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Kyushu University Program for Leading Graduate Schools
Advanced Graduate Program in Global Strategy for **Green Asia**

BULLETIN 2013 Vol. 1

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Kyushu University Program for Leading Graduate Schools
Advanced Graduate Program in Global Strategy for **Green Asia**

President, Kyushu University

Setsuo ARIKAWA

As discussed in the third proposal of the Japanese government's Council for the Implementation of Education Rebuilding, titled “University Education and Global Human Resource Development for the Future”, it is strongly required to make an educational environment at universities that can compete with the best in the world for responding to globalization.

As one of the leading universities in Japan, Kyushu University has been conducting education, research, and medical activities of the highest standards, and produced many outstanding graduates. When it reached the 100th anniversary of its founding in 2011, the university established as its basic principle that it would “enhance its reputation as a world-class educational and research institution propelled by the energy and enthusiasm needed to rise to challenges in the future”. The university proclaimed a plan of action, aiming for nine positional objectives, such as to be “a university that leads the local community and global society”.

In 2012, the Ministry of Education, Culture, Sports, Science and Technology selected the “Advanced Graduate Program in Global Strategy for Green Asia” as part of its Program for Leading Graduate Schools, in the multidisciplinary field. This educational program is of a new type, combining the early part of master’s education and the latter part of post-graduate studies into a five-year course.

The program aims to cultivate exceptional leaders in the field of engineering who can contribute to the achievement of Green Asia, a term referring to an Asia in which economic growth and greater environmental progress occur simultaneously. This program is engaged in developing young professionals who can become original international leaders with the ability to view things on a bigger scale. These professionals can work to achieve a Green Asia—that is, to avoid the expansion of energy consumption in Asia and the massive consumption of fossil fuels in the countries of Asia, while realizing sustainable development.

Kyushu University has been supporting these activities.

Message's

Dean/Professor, Department of Molecular and Material Sciences Interdisciplinary Graduate School of Engineering Sciences, Kyushu University
Program Director

Hideharu NAKASHIMA

The "Advanced Graduate Program in Global Strategy for Green Asia" is a new combined Masters/Ph.D. program. The purpose of the "Green Asia" program is to incubate leaders who can take on the challenges of balancing greening and economic development in the Asia region.

The entire world faces an inevitable demand of achieving sustainable economic growth while preventing mass consumption of fossil resources. With the ever-widening gap between rich and poor compounded by globalization, the rapid rise of energy consumption in Asia, and the fossil resources price hike, effective strategy and action is required to tackle the emerging environmental and resource issues.

Asia is a melting pot of diverse social and cultural structures, and it is also a vigorous region with fast paced economic development. Japan, as part of the Greater Asia community, needs to work with other nations to develop a sustainable global model to realize a Green Asia. Therefore, the training and formation of a global network of leaders is an indispensable part of this program. In addition, our program offers the first-rate education available, and trains individuals who have global vision to work across a wide spectrum of platforms in industrial, academia, and politics. We will execute our unique educational plan in Asia, and then extend our mission to be applied worldwide. With this approach, we are supporting a radical reformation of the graduate school system in Japan, and promoting the formation of a future-oriented renowned educational institution in the world.

Professor, Department of Molecular and Material Sciences, Interdisciplinary Graduate School of Engineering Sciences, Kyushu University
Program Coordinator

Akira HARATA

In order for Japan to become a world leader in science and technology, it is extremely favorable to construct a developing society that utilizes its strong leading edge industrial base and green technology in the international community, especially the Asian sphere, the Middle East and the Oceania region.

Asia is currently undergoing rapid economic development, as well as resources exhaustion and increasing environmental pollution. However, these issues involve economic development, political system, history, culture, and other characters that are strongly bonded in each nation. Therefore, we need a momentum from leading edge science and technology with continuous innovation to develop a global society that can work beyond national boundary.

"Green Asia" is a phenomenal idea to ensure the coexistence of economic expansion and "greenification" (saving resources and environmental conservation). It is also an icon of understanding and cooperation among individuals who care about our environment and who are willing to contribute with extended knowledge in science. With the mission of "Green Asia" we have built a unique program. Graduate students who are in one of the three specialized majors: material science, system engineering, and resource engineering, will also study in the subjects of environmental science and basic sociology and economics. In addition, with the practical experience inside and outside Japan students can acquire the five abilities (research, practice, global perspective, system landscape and leadership) at the end of the program. As a result of the leadership development program individuals will map a human resource network in Asia.

