GUNMA UNIVERSITY

School of Science and Technology
Graduate School of Science and Technology

群馬大学
GUNMA UNIVERSITY

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

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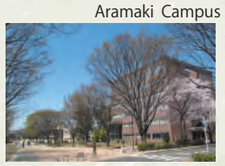
Access

Aramaki Campus



Kiryu Campus

Showa Campus

Ota Campus

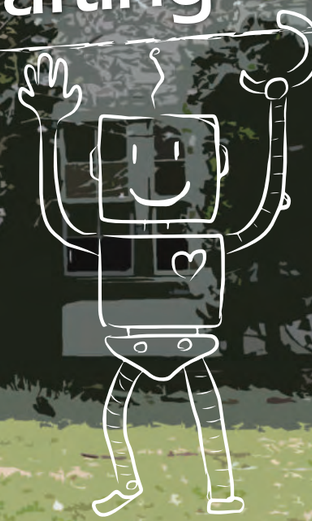
Tokyo Station — JR Yamanote Line — Ueno Station — Hibiya Line — Kitasenjyu Station — Tobu Isesaki Line — Ota Station — Tobu Kiryu Line — Shin-Kiryu Station

■By express bus from Narita
▶ Ota：3 hours ▶ Kiryu：3.5hours

Ota Campus
Kiryu Campus

Publication March 2019

Hand Crafting Our Future



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

Welcome to the School of Science and Technology of Gunma University

Yoichi Seki

Dean of Graduate School of Science and Technology

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.

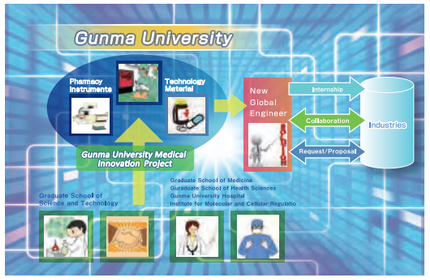
We now have departments in four fields: Chemistry and Chemical Biology, Mechanical Science and Technology, Environmental Engineering Science, and Electronics and Informatics. Through the above projects, the four departments provide our students with educational programs offering a balance between basic 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.

Contents

Advanced technologies paving the way to the future

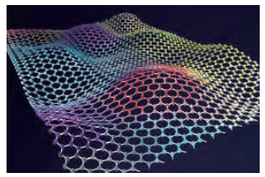
Topics1 Gunma University Medical Innovation



"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 prospec ts comprehensively.

For more information ≫ P08-09

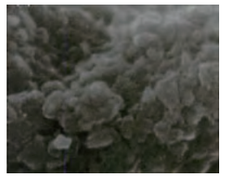
Topics2 International Research and Education Center for Element Science

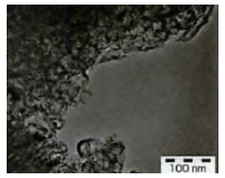


This newly founded center investigates advanced carbon materials and high-quality silicon compounds.

For more information ≫ P10

Topics3 Low-Carbon





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

For more information ≫ P11

An abundance of appealing research fields!

For more information ≫ P08-11

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).

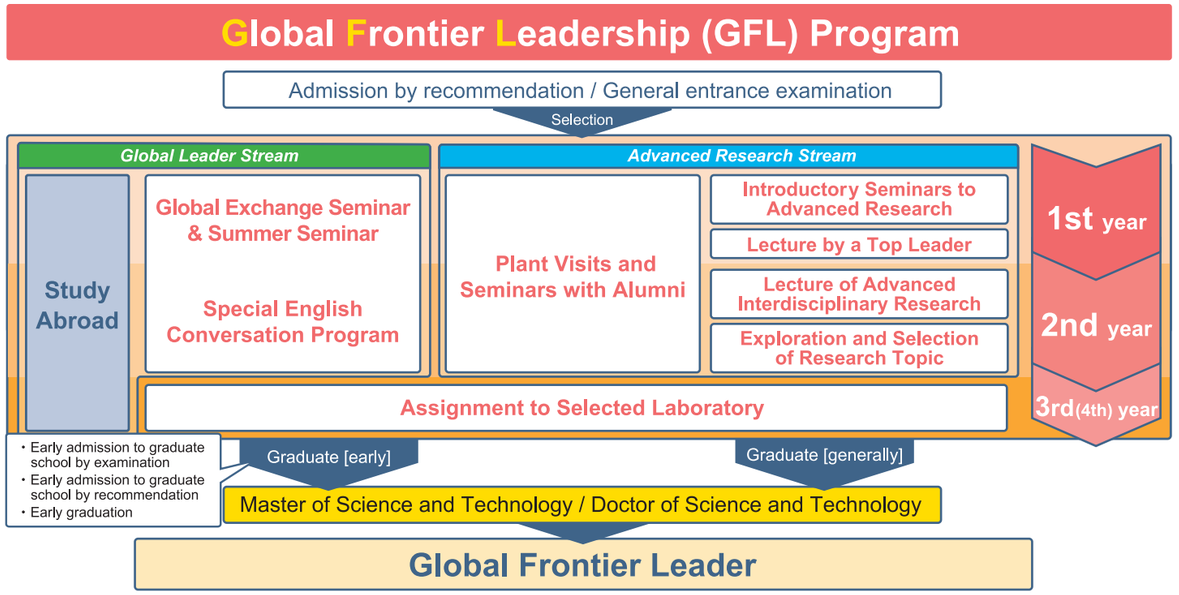


Fig.1 Conceptual diagram of the Global Frontier Leadership (GFL) Program

Student Support Services

Service 1 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

Service 2 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. GUIC 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.

