GUNMA UNIVERSITY

School of Science and Technology
Graduate School of Science and Technology

Hand Crafting Our Future

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

Welcome to Gunma University School of Science and Technology!

Gunma University School of Science and Technology is located in Kiryu, Gunma Prefecture, an ideal learning environment close to nature and populated by warm and friendly people. The School's roots can be traced to the establishment of the Kiryu National Technical College of Textile Science in 1915. At that time, Kiryu was an important center of the Japanese textile industry, particularly the silk industry, and the college therefore consisted of two departments, namely, the Department of Chemistry and the Department of Mechanical Engineering, both of which made important contributions to the industrial endeavors in the Gunma vicinity at that time.

Since then, the college has expanded gradually, adding more departments such as electronics and chemical engineering. Following the end of World War II, the college was reestablished, as the Faculty of Engineering of the nascent Gunma University.

In 2013, the faculty instituted major reforms to meet the ever-changing demands of a modern technological society. 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.

The School of Science and Technology promotes and supports a variety of interdisciplinary research projects, for example, the "Element Innovation" project. This is a government-supported, 5-year multi-disciplinary research project carried out by researchers of various fields, including material science, machinery, electronics and even medical science. This collaborative work has resulted in several important scientific papers and patents. Furthermore, researchers at the school also contribute to the Program for Cultivating Global Leaders in Heavy Ion Therapeutics and Engineering, another government-supported project led by the Joint Project Office of the School of Medicine and the School of Science and Technology.

As you can see, a solid educational program and vibrant research projects await you. We hope you will join us and participate in these unique activities at the School of Science and Technology.

Kazuo Shinozuka

Dean of the Graduate School of Science and Technology

Contents

5 Great Reasons to Choose Gunma University

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

1 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.

2 Global Frontier Leadership Program

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

3 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.

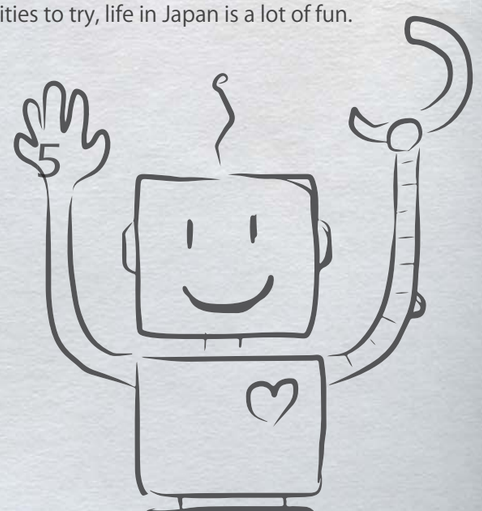
4 A safe location where industry is growing

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.

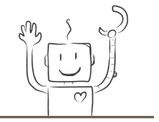
5 Superb seasonal changes and activities

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.

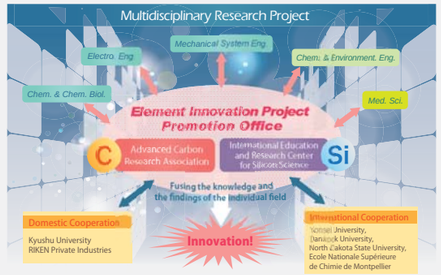
There is so much to learn !



Advanced technologies paving the way to the future



Topics1 Element Innovation



Element Innovation Project

Exploring and establishing a new field of science based on the unique features of the abundant elements, silicon and carbon

Creating novel materials and technology through interdisciplinary research activities

For more information >> P10-11

Topics2 Low-Carbon

Advanced research into carbon materials aims to realize a low-carbon society that uses hydrogen energy.

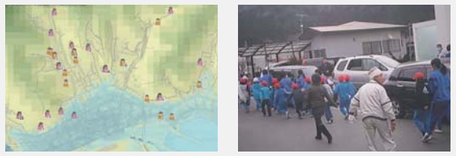
For more information >> P12

Topics3 Green Innovation

This project aims to create a better future for the environment through the development of renewable energy and green innovation.

For more information >> P13

Topics4 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

Topics5 Heavy Ion Radiotherapy

Heavy ions can be used to concentrate destructive force on cancer sites, causing less damage to surrounding healthy tissue.

For more information >> P15

An abundance of appealing research fields!

For more information >> P11 - P15

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).

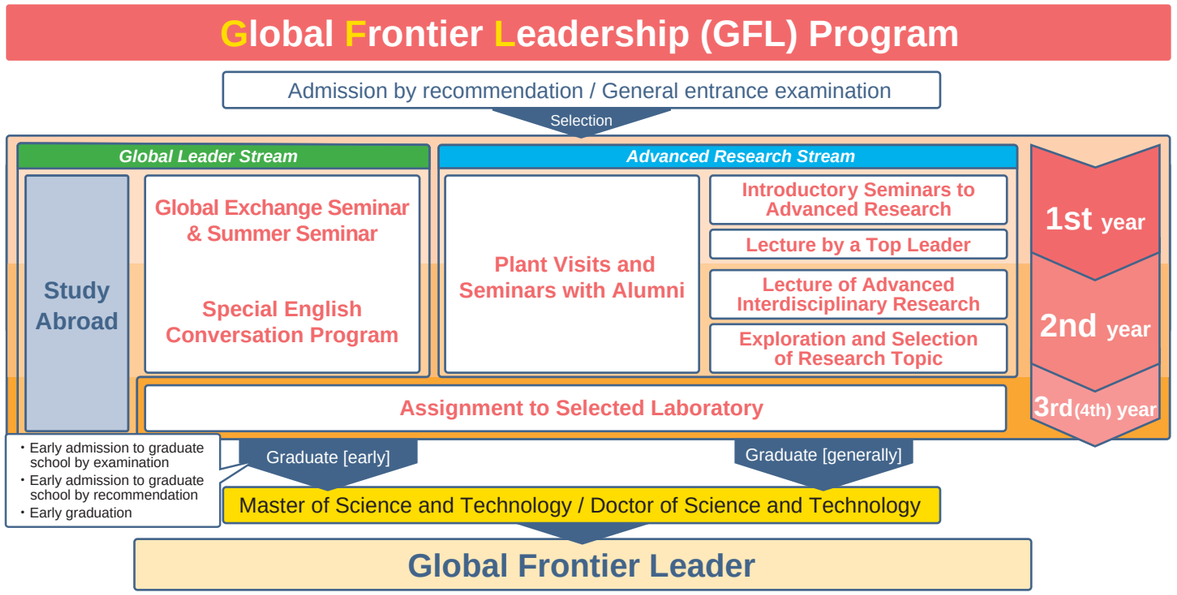


Fig.1 Conceptual diagram of the Global Frontier Leadership (GFL) Program






Student Support Services

Service1 Center for International Education and Research

The Center for International Education and Research (CIER) promotes a comfortable living and studying environment for international students of Gunma University. CIER 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

Service2 Japanese language courses

Japanese language classes for international students are offered at various levels in order to help them pursue their academic goals. International students at Gunma University are encouraged to take Japanese classes in accordance with their individual levels. CIER offers two Japanese programs: Preliminary Intensive Japanese Language Courses for Japanese Government Scholarship Students and "Japanese Language & Japanese Studies." The classes are offered as elective liberal art subjects for registered undergraduate international students. Supplementary Japanese classes may be offered for graduate/research students.