The three departments at the Interdisciplinary Graduate School of Engineering Sciences (IGSES) and the Department of Earth Resources Engineering of Kyushu University, which are the pillars of this program, have been accepting students from a wide array of educational and cultural backgrounds to promote global education in graduate studies. Our university emphasizes the educational innovation of graduate schools to develop human resources for the global field through the GP program (2005-2006: IGSES), the Global CEO program, Novel Carbon Resource Sciences (2008-2012: IGSES),

Message's

Project Campus Asia (2011-2015: IGSES), and Support for the Formation of Collaboration Programs with ASEAN Universities (2012-2016: Faculty of Engineering) in recent years.

Program features

1) Development of the Education Systems: Accepting a wide range of domestic and international students, providing interdisciplinary graduate education, as well as promoting graduate school reform.

2) Curriculum: In addition to the science and engineering curriculum (including international and industrial internships, international exercise), humanities and other social science subjects are included in the curriculum (Green Asia research paper).

3) Mentoring Care Unit (MCU): Introducing an evolutionary guidance care unit.

4) Asia Collaboration Network & Government-Industry-Academia Partnerships: Bridging with over 30 research institutes in Asia, and working with 58 organizations locally in Japan. Constructing a framework of the Green Asia Industrial Theory through humanities and sciences.

5) Education Quality Assurance and External Assessment: Preparing an educational results and guidance portfolio by students.

6) Added-value Oriented Green Engineering: Training individuals to have the abilities of upstream thinking, problem identification / analysis, and expansion / integration to accomplish the goal of "Green Asia."

7) Establishment of the Center for the Advanced Graduate Program in Global Strategy for a Green Asia

The following training principles are the five necessary abilities for leaders in the fields of science and technology: research (creativity), practical (strategic thinking, collaborative and management skills), global perspective, system landscape and leadership.

- Research: Students are advised to take general education courses (environmental studies / energy & resources) at an introductory level, and subsequently, leads to in-depth specialized subjects of students' interests. In order to broaden knowledge in the specialized subjects, students are required to attend seminars of other research groups for a year. In addition, students are required to give an interim presentation including research progress and attended seminars in the second semester of the first year. Students are also required to defend their master's theses at the end of the second year, present their doctoral theses progress at the end of the fourth year.
- Practical: Based on the understanding of the Intellectual Property Theory and the Practical Theory from industrial researchers and technical experts (Intensive course), students are required to gain corporate internship experience in Japan from two ~ three weeks up to two months.
- Global Perspective: Lecturers are invited to hold debates (forums) allowing students to discuss problems and potential solutions on a given subject. Forums are held collaboratively with universities overseas every six months on a specific theme. Students are also required to intern at a partnered overseas university (2 months) and corporation (2 months).
- System Landscape: Economics, politics, philosophy, Asian cultures & international relations, and theory for corporate leadership related to the subject of environmental studies / energy & resources are required to shape a global leader. In addition, students are invited to domestic and overseas collaborating institutions (1 week) to observe the current affairs, and held seminars and debates to discuss those issues.

Our quality guarantee of the program

- Qualifying Exam: Evaluate basic knowledge and research ability upon program entrance.
- Accumulation Test: In the first half of the course, students are required to pass exams based on the course content given in three consecutive months. In the second half, students are to be evaluated on specialized knowledge given each month. Obtaining a passing score is needed to fulfill the degree requirement.
- Program Report: Students are asked to submit a report on the instruction they received in the program and attend an interview.
- Interim Presentation: Students are required to write an interim report and give an oral presentation on their doctoral thesis (one year prior to graduation).
- Degree Examination: Accumulation Test is given one year prior to acquisition of the degree. The result of the course report and the abstract of the doctoral thesis are assessed externally for degree evaluation. Lastly, completion and submission of the doctoral thesis, public hearing (defense), and assessment are required for obtaining the Doctoral Degree of Engineering Sciences.