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

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

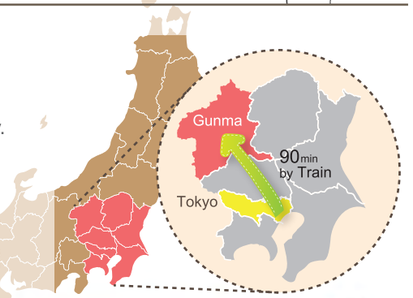
- Comprehensive consultation
- Student activities
- Tuition fee exemption
- Scholarships
- Tutorial system
- Career exploration and preparation
- University housing (International House)
- Immigration matters: Certificate of Eligibility / Extension of period / Part-time job permission
- Off-campus resources: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

Service Hours	Monday - Friday (except holidays) 8:30 am to 5:15 pm

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.

Photo courtesy of Tomioka Silk Mill

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.

Superb seasonal changes and activities

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.

Photo courtesy of visual Gunma

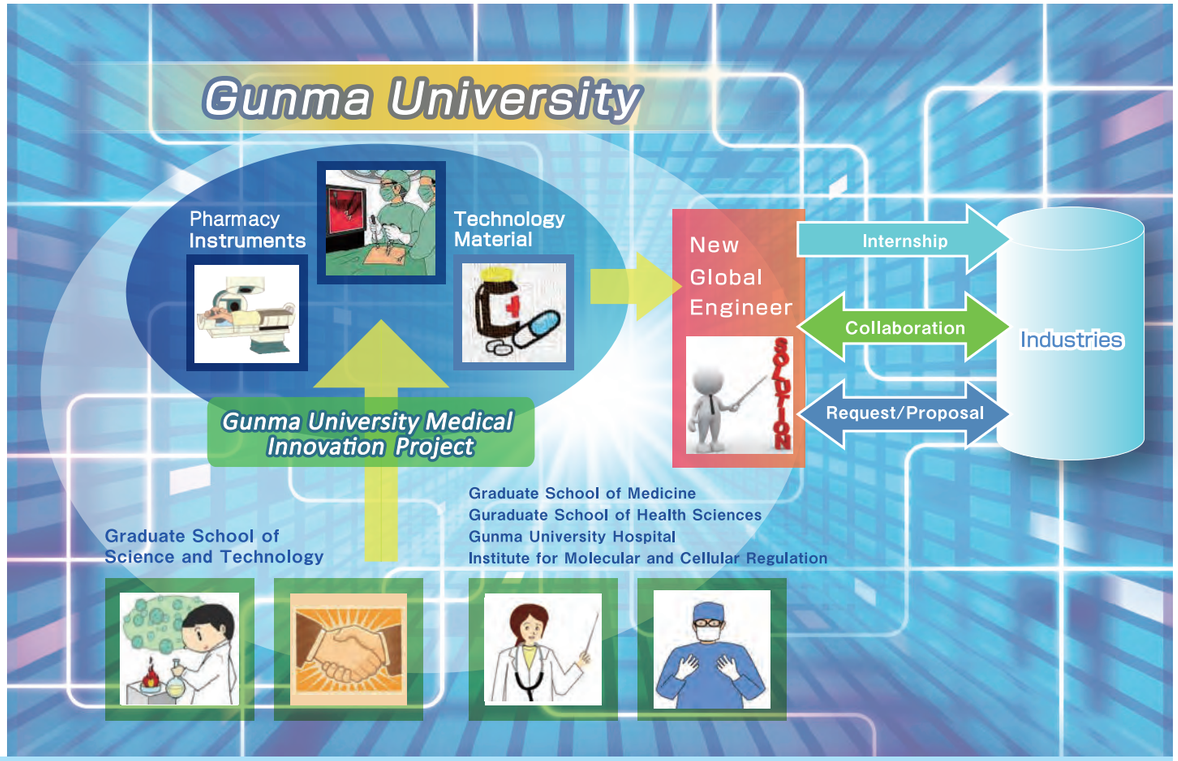
Check! Useful search keywords for discovering the attractions of Gunma

Search

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

5 Great Reasons

Gunma University Medical Innovation



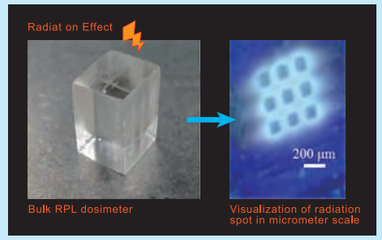
Point 1 Gunma University Medical Innovation Project

"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

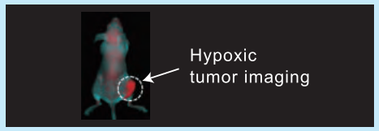
Check it!

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 μm^2.
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

Check it!

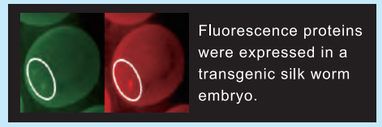


The oxygen level of the interior of living cells and tissues is one of the central parameters in many physiological, pathological, and therapeutic processes. Oxygen deprivation (hypoxia) is connected with various diseases such as cerebral infarction and ischemic heart disease, and is known to occur in tumor microenvironments. We are developing optical probes to visualize the oxygen level of biological cells and tissues on the basis of photochemistry and chemical biology.