CIER Website	http://www.cier.gunma-u.ac.jp/english/

Service3 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

Service Hours	Monday - Friday (except holidays) 8:30 am to 5:00 pm

5 Great Reasons

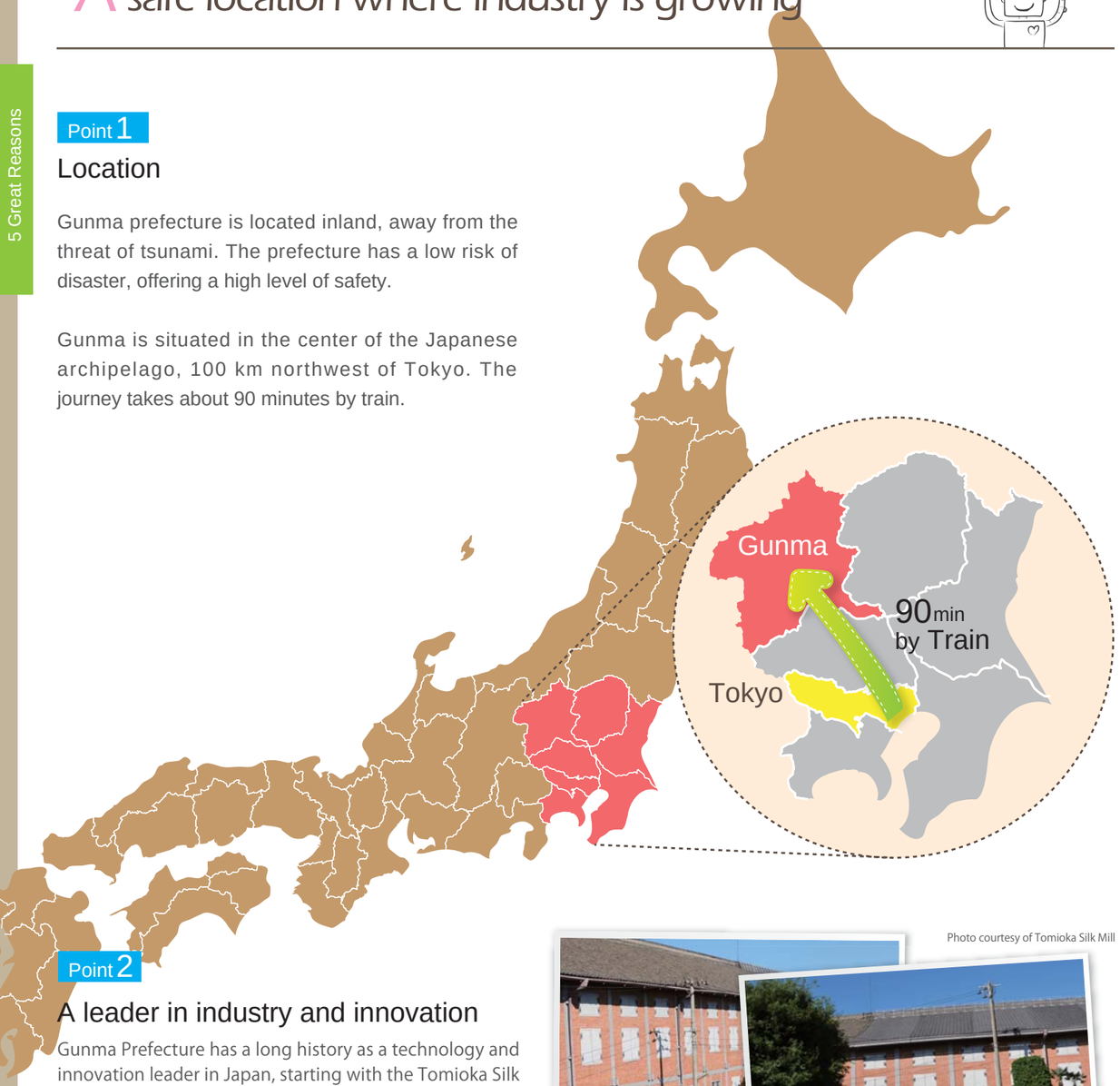
A safe location where industry is growing

Point 1

Location

Gunma prefecture is located inland, away from the threat of tsunami. The prefecture has a low risk of disaster, offering a high level of safety.

Gunma is situated in the center of the Japanese archipelago, 100 km northwest of Tokyo. The journey takes about 90 minutes by train.



Point 2

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.

Point 3

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.

Photo courtesy of Tomioka Silk Mill

Superb seasonal changes and activities


Spring
Oze

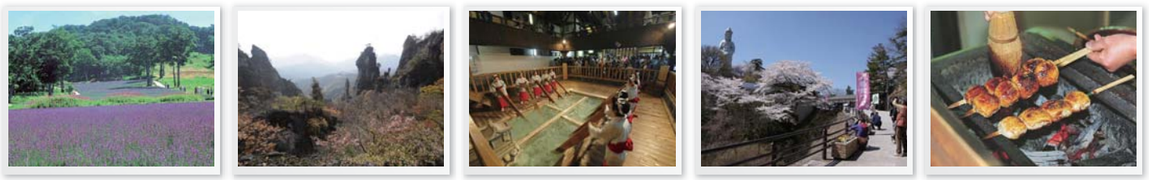

Summer
Fukiware falls


Autumn
Watarase Keikoku Railway


Winter
Ski resort

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 also must not forget is.

Photo courtesy of visual Gunma

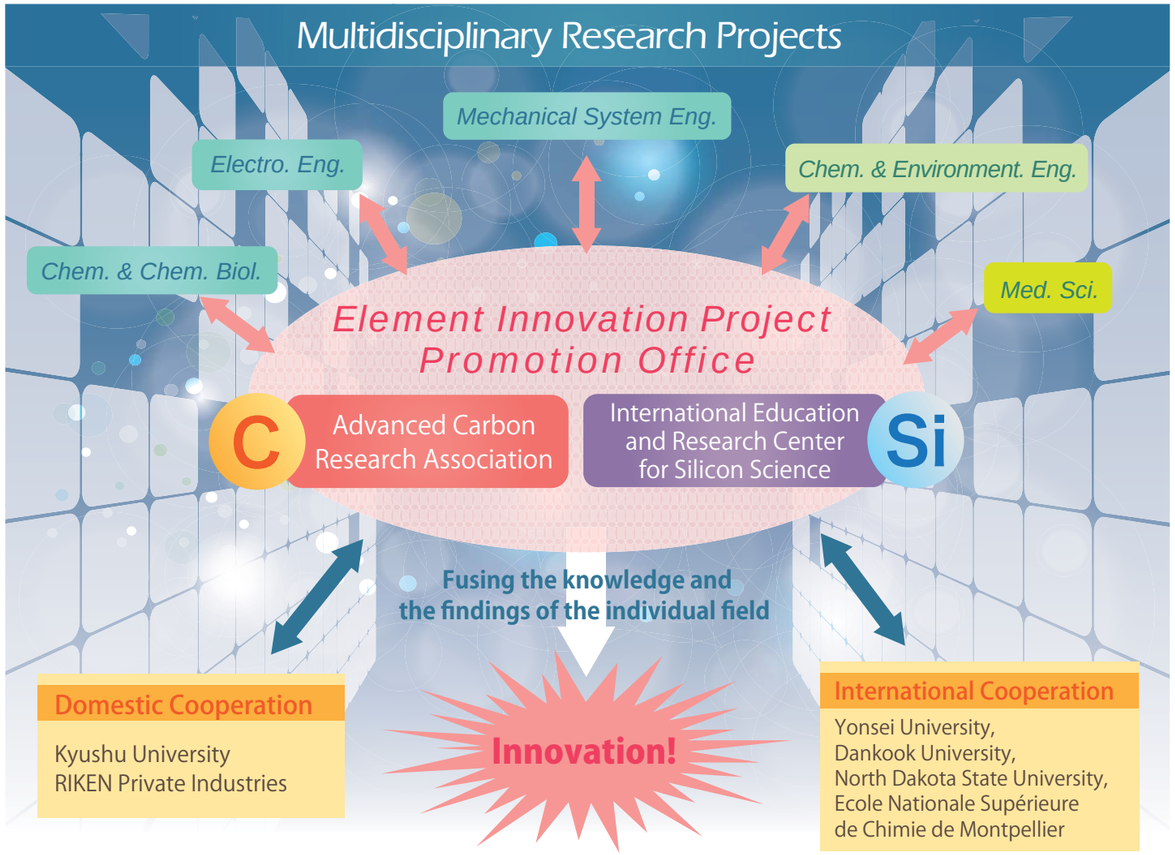


Check! Useful search keywords for discovering the attractions of Gunma

Search

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

Element Innovation



Point 1 About Element Innovation

The “Element Innovation” project is a multi-disciplinary five-year research project that was started in 2011. The project is financially supported by Ministry of Education, Culture, Sports, Science and Technology of Japan.
In the project, we are exploring and establishing a new field of science based on the unique features of two of the most familiar elements in our life, carbon and silicon. At the same time, we are aiming to create novel materials and technology utilizing these elements through interdisciplinary research activities. Thus, a number of researchers from a variety of research fields in Gunma University are participating to achieve the goals of the project.

Dye-sensitized solar cells utilizing Si-coupled dyes

Check it!

Dye-sensitized solar cells (DSSCs) have become a promising alternative photovoltaic technology to conventional inorganic solar cells. However, the photoelectrodes of DSSCs sensitized by commonly used carboxy dyes are not stable in the presence of water, and this instability has been a major problem preventing practical use of such cells. To overcome the problem, we are utilizing Si-coupled dyes in DSSCs and have succeeded in demonstrating the high potential of alkoxysilyl dyes: the dye-adsorbed electrodes have much higher stability to water, and the cells using alkoxysilyl dyes exhibit better photovoltaic performance than those with carboxy dyes.

Si-coupled fluorophore for bioprobe

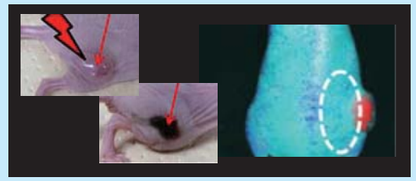
Check it!

Detecting specific bio-substances by using fluorescent material is an important and interesting subject. We have found that the introduction of silyl function into pyrene, a polycyclic aromatic compound, enhances fluorescent brightness almost three times compared to that of the parent compound. Yet, the fluorescent signal of the silylated pyrene is nicely quenched by some nucleobases. Based on these features of silylated pyrene, we were able to develop a specific DNA probe bearing silylated pyrene, which gives a fluorescent signal only under the presence of a fully complementary gene fragment. The probe even can discriminate one-base mutations of the target gene fragment.

Si-Coupled Photosensitizing Drug for Cancer Therapy

Check it!

