Japan. Gunma University provides a tutorial system for those students. A tutor and an international student pair up and conduct regular activities. Tutors support their partner students in their studies and/or research. International students are encouraged to take advantage of this system, not only to assist them in their studies, but to increase their communication opportunities with many other students.

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sources	as	outlined	below.	The	university	requires	students	to
/ersity.								

The Keishin Dormitory is next to Gunma

Japanese Government Scholarship

In 2013, the monthly stipends are 143,000 to 145,000 yen for postgraduate students and 117,000 yen for undergraduate students. For further details, please inquire at the Japanese Embassy in your country. As of June 2013, 31 students of Gunma University qualified for the scholarships

Graduate School Entrance Examination





1.Contact supervisor

Send a letter stating your request for research guidance to the faculty member of your preference. You can find the appropriate address for the faculty member by contacting the office directly. To see to the focus research areas of each faculty member, please refer to the website.

2. Qualification assessment (if required)

We have established deadlines for confirming an applicant' s qualifications (see the following table for details). You need to provide an Entrance Qualification Examination Application prior to the deadline for the course you wish to enter.

3. Application

Be sure to file your application in accordance with the established deadlines for your preferred course (see the following table for details). The following materials are required:

- Application for admission
- A certificate of your graduation from the last university you attended, as well as transcript
- A certificate of your nationality and / or residence status if currently residing in Japan
- An outline of your past research achievements and your intentions for future research activities
- Two photographs (4cm × 3cm)
- Testing fee (30,000 yen)
- Authorization document from the head of the department of your current academic institution or place of employment if applicable

4. Screening examination

The screening examinations are held at Kiryu campus on the scheduled day for examination for each course (see the following table for details).

5. Announcement of results

Successful applicants will receive an announcement in the mail on the scheduled day for announcing the results of the examinations for each course (see the following table for details). Examinee numbers will also be posted on the website.

Table of Admission Procedures

Program/Course	Distribution of essential points	Qualification assessment	Application	Screening examination	Examination categories	Announcement of results
MS (Oct.adm.)	Mid- Jun.	Early Jul.	Mid- Jul.	Late Aug.	*F, R, M, I	Early Sep.
PhD (Oct.adm.)	Mid- Jun.	Early Jul.	Mid- Jul.	Late Aug.	I	Early Sep.
MS (Summer)	Mid- Jun.	Early Jul.	Mid- Jul.	Late Aug.	*F, R, M, I	Early Sep.
PhD (Summer)	Mid- Jun.	Early Jul.	Mid- Jul.	Late Aug.	I	Early Sep.
MS (Winter)	Late Oct.	Mid- Nov.	Late Nov.	Late Dec.	*F, R, M, I	Mid- Jan.
PhD (Winter)	Late Oct.	Mid- Nov.	Late Nov.	Late Dec.	I	Mid- Jan.

The content of the examination categories marked with an asterisk (*) varies depending upon the field of specialization. Be sure to confirm the content for your particular field of specialization in the application guidelines.

F: foreign language, M: major subjects, I: interview, S: short thesis, R: requires subjects

Under Graduate School Entrance Examination

In order to enter a faculty as a regular student, you need to take the Examination for Japanese University Admission for International Students (EJU) held in June and November. Make sure you know which test subjects you are required to take for the faculty you have chosen.

Application packages with application forms will be distributed from October. Please have one sent to you by Gunma University.

Applications will be accepted from January. Entrance examinations will be held in February.

Detailed information on entrance examinations and other items is posted in the Information on entrance examinations & applications for Gunma University website.

http://www.guic.gunma-u.ac.jp/english_sag/applications

Research Students

Gunma University has a system of for research students which allows applicants to study in specialized research fields after screening, provided that the university has enough capacity for education and research. With regard to the admissions application periods and the screening methods, and related matters, situations vary depending upon the course to which you wish to be admitted. The following table is meant to serve as a general outline. Be sure to confirm the details on the website of the particular faculty and course that you are considering. In order to proceed smoothly with regard to professional guidance in your preferred field of research after being admitted, you should determine your field of research and laboratory after you have established contact with a faculty member who deals with your preferred field of specialization.

The following materials are required:

- Application for admission
- A certificate of graduation from the last school you attended, as well as a transcript
- A certified copy of a certificate verifying your nationality and / or residence status if currently residing in Japan
- An outline of your past research achievements and your intentions for future research activities
- Two photographs (4cm× 3cm).
- Testing fee (9,800 yen)
- Authorization document confirming your status as a student or employee from the head of the department of your current academic institution or place of employment

Qualification	Application	Screening Method	Announcement of the Result	Admission Period
Bachelor/Master's Degree	As applicable	Interview, document screening	As applicable	As applicable
	Re Contraction of the second sec	tudent Cantee asonable pricing food with good tast	en rell Composition	

University Data



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Academic Exchange Agreements