Identification and production of biologically active compounds

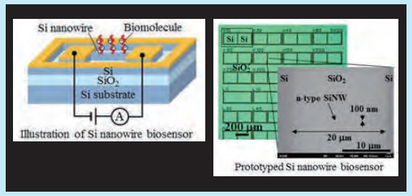
Check it!

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

Check it!

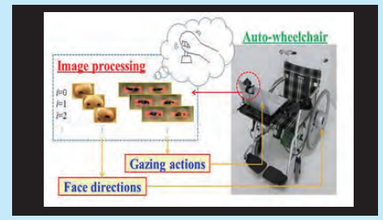


A portable sensor with high sensitivity is needed for the detection of chemical or biological molecules in the fields of biotechnology and medical science. A silicon nanowire (SiNW)-based field effect transistor device has the potential to detect small quantities of biomolecules.
To realize high sensitivity 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).

Intuitive hands free interface

Check it!

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.

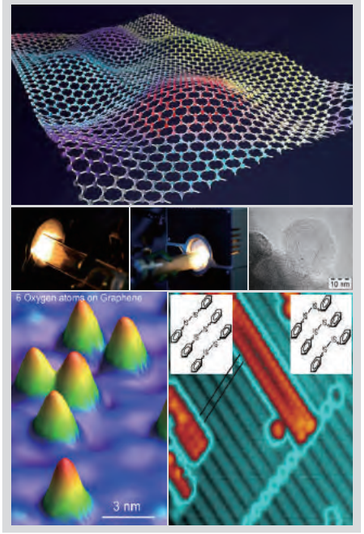


Topics 02

International Research and Education Center for Element Science

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.



Professor
Jun-ichi Ozaki

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.

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

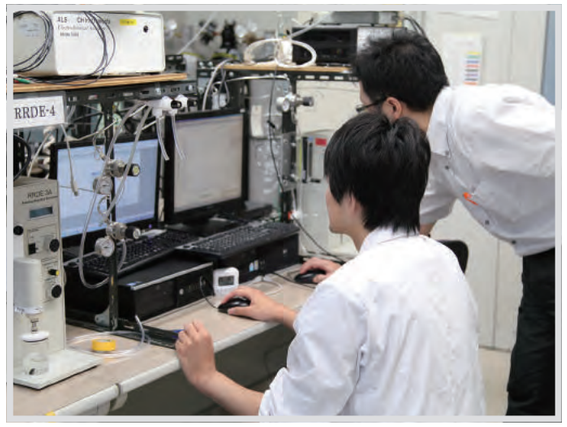
Surface chemistry of nano carbonsurface

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

Topics 03

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.

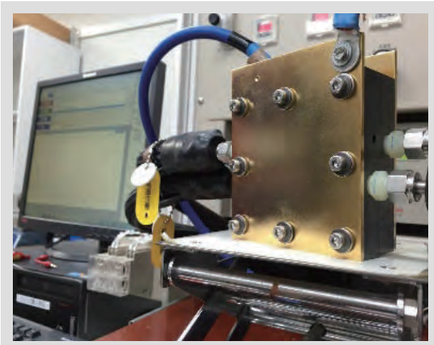
Replacing Platinum in Fuel Cells with Carbon—a Cheap and Abundant Resource

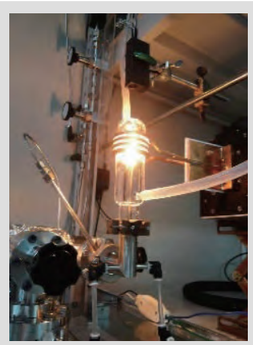
Although platinum is the most common and active catalyst for proton exchange membrane fuel cells (PEMFC) to produce electricity, it is an extremely rare and expensive metal that is usually found only in parts of South Africa and Russia. This has hindered the spread of fuel cells, mainly because of unstable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





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	Master's 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

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

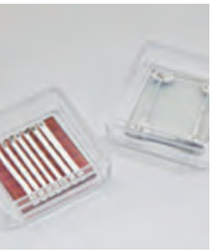
School of Science and Technology

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

Campus Photo

Education Program of Materials and Bioscience Domain of Materials and Bioscience

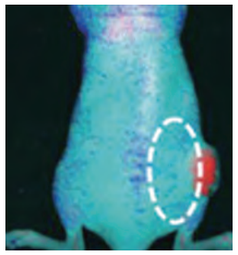
Department of Chemistry and Chemical Biology



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.