Photodynamic therapy (PDT) is a promising cancer treatment based on selective accumulation of a photosensitizing drug to tumor cells and photosensitization of molecular oxygen to reactive singlet oxygen inducing cell death. In this project, we are developing a new PDT drug by using silicon. We discovered that the introduction of silicon atoms into tetraphenylporphyrin, one of the most fundamental PDT drugs, simultaneously improves the quantum yield of singlet oxygen sensitization, cellular uptake efficiency, and the efficiency of selective accumulation to tumors. With these improvements, silylation enhances the photodynamic activity of PDT drugs both in vitro and in vivo.



Optical Waveguide, Optical Switch

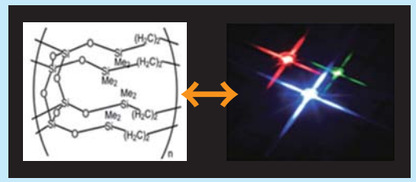
Check it!

Using an ion beam, we succeeded in direct drawing single-mode straight-line, Y-branch, and Mach-Zehnder (MZ) type PMMA waveguides for long-haul optical-fiber telecommunications without a photomask. Furthermore, we fabricated a prototype thermo-optic (TO) switch composed of an MZ waveguide with an ON/OFF ratio of 9.0 dB and a low switching power of 43.9 mW at λ=1.55 μm. We also first succeeded in drawing such waveguides in a photosensitive polysilane film, which can be utilized as a material for a TO switch with reduced power-consumption.

Novel Functional Silicon Materials: Si-Containing Small Molecules

Check it!

In this project, we are focusing on researching novel functional silicon materials. Recently there is increasing demand for highly thermally stable materials. In particular, recent high-intensity LEDs emit substantial heat resulting in the failure of their plastic-based encapsulants. In order to solve this problem, we synthesized well-defined siloxane compounds containing ladder structure, and apply them as an LED encapsulant and other electronic device materials. In addition, we also investigated other Si-containing small molecules that have potential as precursors to useful materials.

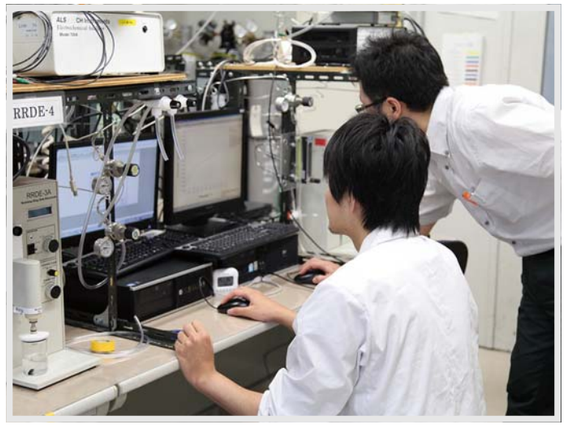


Hand Crafting Our Future

Topics 02

Low-Carbon

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



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.

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.

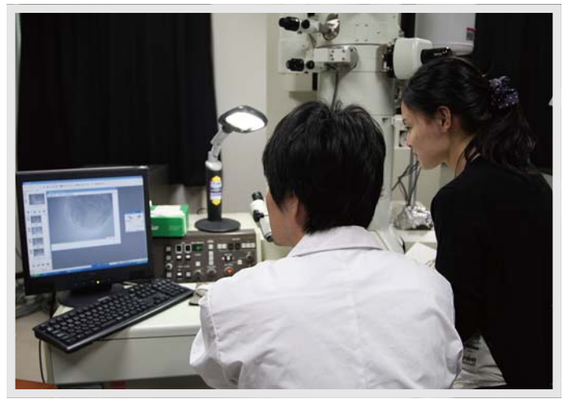
Replacing Platinum in Fuel Cells with Carbon—a Cheap and Abundant Resource

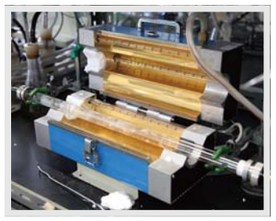
Although platinum is the most common and active catalyst for proton exchange membrane fuel cells (PEMFC) to produce electricity, it is an extremely rare and expensive metal that is usually found only in parts of South Africa and Russia. This has hindered the spread of fuel cells, mainly because of unstable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





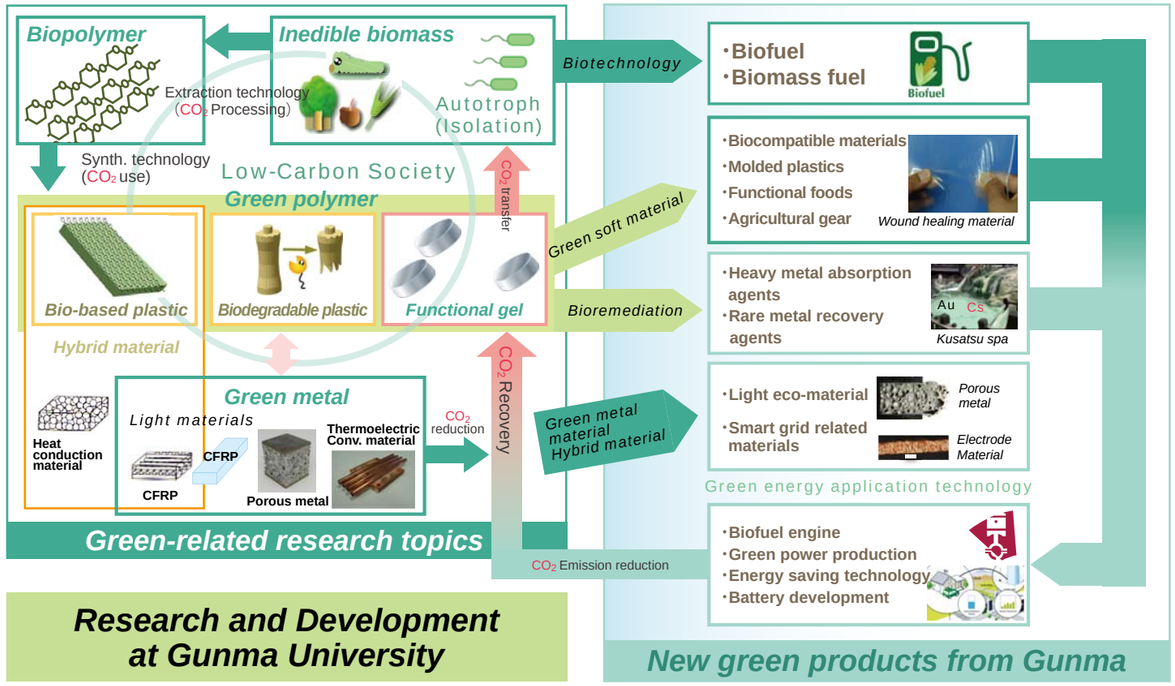
Hand Crafting Our Future

Topics 03

Green Innovation

In the “Green Innovation” project, we seek to realize an ideal future for a low-carbon society by incubating seeds for various green products and technologies such as bio-based polymers, biodegradable polymers, green metals, and advanced use of biomass.

Green Innovation Regional Contribution Project

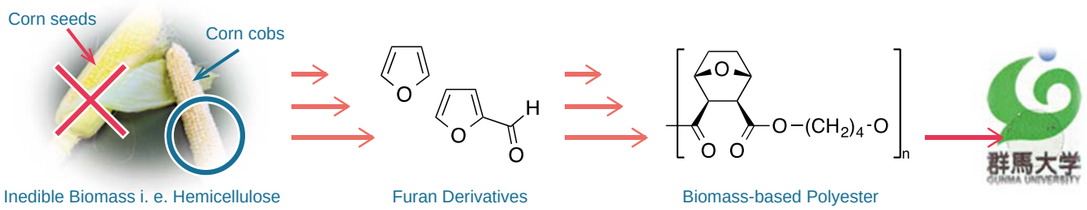


Research and Development at Gunma University

The project is also working to put research results into practice and nurture leaders who can make green innovation happen. We want to cultivate as many green innovators as possible. To achieve this, we have been conducting joint research with local companies, sending graduate students out to learn business skills, and even re-educating workers at small companies to help them make the most of their skills.

Novel Green Plastics from Gunma University

Techniques for using biomass-based materials have become important in helping to reduce the impacts of global warming and the depletion of petroleum resources. Changing biomass from edible to inedible is essential for solving global food issues. A research team at Gunma University has been successful in preparing several novel biomass-based polyesters derived from plant cell walls. Furthermore, the novel polyesters also have good mechanical properties and transparency in the visible region [1, 2].



Inedible Biomass i. e. Hemicellulose — Furan Derivatives — Biomass-based Polyester

References: 1. ACS Symposium Series, 2012, 1105, 91-110. 2. Green Chemistry, 2013, 15, 1318-1325.

Hand Crafting Our Future

Topics 04 Disaster Prevention Research

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


（津波襲来直前に被住居地区住民が撮影）

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.

Hand Crafting Our Future

Topics 05 Medical Engineering for Heavy-Ion Radiotherapy

Gunma University Heavy Ion Medical Center

The Gunma University Heavy Ion Medical Center (GHMC) was established on June 1, 2005 to improve heavy-ion radiotherapy based on radiation biology and clinical studies, to develop related techniques for new treatment methods, and to promote studies relating to heavy-ion medicine. Heavy ions (carbon ions) are accelerated to up to 70% of light speed and then irradiated into deep tumors inside the patient.