Education is our mission. We would like to invite you to witness how our program can shape individuals to take on the challenge of creating a truly Green Asia.

Program for Leading Graduate Schools

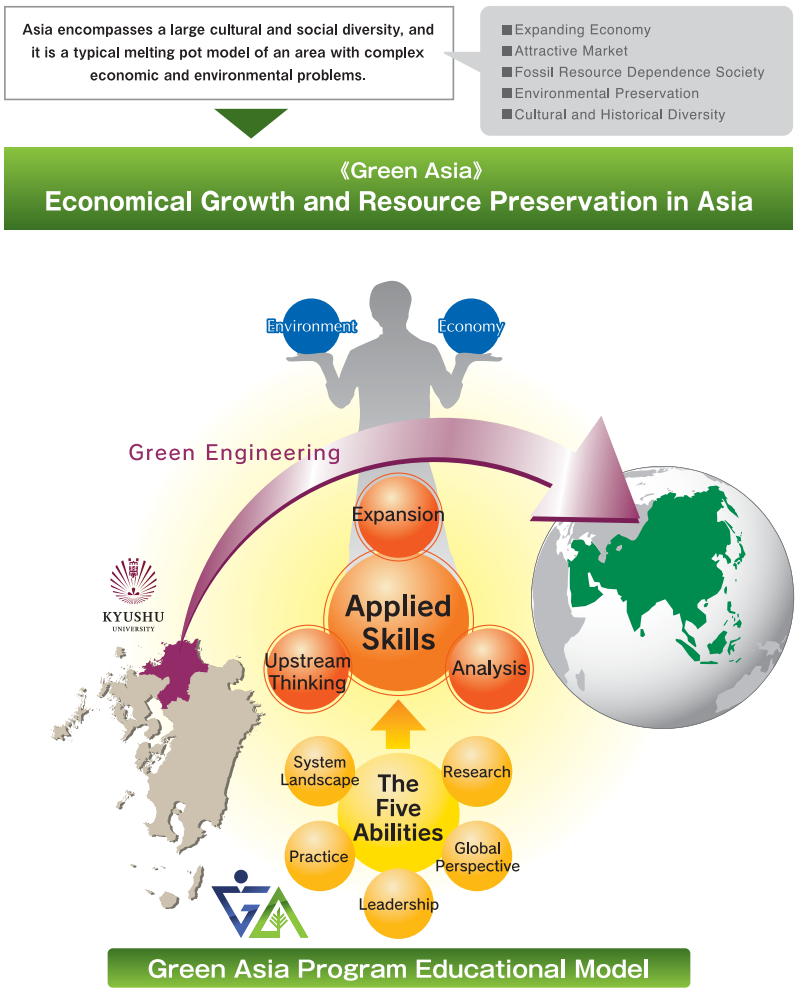
The Program for Leading Graduate Schools seeks to recruit talented individuals with traits of creativity and foresight who can play an active role in government, industry, and academia on a global scale. Our program offers the first-rate education available, and trains students to work across a wide spectrum of platforms. With this approach, we are supporting a radical reformation of graduate school system in Japan, and promoting the formation of a future-oriented renowned educational institution in the world.

Kyushu University Interdisciplinary Graduate School of Engineering Sciences (IGSES) and the Department of Earth Resources Engineering have teamed up to build a unique curriculum for this particular program. Graduate students who are enrolled in one of the three specialized majors: materials science, system engineering, and resource engineering, will also study in the subjects of environmental science and basic sociology and economics. In addition, with the knowledge and practical experiences gained domestically and overseas students will be able to attain the five abilities (research, practical, global perspective, system landscape and leadership), to bridge a human resource network in Asia, and to receive the doctoral degree with "Advance Graduate Program in Global Strategy for Green Asia" certification at the end of the program.

Energy Innovation from Asia to the World Leadership Program in Science and Technology

Our educational program aims at developing leadership in science and engineering to realize a balanced greening and economic growth in Asia. The entire world faces a challenge of maintaining positive economic growth, while drastically reducing resource consumption. Asia encompasses a large cultural and social diversity, and it is a typical melting pot model of an area with complex economic and environmental problems.