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

Education Program of Materials and Bioscience ▶▶▶

	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
	Hiroki Uehara	Development of property and functionality of nano-structured polymeric materials
	Masafumi Unno	Organosilicon and organic heteroatom chemistry: molecular design, synthesis, and application
	Kenji Oosawa	Structural and functional analyses of bacterial flagella and chemotaxis receptors, and genome informatics
	Tetsuo Okutsu	Physical chemistry, photochemistry and crystal growth
	Hiroaki Ozaki	Development of modified nucleic acids and its application
	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
	Soshi Shiraishi	Development of carbon-based nanoporous materials and electrochemical capacitors
	Yoshihiro Sumiyoshi	Studies on molecular structures of transient species and complexes consisting of radicals
	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
	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
	Atsushi Enomoto	Suppression of antibody and T cell responses against allergens and autoantigens, advanced functional foods for prevention of diseases
	Md. Zakir Hossain	Chemical modification of epitaxial graphene on SiC substrate
	Hiroyuki Oku	Malaria vaccine and diagnosis material; biofunctional chemistry; biomedical and functional polymers
	Ken-ichiro Kanno	Synthesis and properties of novel organosilicon compounds using transition-metal complexes
	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
	Tsuyoshi Takahashi	Construction and application of functional molecules using peptide and protein engineering
	Nobuhiro Takeda	Synthesis of metal complexes bearing new ligands for the purpose of activating small molecules
	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
	Jun-ichi Fujisawa	Studies of organic-inorganic hybrid materials for light energy conversions
	Hiroaki Horiuchi	Study of photofunctional materials based on photo-physical chemistry
	Takako Muraoka	Studies on unique ligands with heavier typical elements and their transition metal complexes
	Tomohisa Moriguchi	Development of functional oligonucleotides, chemistry of natural products
	Minoru Yamaji	Photophysics and photochemistry of organic and organometallic compounds
	Keiichi Yamada	Development of novel bioactive peptides utilizing molecular imaging technique
	Toshitada Yoshihara	Photophysical and photochemical studies of aromatic compounds and its application for bioimaging
	Masaru Yoneyama	Transition metal-catalyzed polymerization, Synthesis of polymers from unutilized resources
Visiting Professors	Hideki Abe	Studies on molecular and material design of polymers from biomass organic chemicals
	Takeshi Saito	Preparation and evaluation of organic standard reference materials
	Toshiyuki Suzawa	Process development of biopharmaceuticals
	Noriaki Seko	R & D of the polymer modification technique by radiation processing
	Nobuaki Takahashi	Development of antibody drug and novel antibody based technology
	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
	Tetsuya Yamaki	Nanotechnology Research and Material Development for Applications to Next-Generation Energy Devices
Visiting Associate Professors	Masaki Sugimoto	Synthesis of functional SiC ceramics from Si-based precursor polymers
	Ryoji Tanaka	Exploration of new synthesis methods in organosilicon chemistry
	Naoko Nonose	Chemical standards for inorganic materials and plasma spectrometry
	Keiji Numata	Studies on structure-function relationship of spider dragline silk and artificial silk materials
	Akihiro Hiroki	Radiation modification technologies for environment-friendly polymer materials

＊will retire in March, 2020

Students Voice

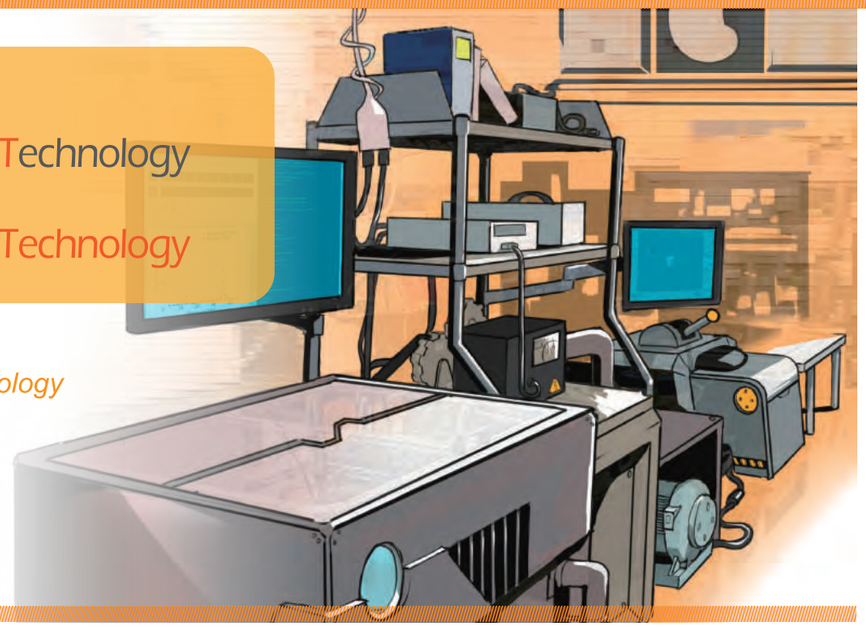
Graduate Student / Soulenthone, Phouvilay

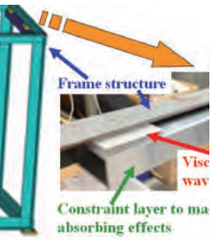
One of my dream is to be a contributor to solve environmental issues causing by plastic wastes. It has come true when I became a member of Kasuya’ s Laboratory at Gunma University. Now I am studying biodegradable polymers, which could be broken down by microorganisms through the metabolic processes.

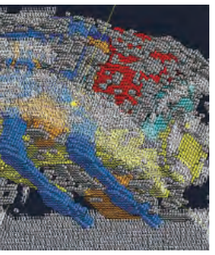
Besides researching, I enjoy Japanese traditional culture such as tea ceremony and Zazen, which were hold by kind Japanese in Kiryu city. It was not only the place to learn Japanese culture, but also the place that I could make friends with lovely local people. I am really enjoying student life here at Gunma University.