Program for Cultivating Global Leaders in Heavy-Ion Therapeutics and Engineering

This program focuses on education and research in heavy-ion medical science and biology, advanced clinical practice using heavy ions, cultivating global leaders in research, and the development of advanced medical equipment and related operation technologies.

Advanced Courses for Cooperation between Medicine and Engineering

Advanced Engineering of Systems and Controls for Cooperation between Medicine and Engineering, Advanced Course

Prof. Kou Yamada

This lecture provides an overview of system engineering and control engineering, covering a wide scope from fundamentals of theory through to their applications in engineering.

Advanced Engineering of Charge Beams for Cooperation between Medicine and Engineering, Advanced Course

Prof. Sumio Hosaka

This lecture covers basic scattering of charged particles, typical equipment, and applications.

Radiation Control and Measurement for Cooperation between Medicine and Engineering, Advanced Course

Prof. Hiroshi Sakurai

This lecture introduces measuring methods for characterizing electronic materials using x-rays and particle beams, covering basic theory and accelerator applications.

Advanced Engineering of Ion Beam Applications for Cooperation between Medicine and Engineering, Advanced Course

Prof. Osamu Hanaizumi and Prof. Kenta Miura

This lecture covers photonic device engineering using ion beam technologies.

Advanced Ultrasonic Wave Medical Technology, Advanced Course

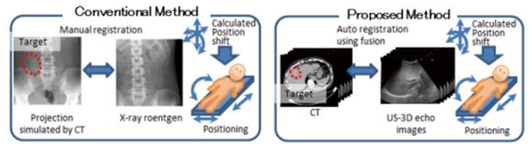
Prof. Yoshiki Yamakoshi

This lecture covers the basics of ultrasonic waves, with an eye to medical applications.

Research Topics 1

Confirmation of Exposure Position before Treatment

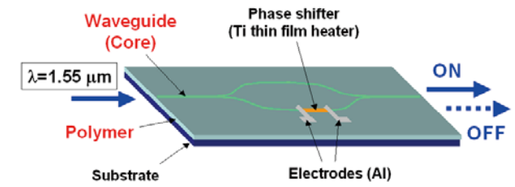
Image fusion of X-ray CT and ultrasonic imaging system



Research Topics 2

Optical Device

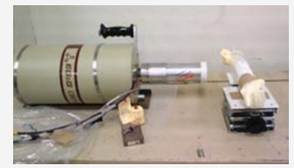
Polymer optical waveguides and thermo-optic switches



Research Topics 3

Irradiation Position Monitoring during Treatment

Spectroscopy of positron annihilation photon



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.

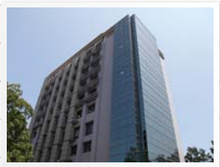
Expansion & Renewal: The New Graduate School of Engineering

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

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

School of Science and Technology

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

Campus Photo





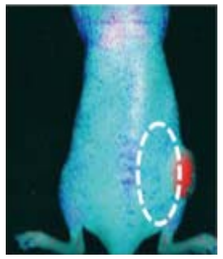

Education Program of Materials and Bioscience Domain of Materials and Bioscience

Department of Chemistry and Chemical Biology

Materials and Bioscience

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 joint research projects with other groups.



Electrochemistry and Carbon Material Science

Our group is focusing on the development of novel materials and devices, based on fundamental research results for applied electrochemistry and carbon material science. One example is a nanoporous or nanostructured carbon material for electrochemical energy storage devices such as electrochemical capacitors and rechargeable batteries, which was developed with a view to realizing an energy-saving society and smart communities. From an early stage, we have investigated and revealed the capacitance performance of carbon nanotubes, carbon nanofibers, and hetero-atom doped nanoporous carbon electrodes to demonstrate the significance of controlling nano-size or nano-structures and interfacial modification.

Professor Soshi Shiraishi

Functional Analysis of Receptors, Characterization and Application of Protein Self-Assembly

Takeda lab is investigating protein science. For the protein expression system, our lab has employed transgenic silkworms to express several antigens, cytokines, and membrane receptors to achieve new industries. From a physiological perspective, functional characterization of G protein coupled receptors (GPCRs) is an important target for us. Our lab is focusing on novel ligand screening and designs for functional characterization of GPCRs, in particular orphan GPCRs, as well as new drug development. We also have a great interest to understand how proteins interact with each other to assemble into an ordered biological structure. Bacteriophages are used for the research target, since they are composed of well-ordered structures, such as dome-like heads, tube-like sheath structure, and fibers.

Professor Shigeki Takeda

Faculty Members and Fields of Specialization

	Faculty Members	Fields of Specialization
Professors	Motoko S. Asano	Photophysics and design of photofunctional composite molecular systems including coordination compounds
	Hideki Amii	Development of synthetic organic reactions and their applications
	Keiji Ueno	Syntheses, structures, and reactivities of organo- and inorganometallic complexes
	Masafumi Unno	Organosilicon and organic heteroatom chemistry: molecular design, synthesis, and application
	Kenji Oosawa	Structural and functional analysis of bacterial flagella and chemotaxis receptors, and genome informatics thermodynamic properties of polymer solutions
	Tetsuo Okutsu	Physical chemistry, photochemistry and crystal growth
	Hiroaki Ozaki	Structural analysis of nucleic acids by fluorescence. Synthesis and properties of modified nucleic acids
	Ken-ichi Kasuya	Structure and function of polyester-degrading enzymes, screening of microorganisms involved in the environmental cleanup
	Soichiro Kyushin	Structures and properties of organosilicon compounds
	Toru Kyomen	Solid state chemistry and design of functional oxides
	Takako Kudo	Molecular orbital study of silicon or transition metal compounds
	Kazuo Shinozuka	Chemistry of functional oligonucleotides such as antisense DNA, nonradioisotope labeled oligonucleotide probes, and the artificial nuclease system
	Soshi Shiraishi	Development of carbon-based nanoporous materials and electrochemical
	Masashi Sonoyama	Biomolecular science, Biophysical chemistry of proteins, Biospectroscopy, Bioinformatics
	Hiroshi Takahashi	Structural analysis and thermal study of model biomembranes
	Shigeki Takeda	Functional analysis of receptors, characterization and application of protein self-assembly
	Kin-ichi Tsunoda	Opto-chemical sensors, liquid chromatography of metal chelates and atomic spectrometry
	Toshiaki Dobashi	Phase equilibrium of multicomponent solutions, structure of microcapsules and physical chemistry of biological materials
	Seiji Tobita	Photochemical and photophysical processes of aromatic compounds
	Yosuke Nakamura	Construction and properties of novel π-conjugated systems including fullerene chemistry and supramolecular chemistry
	Minoru Hanaya	Development and characterization of functional solid-state materials
	Mitsuhiro Hirai	Study of nano-structure, dynamics and functions of proteins/membrane signaling systems using neutrons and synchrotron X-ray
	Ichiro Matsuo	Glycoscience, Glycotechnology, Synthetic study of glycoconjugates
	Takeshi Yamanobe	Structure of polymers and solid state NMR
	Takao Yamamoto	Statistical physics
	Kaori Wakamatsu	Structural biology of proteins involved in signal transduction, prevention of protein aggregation, and development of epileptic rat
Associate Professors	Naoki Asakawa	Bio-inspired devices using emergent property found in polymers
	Yusuke Inoue	Functional analysis of the liver-enriched nuclear receptors using gene-targeted mice
	Shinji Iwamoto	Solvothermal synthesis of inorganic materials and their performance as catalysts
	Hiroki Uehara	Development of property and functionality of nano-structured polymeric materials
	Atsushi Enomoto	Suppression of antibody and T cell responses against allergens and autoantigens, advanced functional foods for prevention of diseases
	Hiroyuki Oku	Synthetic chemical and biological study of malaria; bioinorganic chemistry; biomedical and functional materials
	Ken-ichiro Kanno	Synthesis and properties of novel organosilicon compounds using transition-metal complexes
	Masayasu Kuwahara	Creations of new nanobiomaterials based on functionalized nucleic acids
	Kiichi Sato	Development of micro bioanalysis systems
	Hiroshi Sano	Exploration of new synthetic methods based on organometallic chemistry, particularly for asymmetric synthesis and natural product synthesis
	Yoshihiro Sumiyoshi	Studies on molecular structures of transient species and complexes consisting of radic
	Shoji Takigami	Chemical modification and physical properties of naturally ocurring polymers.
	Nobuhiro Takeda	Synthesis of novel organometallic compounds by taking advantage of the properties of heteroatoms
	Hiroyuki Takeno	Self-assembling structure and dynamics of multicomponent polymer systems
	Yoshiharu Toyama	Blood rheology, blood coagulation, and effects of high pressure on living organisms and biomaterials
	Nobukazu Nameki	Analyses of novel translation regulation mechanisms, and structural bioinformatics
	Hiroaki Horiuchi	Study of photofunctional materials based on photo-physical chemistry
	Tomohisa Moriguchi	Development of functional oligonucleotides, chemistry of natural products
	Minoru Yamaji	Photophysics and photochemistry of organic and organometallic compounds
	Masaru Yoneyama	Transition metal-catalyzed polymerization, polymerization in specific environments, and synthesis of polymers with specific structures
Visiting Professors	Masayuki Ikeno	Development of silicone elastomers
	Maki Ito	Synthesis andstructure analysis of silsesquioxanes
	Takahumi Imai	Polyorganosiloxanes: preparation, characteristics and industrial applications
	Takayuki Kawashima	Creation of new functional molecules utilizing main group elements
	Hiroshi Kishi	Development of functional ceramic materials
	Hideaki Kusaka	Pharmacological and safety evaluation for drug candidates
	Takeshi Saito	Preparation and evaluation of organic standard reference materials
	Noriaki Seko	R&D of the polymer modification technique by radiation processing
	Mitumasa Taguchi	Reactions of radiation-induced reactive species and their applications in water environment conservation
	Masahiko Numata	Preparation and evaluation of organic standard reference materials
	Yasunari Maekawa	Synthesis of thermally stable polymeric functional materials
	Masahito Yoshikawa	Studies on gamma-ray irradiation effects of silicon carbide metal-oxide semiconductor structures
Visiting Associate Professors	Yoshinobu Konno	Process development of biopharmaceuticals
	Masaki Sugimoto	Synthesis of functional SiC ceramics from Si-based precursor polymers
	Ryoji Tanaka	Exploration of new synthesis methods in organosilicon chemistry
	Eiichi Tabei	Decomposition mechanisms of organosilicon compounds
	Naoko Nonose	Chemical standards for inorganic materials and plasma spectrometry
	Akihiro Hiroki	Radiation modification technologies for environment-friendly polymer materials
	Shigehiro Yanagihara	Development of test method and quality control of biopharmaceuticals