Number of International Students

												GC	venin	ent Sci	1010151	ΠP	Fliva	e runaing
Area	Countries and Regions	Undergraduate		G	Graduate Students Research Students					E	Exchange Students							
		Stuc	dents	Mas Prog	ter's gram	Doct Prog	toral gram	Underg	raduate	Grad	luate	Underg	raduate	Grad	luate	Sub	-total	Total
Asia	Malaysia	41														41		41
	Indonesia	3				1	1									4	1	5
	Korea						1										1	1
	Mongolia	1	3	1	2				2	1						3	7	10
	Vietnam		8		3				1								12	12
	China		9		20		13		5				5		3		55	55
	Taiwan				1												1	1
	Cambodia	2	1		1											2	2	4
	Thailand					2	1									2	1	3
	Philippines					1										1		1
	Nepal				2												2	2
	Laos	1			1											1	1	2
	Sri Lanka				3												3	3
	Total	48	21	1	33	4	16		8	1			5		3	54	86	140
Middle East	Iran					1										1		1
	Syria				1												1	1
	Total				1	1										1	1	2
Europa	France														1		1	1
	Total														1		1	1
	Total	48	21	1	34	5	16		8	1			5		4	55	88	143
		6	69		5	6			ļ	9			Q)				143

Agreements between Universities

Australia	University of Wollongong
Bangladesh	University of Dhaka
China	Xi' an Jiaotong University
China	Xiamen University
China	Shenyang University of Chemical Technology
China	Noeth China Electric Power University
China	Dalian University of Technology
China	Dailian Polytechnic Unveisity
China	Institute of Process Engineering, Chinese Academy of Sciences
China	Chongqing Jiaotong University
China	Hainan University
Czech Republic	Technical University of Ostrava

Agreements between Faculties

Bangladesh	Dsffodil International University, Faculty of Engineering	Korea	Faculty of Engineering, Mokpo National University		
Bangladesh	Dsffodil International University, Faculty of Science and information	Korea	College of Science and Technology, Yonsei University		
Bolgium	Liniversity of Liege	Korea	Chungnam National University		
Canada	Ryerson University	Korea	Graduate School of Industry, Seoul National University of Sciend and Technology		
China	School of Chemistry and Chemical Engineering, Sun Yat-sen University	Korea	The Research and Education Center for Advanced Silicon materials		
China	School of Instrument Science and Opto-Electronic Engineering, Hefei University of Technology	Korea	Nano-Science Research Division, Korean Institute of Science and Technology		
China	School of Mechanical Engineering, Shanghai Jiaotong Daxue	Korea	College of Engineering, Kyung Hee University		
China	College of Information Engineering, Yangzhou University	Korea	College of Engineering, Yonsei University		
China	School of Optoelectronics and Communication Engineering,	Malaysia	Faculty of Engineering and Fuel Cell Institute, Universiti Kebangsaan Malaysia		
China	College of Decision Jesterment Tienin University	Malaysia	Universiti Teknologi PETRONAS		
		Malaysia	Universiti Malaysia Pahang		
Gnina	Jiangsu University of Science and Technology	Malaysia	Universiti Teknologi MARA		
China	Reseach Center of Urban Environmental Engineering and Circular Economy of the Institute of Urban Environment, Chinese Academy of Sciences		Faculty of Food Technology and Merchandizing of the		
China	Fudan University	Spain	Universidad Politachica de Valencia		
China	School of Energy and Power Engineering, Yangzhou University	Sweden	School of Engineering University of Borac		
China	School of Mechanical Engineering, Yangzhou University	Taliana	Online of Engineering, onliversity of Doras		
China	School of Optic & Electronic Engineering, University Shanghai For		College of Engineering of lungnwa University of Science and Technology		
	State Key Laboratory of Geobazards Prevention, Chengdu University of	Toiwon	National Chin-Vi University of Tachnalamy		
China	Technology	Theiland	King Manglut's Institute of Technology		
China	China University of Mining and Technology	Thailand	Ring Mongkut s insuluce of Technology Laukranbang		
China	School of Sciences, Northeastern University	Thailand	Technology Isan (RMUTI)		
China	School of Mechanical Engineering, Tsinghua University	Thailand	Thai-Nichi Institute of Technology		
China	School of Mechanical Engineering, Southwest Jiaotong University	Thailand	Faculty of Science, Mahidol University		
China	Hunan University of Science and Technology	Thailand	Faculty of Science and Technology, Nakhon Pathom Rajabhat University		
China	School of Material Science & Engineering, Hebei University of technology	Thailand	Faculty of Engineering, Chulalongkorn University		
France	National Graduate School of Chemistry and Chemical Engineering,	Thailand	King Mongkut's University of Technology Thonburi		
France	ESIEE Paris		Faculty of Industry and Technology, Rajamangala University of Technology Isan		
France	Institut Polytechnique des Sciences Avancees (IPSA)	U.K.	City University		
Indonesia	Faculty of Mathematics and Natural Sciences, Institut Teknologi Bandung	U.S.A.	College of Engineering, The University of Washington		
Indonesia	Jakarta State University	Vietnam	Faculty of Mechanical Engineering Hanoi University of Technology		
Korea	Center for Photofunctional Energy Materials, Dankook University	Vietnam	Hanoi Irradiation Center, Vietnam Atomic Energy Institute		

France	Universite'de la Me'diterrane'e (Aix-Marseille ${\ensuremath{\mathbb I}}$)
india	Indian Institute of Technology Delhi
Korea	Yeungnam University
Korea	Seoul National University
Peru	Pontificia Universidad Catolica del Peru
Republic of Azerbaijan	Baku State University
Singapore	NanyangTechnological University
Taiwan	National Formosa University
Thailand	Chiang Mai University
U.K.	Glyndwr University
U.S.A.	North Dakota State University
U.S.A.	The State University of New York at Stony Brook

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