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

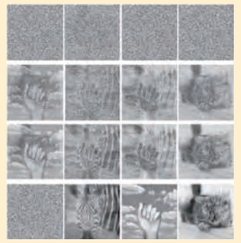
Fluid mechanics is a fundamental research field in mechanical science and technology with a wide range of applications, including the aircraft technology, car engineering, cleaning of electronics devices, and control of air pollution.
Our laboratory studies a wide range of problems concerned with the 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

Education Program of Mechanical Science and Technology ▶▶▶

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	Heterophase interface science, micro joining, electronics packaging materials, brazing, surface treatment and corrosion of metals
Takaaki Suzuki	Micro-Nano Systems and Control, Bio-applications
Yoshihiko Hangai	Fabrication and mechanical evaluation of porous metals
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 using fracture mechanics
Takao Yamaguchi	Numerical analysis for dynamics of cars, machines and living bodies, wave black hole, vibration damping,
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. Research for the application of ELID process. Creating a desktop processing machine and test.
Associate Professors	
Tomoyasu Aihara	Microscopic evaluation of metal strength and destruction, and character of fluid by simulation
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
Masahiro Inoue	Development and characterization of organic/metal/inorganic hybrid materials, and their application to novel electronic systems
Atsushi Iwasaki	Structural health monitoring and composite material
Takeki Ogitsu	Car Robotics, Intelligent Transportation Systems
Hisanobu Kawashima	Bubble dynamics, heat and fluid flow measurement, and multiphase flow
Shinji Koyama	Precision bonding, surface hardening, corrosion resistance, wear resistance
Yoshio Zama	Spray flow, Quantitative visualization measurement, Automotive engineering
Yoichi Shiraishi*	Design automation algorithms, combinatorial optimization algorithms
Nobuaki Nakazawa	Human interface, biomedical motion control, and motion planning for a robot
Masato Funatsu	Hypersonic and high-temperature gas dynamics, Thermal protection system for space vehicle, Plasma diagnoses by spectroscopy
Toshikazu Matsui*	Human vision and its signal processing, Human robotics, Visual interface (optimal design of information display)
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	
Shuji Matsumura	Numerical simulation of linear and nonlinear vibration noise and its application to the automobile

* will retire in March, 2020



(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.

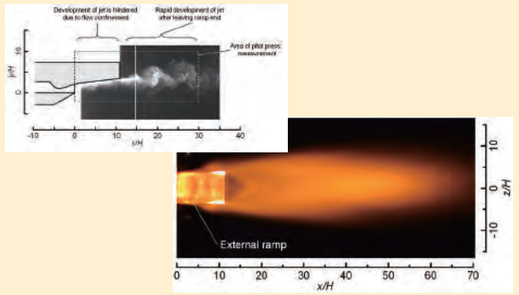
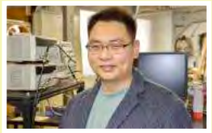


Fig. Beyond the sonic barrier: supersonic jet from a test nozzle, (top) turbulence structure, and (bottom) operation of a hydrogen afterburner.

Students Voice

Graduate Student / Long Cheng



In October 2015, I came to Gunma University for my Science and Engineering doctorate. At first, the cultural difference between the Japanese and Chinese confused me a lot. As such, I felt uneasy and it was difficult for me to understand Japanese people's feelings. I also realized that the importance of talking to other people actively.
At present, I am studying in the laboratory of Energy and Environment. With the great help of my advisor and group members, I consider that my professional knowledge has greatly improved. Their conscientious and rigorous research attitude has made me develop good habits. The greatest feeling for me has been an advanced Japanese ability, which I consider necessary when undertaking any research in Japan.

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

Education Program of Environmental Engineering Science ▶▶▶

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.
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
Shin-ichi Tobishima*	Study of new materials for advanced high energy batteries and new energy conversion technology
Nobuyoshi Nakagawa	Development of an efficient liquid fuel cell by means of catalyst preparation and by optimizing the electrode structure.
Akihiko Wakai	Numerical simulation of slope failure induced by earthquake
Tomohide Watanabe	Biological wastewater treatment, microbial and physicochemical degradation of water pollutants, Advanced water / wastewater treatment , resource recovery
Associate Professors	
Tsukasa Ito	Water treatment, environmental microbiology 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 bio-molecular manipulation methods and application of reaction process analysis by using molecule design techniques
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
Fei CAI	Earthquake-resistant measures for ground and earth structures, safety evaluation of landslides, and shallow ground thermal energy utilization
Kazuyoshi Sato	Synthesis and processing of ceramic materials and application for energy and environmental devices
Reiji Noda	Development and evaluation of waste/biomass energy utilization processes, Evaluation and design of a local society based on energy/mass flow analysis
Miyabi Hiyama	Application of electrostatics on bio-separation and micro-chemical systems, development of bio-micro-electromechanical systems
Azuchi Harano	Development of droplet levitation device and its application for micro chemical process
Hideyuki Morimoto	Development of all-solid-state batteries and novel battery materials
Visiting Professors	
Hiromi Shirai	Environmental combustion engineering, clean energy conversion engineering
Hisao Makino	Aerosol engineering, clean coal technology
Visiting Associate Professors	
Kenji Tanno	Numerical combustion simulation, Energy control