Students Voice

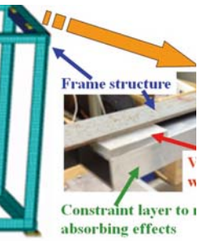
Graduate Student / Chowdhury Jakir Ahmed

Professor Shinozuka’ s Laboratory, Gunma University Faculty of Engineering

At Professor Shinozuka’ s Laboratory, I was plunged straight into advanced research in oligonucleotide chemistry. I am thoroughly enjoying my time here at the university and have come to love not only the university, but also the local people here in Gunma. The local environment here is also extremely beautiful.

Education Program of Mechanical Science and Technology Domain of Mechanical Science and Technology

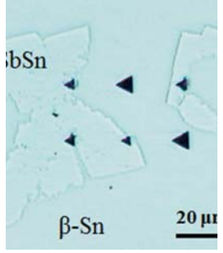
Department of Mechanical Science and Technology



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.



Numerical Analysis of the Dynamic Characteristics of Structures

We are working to create structures that can absorb dangerous waves, such as earthquakes, impacts, oscillations, supersonic waves, and chaotic motion, which can destroy important facilities and apparatus. These waves are often invisible because of their small amplitudes and have sometimes enough energy to cause destruction due to their high cycles. Viscoelastic materials can absorb these waves by converting wave energy into heat. We seek to discover high performance absorbing structures by using numerical analysis to solve millions of equations of motion simultaneously. We are also developing original computation methods to create such absorbing structures.

Professor Takao Yamaguchi

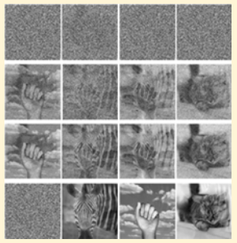
Microjoining, Interfacial Reaction, and Electronic Packaging Materials

Electronic devices have become widespread in various industrial products such as automobiles, consumer and industrial electronics, aerospace, and smart grid systems. Electronics packaging technology ("Jisso" in Japanese) is a key technology supporting the development of electronics devices. Bonding of different materials which make up electronic devices is the most important aspect of electronics packaging. We conduct research into bonding methodologies and structures and materials for electronics packaging. Moreover, we are working to clarify the effect of microstructures on the mechanical properties and reliability of joints based on metallography.

Porfessor Ikuo Shohji

Faculty Members and Fields of Specialization ▶▶▶

Faculty Members	Fields of Specialization
Professors	
Kenji Amagai	Thermo-fluid engineering, Interfacial flow, Atomization, Environmental fluid engineering
Tsuneaki Ishima	The experimental elucidation for flow, heat and mass transfer and laser application for flow including small particle
Shugang Wei	High-speed arithmetic circuits, VLSI systems, and digital audio signal processing
Seiichi Shiga	Mixture formation and combustion in internal combustion engines, liquid atomization
Ikuo Shohji	Micro joining, interfacial reaction, electronics packaging materials, brazing, surface treatment and corrosion resistance of stainless steel
Yusaku Fujii	Precision measurement, Optical measurement, Electrical-mechanical measurement
Masaaki Matsubara	Strength evaluation of new material and structural integrity estimation using fracture mechanics
Takao Yamaguchi	Numerical analysis for dynamics of cars etc., wave dynamics, vibration damping, sound proof
Ko Yamada	System control theory and its application, control of machine and robot, and intelligent control of the machine
Weimin Lin	Developing a high efficiency ultra-precision polishing machine. Reseach for the application of ELID process. Creating a desktop processing machine and test.
Hisaki Watari	Weight reduction technology by plastic forming, New forming and shaping technology for light metals, Production method of magnesium alloy sheets
Associate Professors	
Tomoyasu Aihara	Microscopic evaluation of metal strength and destruction, and character of fluid bysimulation
Midori Asaka	Network security
Mikiya Araki	Jet engines, Jet noise, Combustion, Spray
Yoshinori Ando	Robust control theory and its application to the machine motion control and safety of the man-machine system
Atsushi Iwasaki	Structural health monitoring and composite material
Kazuomi Kusumoto	The electrode phenomena on welding and surface modification by PVD
Yoichi Shiraishi	Design automation algorithms, combinatorial optimization algorithms,
Nobuaki Nakazawa	Human interface, biomedical motion control, and motion planning for a robot
Yoshihiko Hangai	Fabrication and mechanical evaluation of porous metals
Masato Funatsu	Hypersonic and high-temperature gas dynamics, Thermal protection system for space vehicle, Plasma diagnoses by spectroscopy
Tomohiko Furuhata	Combustion, spray flow and gas turbines
Toshikazu Matsui	Human robotics (human mimetic control, human vision, and cooperative control of vision and body in humans)
Tsutomu Matsuura	Mathematical engineering, multivariate analysis, inverse problem, neural network, reproducing kernel theory
Shinichi Maruyama	Vibration analysis and measurements of machines and structures, Nonlinear phenomenon
Iwanori Murakami	Applied electromagnetics, Actuator, Applied of superconducting levitation, Jumping robot
Visiting Professors	
Makoto Kaneko	Thermohydrodynamic measurement and simulation
Shuji Matsumura	Numerical simulation of linear and nonlinear vibration noise and its application to the automobile



(a)
(b)
(c)
(d)

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.

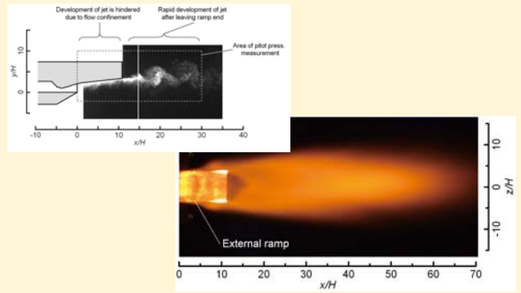


Fig. Beyond the sonic barrier: supersonic jet from a test nozzle, (top) turbulence structure, and (bottom) operation of a hydrogen afterburner. (Prof. Mikiya Araki)

Students Voice

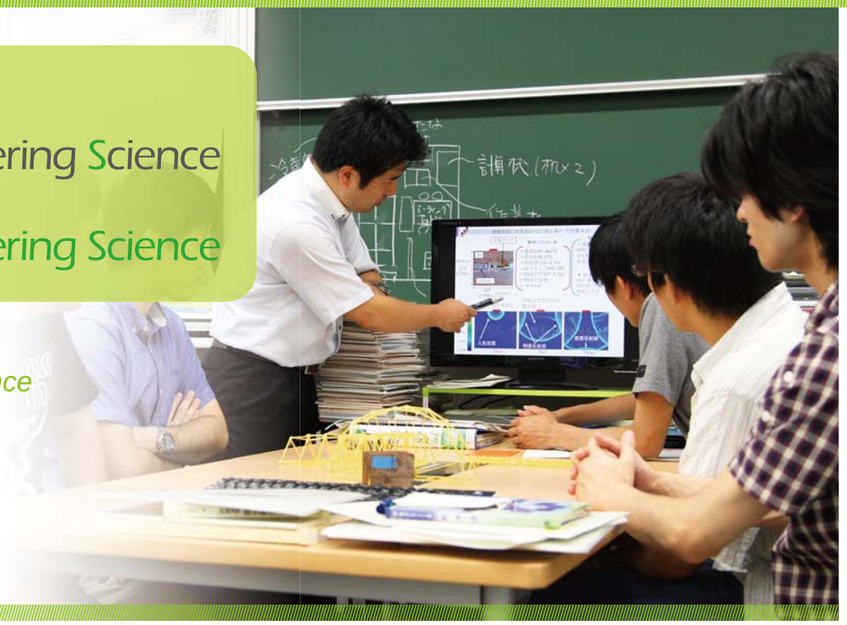
Graduate Student / Hefeng Liang

My experience in Gunma University

In 2011, I came to Gunma University as an exchange student. In a totally new environment, I expanded my horizons and enriched my experience.
Now I am studying in the Department of Mechanical Science and Technology. Under the patient guidance of my professor, my expertise has been further improved. Meanwhile, I have met some Japanese friends in my extra-curricular activities, which has helped me understand Japanese culture more deeply.

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

Development of Steam/Hydrogenation Hybrid Process for High-Grade Oil Production from Biomass

Biomass resources such as agricultural wastes or animal mature are widely spread, causing high collection and transportation costs and hindering efforts to establish their large scale utilization. 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.

Associate Professor Reiji Noda

Faculty Members and Fields of Specialization▶▶▶

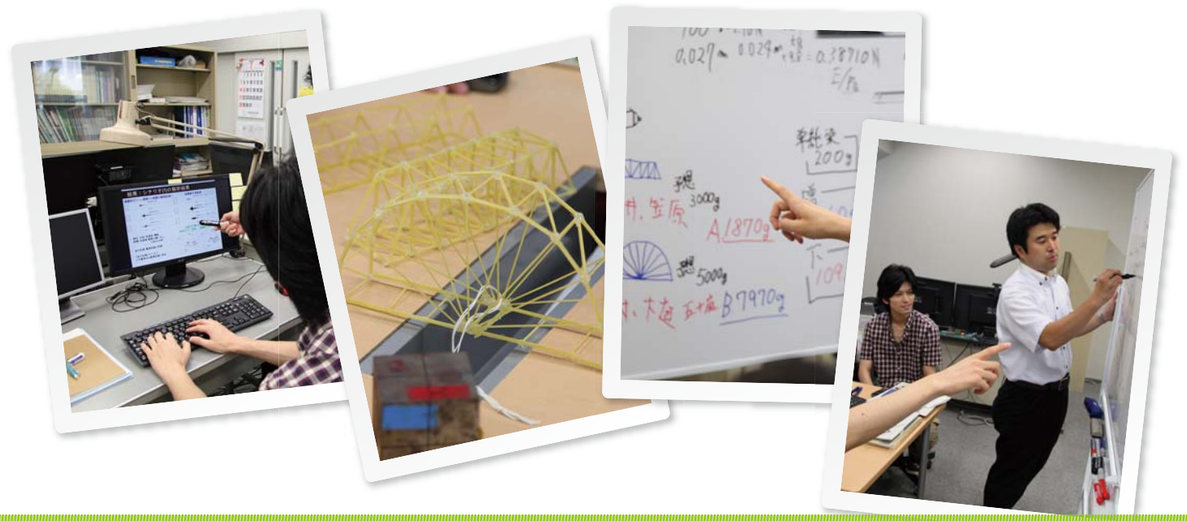
Faculty Members	Fields of Specialization
Professors	
Hideyuki Itabashi	Speciation of metal ions, complexing capacity of natural water samples, and solvent extraction of metal ions based on the HSAB principle
Takayuki Ohshima	Applications of pulsed electric field in biotechnology. Development of water treatment system with high-voltage devices.
Jun-ichi Ozaki	Design and preparation of catalytic carbon materials, particularly used in the applications of fuel cell and biomass conversion.
Toshitaka Katada	Disaster management for safe and secure society
Shinji Katsura	Development of manipulation technologies for biological molecules and their industry applications
Yutaka Kawahara	Biomass science, development of bio-based materials and utilization of natural fibrous resources
Shin-ichi Kuroda	Development of functional and high performance materials through the surface and interface control by means of plasma and photo-techniques
Yoshihiko Shimizu	Mechanics of sediment transport, fluvial process in stream with vegetation, and river management
Takayuki Takarada	Gasification and pyrolysis of biomass. Utilization of fluidized bed. Plasma CVD synthesis. Treatment of wastes.
Shin-ichi Tobishima	Study of new materials for advanced high energy batteries and new energy conversion technology
Nobuyoshi Nakagawa	Anarysis of electrode reaction and mass transfer in fuel cells, Development of a novel fuel cell
Akihiko Wakai	Numerical simulation of slope failure induced by earthquake
Tomohide Watanabe	Biological wastewater treatment, Environmental technology for aquatic environment, Advanced water/ wastewater treatment systems, Waste treatment for resource recovery
Associate Professors	
Tsukasa Ito	Biological wastewater treatment, systematic arrangement of environmental microorganisms, and investigation and biodegradation of environmental pollutants
Ken-ichi Uzaki	Three-dimensional structure of wind-driven currents accompanied with river including the coastal zone secondary circulations, regional sediment transport process in the Tone
Masahiko Oshige	Development of molecular design technologies for biomolecule and their industry applications.
Mitsuo Ozawa	Fire resistance of concrete, Control of cracking due to volume change in concrete at early age
Masanobu Kanai	Risk communication, Community activity for disaster prevention, Disaster education
Takahiro Saitoh	Applied mechanics, computational mechanics and non-destructive evaluation for civil engineering structures
Reiji Noda	Development and evaluation of waste/biomass energy utilization processes, Evaluation and design of a local society based on energy/mass flow analysis
Masaru Hakoda	Application of electrostatics on bio-separation and micro-chemical systems, development of bio-micro-electromechanical systems
Azuchi Harano	Reaction mechanisms of aerosols with air pollutants and development of a preservation technology of the environment
Masanobu Mori	Development of water purification systems and water-quality monitoring systems
Hideyuki Morimoto	Mechanochemical synthesis and electrochemical properties of battery materials
Visiting Professors	
Hiromi Shirai	Environmental combustion engineering, clean energy conversion engineering
Hisao Makino	Aerosol engineering, clean coal technology
Visiting Associate Professor	
Hirohumi Tsuji	Analysis of energy transfer in high temperature gas, temperature measurement in two phase-flow

Students Voice

Graduate Student / Song Shuo (China)

A Fulfilling and Happy Lifestyle in Research

I am in a laboratory that focuses on the technology development for energy conversion processes, particle processing, waste treatments and related subjects. So far, I have studied the development of a fluidized bed granulation process to construct a process model and simulators. I am having a fulfilling and happy lifestyle in research with the support of my professor and fellow lab members.



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.

Making machines more intelligent

Machine learning is everywhere. Machine learning, the main theme of our laboratory, is a computational paradigm that automatically determines underlying rules from a given data set. For instance, a machine learning algorithm is used to train a computer to learn a classification rule for human faces using a set of face and non-face images. The trained computer can then detect faces from arbitrary images. This is the fundamental technique incorporated into the latest digital cameras to bring faces into focus. Nowadays, machine learning has a wide variety of applications. Our laboratory is exploring further potential applications of machine learning, as well as making theoretical discoveries.

Associate Professor Tsuyoshi Kato

High-Speed Data Transmission Techniques for VLSI System

Demand for data rates beyond the gigabyte-per-second level has been increasing due to the need to manage the exponentially growing data traffic in VLSI communications, including server backplanes for data centers. However, in such high-speed data transmission, channel distortions such as inter-symbol interference and noise significantly limit I/O bandwidth relative to device performance. To solve this problem, we investigate efficient coding schemes such as multiple-valued data coding and partial response signaling. The photo shows a measurement system for high-speed data transmission.