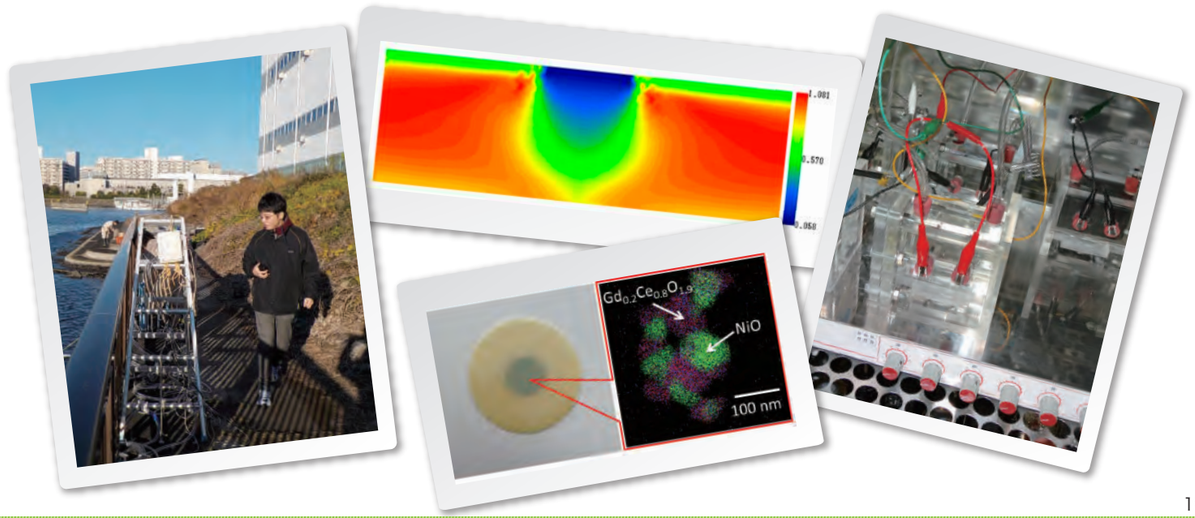
* will retire in March, 2020

Students Voice

Graduate Student / Sun Yan

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

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



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

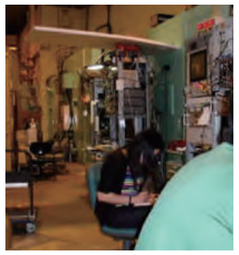
Department of
Electronics and Informatics

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.

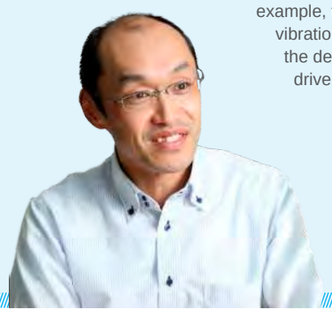
(1) Electronics course is hardware and physics oriented. Our target is to contribute electronics, communication and computer as well as power electronics areas. We provide students education of fundamental and advanced electronics, electronic devices, semiconductor, electromagnetic wave theory, communication, 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.



Industrial application of AI-based control technology

For the next ten years, new technologies such as AI, big data, and IoT evolve and spread in a wide range of fields. Industry structure will also be greatly affected by these technologies. We are developing AI technology-based energy harvesting system, process control system and so on. For example, the self-powered system based on vibration power generation combined with the deep learning technique is applied to drive a wireless sensor node for factory diagnosis. In the process control system, the temperature is precisely controlled by using a learning algorithm based on the neural network.



Professor Seiji Hashimoto

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

Education Program of Electronics and Informatics, Mathematics and Physics ▶▶▶

Faculty Members	Fields of Specialization
Professors	
Kazuyuki Amano	Computational complexity, theory of algorithms, machine learning
Masaaki Amou	Transcendental number theory, Diophantine approximations
Takeo Ishikawa	Electrical machines, power electronics, optimal design, and computer simulation by magnetic diffraction, scattering and absorption of synchrotron radiation
Naoya Ohta	Image processing, computer vision, and pattern recognition
Tomihiro Kamiya	High energy ion beam, microbeam, radiation detector, ion beam therapy
Haruo Kobayashi	Analog and digital integrated circuit design and signal processing algorithms
Hiroshi Sakurai	Magnetic nano device, measurement using x-rays
Yoichi Seki	Data mining, statistical learning theory and applied data analysis
Hayato Sone	Nanometer measurement and fabrication, nanoelectronic devices, high-sensitive biosensor for medical use, crystal growth
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
Kazumi Tanuma	Elasticity equations, inverse problems
Shin-ichi Nakano	Graph algorithm, and Information visualization
Seiji Hashimoto	Motion control, system identification, vibration control, precision control, renewable energy
Osamu Hanaizumi	Devices for optical communication, Microphotonics
Kuniyuki Motojima	Radio wave propagation, Wireless measurement, Electromagnetic wave simulation
Tatsuya Nagao	Theory of strongly correlated electron system
Yoshiki Yamakoshi	Ultrasonic 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	
Toru Araki	Graph theory, Graph algorithm, Combinatorial optimization
Tadashi Ito	Computed tomography and its applications, inverse problems in measurement
Hiromasa Oku	Dynamic image control, High-speed image processing, High-speed optical devices
Syun-ji Ozaki	The optical properties and electronic energy-band structures of nanoatructured semiconductors and ternary compound semiconductors
Tsuyoshi Kato	Bioinformatics, machine learning, and statistical analysis
Ken-ichi Kawanishi	Information and communication systems, performance evaluation, queueing theory
Nobuyuki Kurita	Magnetic bearing, maglev motor, automatic control engineering, power electronics
Tamihiro Gotoh	Material science for optical devices
Morihiko Sato	Production of pulsed power generation system with MOSFETs and underwater pulsed electric discharge
Masako Suzuki	X-ray spectroscopy, Surface/Interface science, Multif
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
Hirofumi Nagoshi	Analytic number theory, value-distribution of arithmetic functions
Makoto Hamana	foundations of programming languages, functional programming, term rewriting
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.
Kenta Miura	Light-emitting materials and devices, Photoelectric devices
Takashi Miwa	Applied measurement for electromagnetic and ultrasonic wave
Takahumi Miyazaki	Exponential Diophantine equation, Diophantine analysis
Yoshifumi Morita	Theoretical study on low dimensional quantum systems and superconductors
Ushio Yamamoto	Human interfaces, computer networks, and multi-agent systems
You Yin	Materials and devices for brain-like chip and information storage, nanofabrication, nanometrology
Yasushi Yuminaka	Multiple-valued logic and new-paradigm analog/digital integrated circuits
Hirofumi Yokouchi	Logic of programs and its applications to programming languages
Lecturer	
Takeshi Ohtsuka	Geometric surface evolution equation, Singular limit of reaction diffusion equation
Toshimitsu Takaesu	Spectral Analysis and Scattering Theory for Relativistic Quantum Field Models
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
Kazuo Saito	Advanced electronic engineering
Naoya Sasaki	Molecule dynamic simulation, Nanometer dynamics of lubrication and wearing
Takahiro Miki	Analog integrated circuit design