Associate Professor Yasushi Yuminaka

Faculty Members and Fields of Specialization ▶▶▶

Faculty Members		Fields of Specialization
Professors	Sadao Adachi	Optical properties and microelectronics of group-IV semiconductors, III-V and II-VI semiconducting compounds
	Takeo Ishikawa	Electrical machines, power electronics, optimal design, and computer simulation
	Masahisa Ito	Magnetic structures and electronic properties of magnetic materials studied by magnetic diffraction, scattering and absorption of synchrotron radiation
	Haruo Kobayashi	Analog and digital integrated circuit design and signal processing algorithms
	Hiroshi Sakurai	Magnetic nano device, measurement using x-rays
	Kazumasa Takada	Design and characterization of optical fiber and WDM devices, Optical sensing
	Manabu Takahashi	Theoretical study on electronic properties and magnetism in transition metal compounds
	Osamu Hanaizumi	Devices for optical communication, Microphotonics
	Kuniyuki Motojima	Electromagnetic theory, Electromagnetic compatibility
	Yoshiki Yamakoshi	Ultrasonic imaging systems for medical diagnoses, and measurement using ultrasonic waves
Associate Professors	Kazuo Itoh	The fabrication of semiconductor nano-structures and their applications
	Tadashi Ito	Computed tomography and its applications, inverse problems in measurement
	Syun-ji Ozaki	The optical properties and electronic energy-band structures of nanoatructured semiconductors and ternary compound semiconductors
	Tamihiro Gotoh	Material science for optical devices
	Morihiko Sato	Production of pulsed power generation system with MOSFETs and underwater pulsed electric discharge
	Hayato Sone	Nanometer measurement and fabrication, nanoelectronic devices, cantilever-based sensors, surface modification, crystal growth
	Nobukazu Takai	CMOS analog integrated circuit design and its automated design algorithm.
	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
	Seiji Hashimoto	Motion control, system identification, vibration control, precision control, renewable energy
	Toshiya Hikihara	low-dimensional strongly correlated electron systems, quantum spin systems, numerical calculation
	Shin-ichi Furusawa	Physics of solid state ionics, nanoionics, ionic device.
	Akio Matsuoka	The production and electrical properties of Fullerenes
	Kenta Miura	Optical waveguiding devices, Lighit emitting materials
	Takayuki Miyazaki	The structural, optical, and electrical properties of various thin films
	Takashi Miwa	Applied measurement for electromagnetic and ultrasonic wave
	Yoshifumi Morita	Theoretical study on low dimensional quantum systems and superconductors
	Yasushi Yuminaka	Multiple-valued logic and new-paradigm analog/digital integrated circuits
Information Science (sub-course)		
Professors	Kazuyuki Amano	Computational complexity, theory of algorithms, machine learnig
	Naoya Ohta	Image processing, computer vision, and pattern recognition
	Yoshikuni Onozato	Computer networks, satellite communication systems, and system performance evaluation
	Yoichi Seki	Data mining, statistical learning theory and applied data analysis
	Shin-ichi Nakano	Graph algorithm, and Information visualization
	Koichi Yamazaki	Combinatorial optimization, approximation and randomized algorithms, computational complexity
	Hidetoshi Yokoo	Data compression, data structures, and information theory
Associate Professors	Toru Araki	Graph theory, Graph algorithm, Combinatorial optimization
	Hiromasa Oku	Dynamic image control, High-speed image processing, High-speed optical devices
	Tsuyoshi Kato	Bioinformatics, machine learning, and statistical analysis
	Ken-ichi Kawanishi	Information and communication systems, performance evaluation, queueing theory
	Ken-etsu Fujita	Logic of programming, programming languages
	Ushio Yamamoto	Human interfaces, computer networks, and multi-agent systems
	Hirofumi Yokouchi	Logic of programs and its applications to programming languages
Lecturer	Yoshihide Hosokawa	Database systems, information retrieval, location-based services
Mathematical Science		
Professors	Masaaki Amou	Transcendental number theory, Diophantine approximations
	Kazumi Tanuma	Elasticity equations, inverse problems
	Shuji Watanabe	Integral transforms of Fourier type, commutation relations in quantum mechanics and their applications
Associate Professors	Kazuo Amano	Computer algebra, numerical analysis, differential equations
	Hirofumi Nagoshi	Analytic number theory, value-distribution of arithmetic functions
Lecturer	Takeshi Ohtsuka	Geometric surface evolution equation, Singular limit of reaction diffusion equation
Visiting Professors	Kenichi Onda	Power electronics circuit
	Teruo Kohashi	Magnetic metrology, Spin polarized scanning electron microscopy
	Kazuo Saito	Advanced electronic engineering
	Naoya Sasaki	Molecule dynamic simulation, Nanometer dynamics of lubrication and wearing
	Ken Harada	Electron physics, Electron interference microscopy
	Takahiro Miki	Analog integrated circuit design

Students Voice

Graduate Student / Electronics and Computing / Raissa Relator

Department of Computer Science

My current research is related to bioinformatics with a focus on developing and applying machine learning methods and pattern recognition techniques for data analysis. Some of my interests include protein-ligand interaction and enzyme active-site prediction, both of which are valuable for drug discovery. With a large volume of different kinds of information available nowadays, there is a need to find appropriate methods to examine them and use them to our advantage.

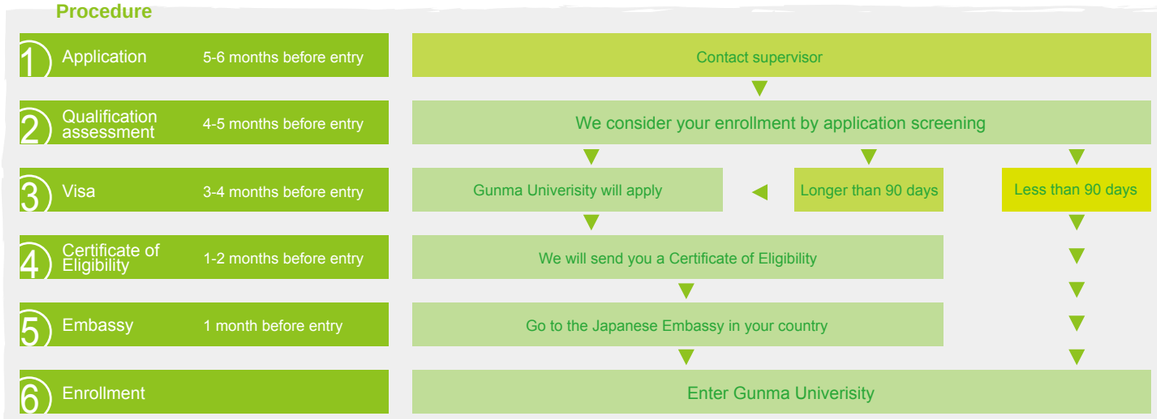
Procedures for Entering Japan

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)	http://www.mofa.go.jp/j_info/visit/visa/
Countries/Regions with visa exemption agreements (Ministry of Foreign Affairs of Japan)	http://www.mofa.go.jp/j_info/visit/visa/short/novisa.html
Regional affairs (Ministry of Foreign Affairs of Japan)	http://www.mofa.go.jp/region/

Procedures for Foreign Nationals Currently Residing in Japan

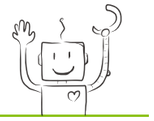
After completing the procedures for admission to Gunma University, you need to apply for a “Change of Residence Status” at the local immigration office. This is only necessary if your current status is not “Student.” If you will be moving to or near the campus from another city or town, you should go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

After receiving letter of permission	**Tokyo Immigration Office**	**City Office**
	Apply for change/extension of resident status	Apply for resident registration

Academic Calendar

■ Holidays / Saturdays, Sundays and National holidays

Student Life and Expenses



Tuition and Fees

Studying in Japan inevitably requires a certain amount of financial resources as outlined below. The university requires students to confirm a sufficient preparation of funds before enrolling at Gunma University.

	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:
Private apartments and lodging houses (as of April, 2013)

	Apartment Features	Rent per Month
Apartment	Six tatami mats Kitchen With lavatory, shower and bath	30,000 to 40,000 yen

Gunma University International House

The Gunma University International House is an international student residence facility located in Kiryu. Residency is limited to one year.

	Room Fee	Number of Rooms
International House	5,900 yen Single	33
	11,900 yen Couple	2
	14,200 yen Family	1

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.

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.

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.

Graduate School Entrance Examination

01 Contact supervisor → 02 Qualification assessment (if required) → 03 Application → 04 Screening examination → 05 Announcment of results

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.cier.gunma-u.ac.jp/english/page1/nyuushi.html

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

Q: How high is Gunma University ranked among universities in the world and in Japan?

A: According to the Times, an authoritative British magazine, Gunma University was highly evaluated in world rankings, at 252nd in 2006, 331st in 2007, 396th in 2008, 401st to 500th in 2009, 551st to 600th in 2010 and 401st to 500th in 2011., In Japan, the university was ranked 16th in 2006, 17th in 2007, 23rd in 2008, 20th to 33rd in 2009 and 21st in 2011.

University Data

Number of International Students

Government Scholarship　Private Funding

Area	Countries and Regions	Undergraduate Students		Graduate Students				Research Students				Exchange Students		Students		Sub-total		Total
				Master's Program		Doctoral Program		Undergraduate		Graduate		Undergraduate		Graduate				
Asia	China	3	5		36		12		9				5		2	3	69	72
	Malaysia		29		3		4										36	36
	Vietnam		12		5												17	17
	Indonesia		1				1										2	2
	Mongolia	1	2													1	2	3
	Cambodia	4														4		4
	Korea		1		2		1						1				5	5
	Tajikistan	2														2		2
	Laos	2	1													2	1	3
	Thailand			2			1								1	2	2	4
	Philippines					1										1		1
	Taiwan						1										1	1
	Nepal						1										1	1
	Bangladesh				1	1										1	1	2
	Total	12	51	2	46	1	21		9				6		3	16	137	153
Middle East	Iran				1				1								2	2
	Lebanon																	
	Total																2	2
Europe	U.K.		1														1	1
	Spain																	
	France												1				1	1
	Total																2	2
	Total																	157