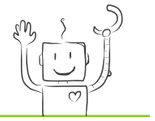
* will retire in March, 2020

Students Voice

Graduate Student / Yifei Sun

My current research is about electro-magnetic interference (EMI) reduction techniques in switching power converters. EMI problem is a big issue for electronic appliances; if they do not meet EMI regulations, they cannot be in the commercial market. Then the EMI noise spectrum spread technique of suppressing the peak levels at the fundamental frequency is widely used. However, it spreads the EMI noise also in the radio receiver signal band, which disturbs the radio receiver performance. Based on this background, my research target is set to reduce the EMI noise diffusion at the specific frequencies (radio receiver bands) when the EMI spectrum spread technique is employed. I have come up with new ideas to solve this problem, verified them with simulations and experiments, and presented their contents in international conferences.

Procedures for Entering Japan

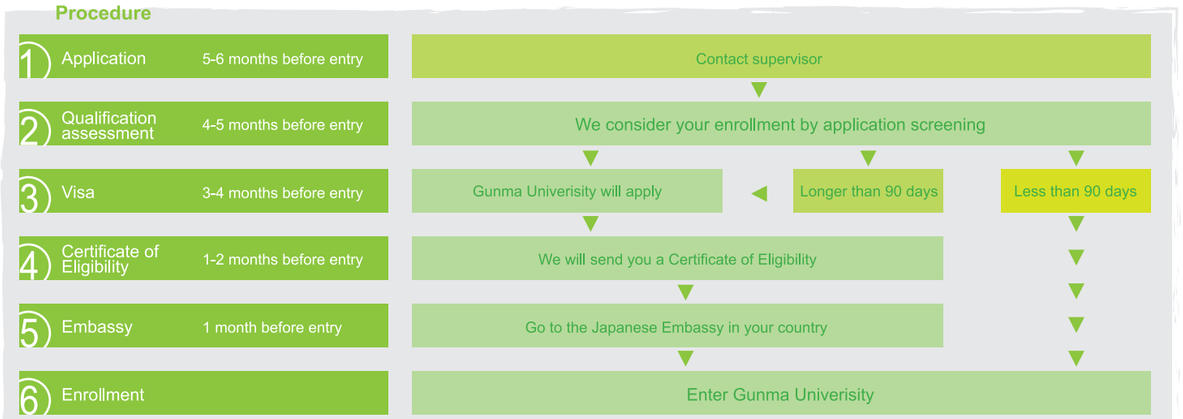


Students admitted to Gunma University as an “International Student (Ryugakusei)” should have a Certificate of Eligibility as a student. If a foreign student does not possess this status, services to international students, including scholarship applications, will not be available.

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

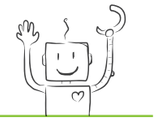
After completing the procedures for admission to Gunma University, you need to apply for a “Change of Residence Status” at the local immigration office. This is only necessary if your current status is not “Student.” If you will be moving to or near the campus from another city or town, you should go 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	20,000 to 30,000 yen
	Kitchen	
	With lavatory, shower and bath	

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

Keishin Dormitory

The Keishin Dormitory is next to Gunma University International House

	Facilities	Rent (Monthly)
A Type	Private kitchen, toilet, shower, and bath	25,000 yen
B Type	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.

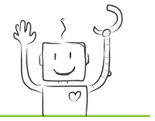
Japanese Government Scholarship

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.

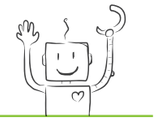
Table of Admission Procedures

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.

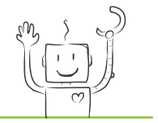
Application packages with application forms will be distributed from October. Please have one sent to you by Gunma University.