Academic Exchange Agreements

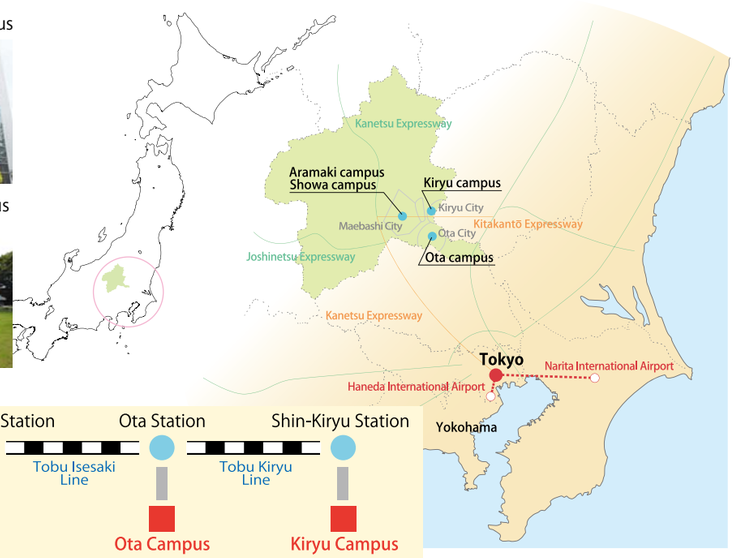
Agreements between Universities

Australia	University of Wollongong	India	Indian Institute of Technology Delhi
Bangladesh	University of Dhaka	Korea	Seoul National University
China	Chongqing Jiaotong University	Korea	Yeungnam University
China	Dailian Polytechnic Unveisity	Peru	Pontificia Universidad Catolica del Peru
China	Dalian University of Technology	Republic of Azerbaijan	Baku State University
China	Hainan University	Saudi Arabia	King Fahd University of Petroleum and Minerals
China	Institute of Process Engineering,Chinese Academy of Sciences	Singapore	Nanyang Technological University
China	Noeth China Electric Power University	Taiwan	National Formosa University
China	Shenyang University of Chemical Technology	Thailand	Chiang Mai University
China	Xi' an Jiaotong University	U.K.	Noorth East Wales Institute of Higher Education
China	Xiamen University	U.S.A	North Dakota State University
France	Universite'de la Me'diterrane'e (Aix-Marseille Ⅱ)	U.S.A	The State University of New York at Stony Brook, Stony Brook University

Agreements between Faculties

Canada	Ryerson University	Korea	Faculty of Engineering, Mokpo National University
China	China University of Mining and Technology	Korea	Graduate School of Industry, Seoul National University of Sciend and Technology
China	College of Information Engineering, Yangzhou University	Korea	Nano-Science Research Division, Korean Institute of Science and Technology
China	Hunan University of Science and Technology	Korea	The Research and Education Center for Advanced Silicon materials
China	School of Chemistry and Chemical Engineering, Sun Yat-sen University	Malaysia	Faculty of Engineering and Fuel Cell Institute, Universiti Kebangsaan Malaysia
China	School of Energy and Power Engineering, Yangzhou University	Malaysia	Universiti Teknologi PETRONAS
China	School of Instrument Science and Opto-Electronic Engineering, Hefei University of Technology	Malaysia	University Malaysia Pahang
China	School of Material Science & Engineering, Hebei University of technology	Russia	The Faculty of Food Technology and Merchandizing, The Saratov State Agrarian University named after N.I.Vavilow
China	School of Mechanical Engineering, Shanghai Jiaotong Daxue	Spain	Universidad Politécnica de Valencia
China	School of Mechanical Engineering, Southwest Jiaotong University	Sweden	School of Engineering, University of Borås
China	School of Mechanical Engineering, Tsinghua University	Taiwan	College of Engineering of lunghwa University of Science and Technology
China	School of Optic & Electronic Engineering, University Shanghai For Science and Technology	Thailand	Faculty of Agriculture and Technology Nakhon Ratchasima Campus,Rajamangala University of Technology Isan
China	School of Optoelectronics and Communication Engineering, Xiamen University of Technology	Thailand	Faculty of Engineering, Chulalongkorn University
China	School of Sciences, Northeastern University	Thailand	Faculty of Engineering, Khon Kaen Campus,Rajamangala University of Technology Isan
China	State Key Laboratory of Geohazards Prevention, Chengdu University of Technology	Thailand	Faculty of Engineering, Rajamangala University of Technology Isan, Khon Kaen Campus
Czech Republic	Technical University of Ostrava	Thailand	Faculty of Industry and Technology, Rajamangala University of Technology Isan
France	Ecole Superieure D'ingenieurs en Electronique et Electrotechnique Paris	Thailand	Faculty of Science and Technology, Nakhon Pathom Rajabhat University
France	National Graduate School of Chemistry and Chemical Engineering, The University of Montpellier	Thailand	Faculty of Science, Mahidol University
Indonesia	Faculty of Mathematics and Natural Sciences, Institut Teknologi Bandung	Thailand	King Mongkut's Institute of Technology Ladkranbang
Korea	Center for Photofunctional Energy Materials, Dankook University	Thailand	King Mongkut's University of Technology Thonburi
Korea	College of Engineering, Kyung Hee University	Thailand	Thai-Nichi Institute of Technology
Korea	College of Engineering, Kyung Hee University,Yongin,Korea	U.K.	City University
Korea	College of Engineering, Yonsei University	U.S.A	College of Engineering, The University of Washington
Korea	College of Natural Science,Chosum University	Vietnam	Faculty of Mechanical Engineering Hanoi University of Technology
Korea	College of Science and Technology, Yonsei University	Vietnam	Hanoi Irradiation Center, Vietnam Atomic Energy Institute

Access

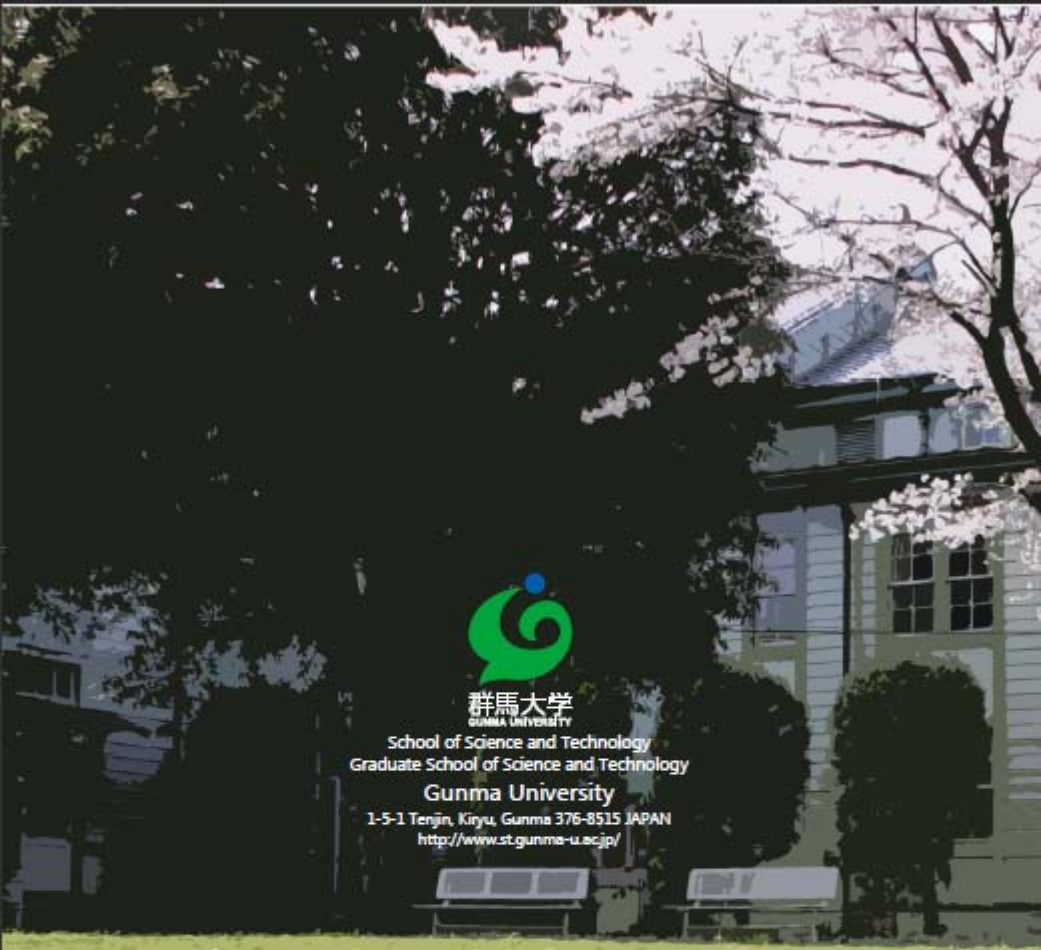


Tokyo Station — JR Yamanote Line — Ueno Station — Hibiya Line — Kitasenjyu Station — Tobu Isesaki Line — Ota Station — Tobu Kiryu Line — Shin-Kiryu Station

■By express bus from Narita

▶ Ota：3 hours　▶ Kiryu：3.5hours

Ota Campus　Kiryu Campus



群馬大学
GUNMA UNIVERSITY

School of Science and Technology
Graduate School of Science and Technology
Gunma University
1-5-1 Tenjin, Kiryu, Gunma 376-8515 JAPAN
http://www.st.gunma-u.ac.jp/

Publication: Sep. 2014