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.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

Data

Number of Students in school of Science and Technology

Government Scholarship　Private Funding

Area	Countries and Regions	Students		Graduate Students				Research Students				Exchange Students				Sub-total		Total
				Master's Program		Doctoral Program		Undergraduate		Graduate		Undergraduate		Graduate				
Japan		2,246		615		78		9		2								2,950
Asia	Malaysia	37														37		37
	Indonesia	4				2										6		6
	Korea						1										1	1
	Mongolia		3		3	2			1							2	7	9
	Vietnam		7		6		1										14	14
	China		9		28		14		5				6		3		65	65
	Taiwan				1										1		2	2
	Cambodia	3			1											3	1	4
	Thailand					3	1									3	1	4
	Philippines					1										1		1
	Laos				1		1										2	2
	Sri Lanka				2		1										3	3
	Total	44	19		49	8	19		6				6		4	52	96	148
Middle East	Iran					1										1		1
	Syria				1												1	1
	Total				1	1										1	1	2
Africa	Egypt		1		1												2	2
	Ivory Coast	1			1											1	1	2
	Total	1	1		2											1	3	4
Europe	France												2				2	2
	Total												2				2	2
	Total	45	20		45	9	19		6				8		4	54	102	156
		65		73				6				12						156

Academic Exchange Agreements

Agreements between Universities

Australia	University of Wollongong	Czech Republic	Technical University of Ostrava
Bangladesh	University of Dhaka	France	Universite'de la Me'diterrane'e (Aix-Marseille Ⅱ)
China	Xi' an Jiaotong University	Korea	Yeungnam University
China	Xiamen University	Korea	Seoul National University
China	Shenyang University of Chemical Technology	Republic of Azerbaijan	Baku State University
China	Noeth China Electric Power University	Singapore	Nanyang Technological University
China	Dalian University of Technology	Taiwan	National Formosa University
China	Dailian Polytechnic Unveisity	Thailand	Chiang Mai University
China	Institute of Process Engineering, Chinese Academy of Sciences	U.K.	Glyndwr University
China	Chongqing Jiaotong University	U.S.A.	North Dakota State University
China	Hainan University	U.S.A.	The State University of New York at Stony Brook

Agreements between Faculties

Bangladesh	Daffodil International University Faculty of Science and Information Technology	Indonesia	Jakarta State University
Belgium	University of Liege	Indonesia	Sumatran Institute of Technology
China	School of Instrument Science and Opto-electronic Engineering, Hebei University of Technology	Indonesia	Institut Teknologi Bandung, Faculty of Mathematics and natural Science
China	Shanghai Jiao Tong University (School of Mechanical Engineering)	Korea	College of Science and Technology, Yonsei University
China	College of Information Engineering of Yangzhou University	Korea	College of Engineering, Yonsei University
China	School of Mechanical Engineering Yangzhou University	Korea	The Research and Education Center for Advanced Silicon Materials
China	Jiangsu University of Science and Technology	Korea	Nano-Science Research Division, Korea Institute of Science and Technology
China	Shandong University	Korea	Dankook University, Center for Photofunctional Energy Materials
China	Fudan University	Korea	College of Environment and Applied Chemistry, Kyung Hee University
China	School of Mechanical and Electric Engineering/Artificial Organ Technology Lab Soochow University	Korea	Seoul National University of Science andTechnology
China	Research Center of Urban Environmental Engineering and Circular Economy of the Institute of Urban Environment, Chinese Academy of Sciences	Korea	Chungnam National University
China	School of Optic and Electronic Engineering, University of Shanghai for Science and Technology	Malaysia	Universiti Teknikal Malaysia Melaka, Facuity of Electronic and Computer Engineering
China	State Key Laboratory of Geohazards Prevention and Geoenvironment Protection,Chengdu University of Technology	Malaysia	Universiti Kebangsaan Malaysia
China	China University of Mining and Technology	Malaysia	Universiti Teknologi Petronas
China	School of Science, Northeastern University	Malaysia	Universiti Malaysia Pahang
China	School of Mechanical Engineering, Southwest Jiaotong University	Malaysia	Universiti Teknologi Mara (Terengganu)
China	Hunan University of Science and Technology	Sweden	Faculty of Textiles, Engineering and Business, University of Borås
China	Yangzhou University School of Hydraulic, Energy and Power Engineering	Taiwan	College of Engineering of Lunghwa University of Science and Technology
China	School of Optoelectronics and Communication Engineering, Xiamen University of Technology	Taiwan	College of Engineering National Chiao Tung University
China	Tianjin University	Taiwan	National Central University
China	School of Materials Science and Engineering Hebei University of Technology	Taiwan	I-Shou University
Czech Republic	Technical University of Ostrava	Taiwan	National Chin-Yi University of Technology
France	Institut Polytechnique des Sciences Avancees (IPSA)	Thailand	Faculty of Science, Mahidol University
France	École Nationale Supérieure de Chimie de Montpellier	Thailand	Faculty of Engineering, Chulalongkorn University
France	Ecole Superieure D'ingenieurs en Electrotechnique et Electronique Paris	Thailand	King Mongkut's University of Technology Thonburi
India	Chitkara University	Thailand	King Mongkut's Institute of Technology Ladkrabang
India	Hindustan University	Thailand	Rajamangala University of Technology Isan
		Thailand	Thai-Nichi Institute of Technology
		Vietnam	Faculty of Mechanical Engneering, Hanoi University of Science and Technology
		Vietnam	Hanoi Irradiation Center, Viet Nam Atomic Energy Institute