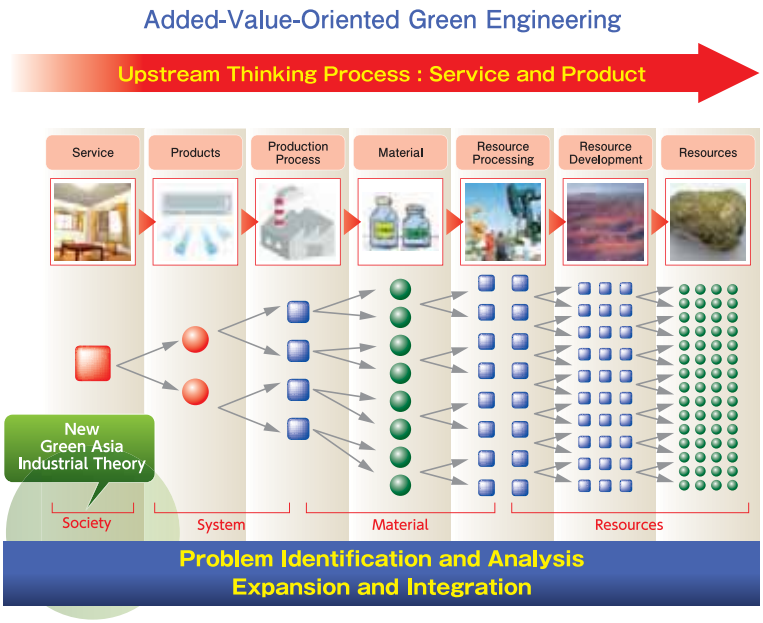
An effective strategy was never implanted for countries to accomplish sustainable economic growth while dealing with environmental and resource restrictions related to mass consumption of fossil fuels. In this century, the role of our country is to develop a sustainable global model to realize a Green Asia. Negative influences from globalization have emerged, such as the ever-widening gap between the rich and poor, rapid energy consumption in Asia and fossil resources price hike. The Global Strategy for Green Asia is a flexible approach based on social, industrial, and economical independent development that has grown from Asian and Oceanic history and culture. Such approach with a strong global network generates a synergistic effect between greening and growth.



Candidate Cultivation

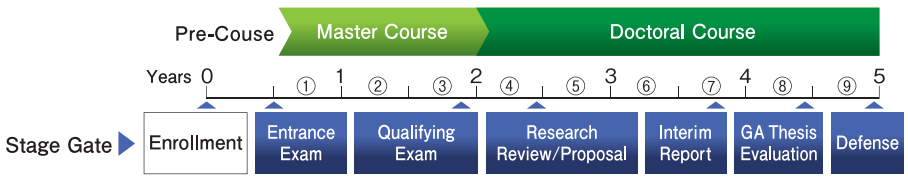
Cultivating leadership in science and engineering, with the concept of added-value-oriented green engineering, to ensure the coexistence of greening and economic growth (Green Asia).

Successful candidates have the opportunity to be trained in one of the three specialized fields: materials science, system engineering, and resource engineering, with additional lectures on the topics of environmental science, fundamental sociology and economics. Furthermore, candidates can network with other professionals in Asia through educational trainings done domestically and abroad. Finally, candidates who fulfilled all the required training can assume a leading role in the field with the five abilities of research, practice, global perspective, system landscape and leadership.



Program Features

1. Education System Development: Accepting a wide range of domestic and international students, providing interdisciplinary graduate education, as well as promoting graduate education reform.
2. Curriculum: In addition to the science and engineering curriculum (including international and industrial internships, international exercises), humanities and other social science subjects are included in the curriculum (Green Asia research paper).
3. Mentoring Care Unit (MCU): introducing an evolutionary guidance care unit.
4. Asia Collaboration Network & Government-Industry-Academia Partnerships: Bridging over 30 research institutions in Asia, and working with 58 organizations locally in Japan. Constructing an Industrial System in Green Asia through humanities and sciences.
5. Education Quality Assurance and External Assessment: Preparing an educational results and guidance portfolio by students.
6. Added-Value-Oriented Green Engineering: Training individuals to have the abilities of upstream thinking, problem analysis, and expansion to accomplish the goal of a “Green Asia.”
7. Establishment of the “Green Asia Education Center.”

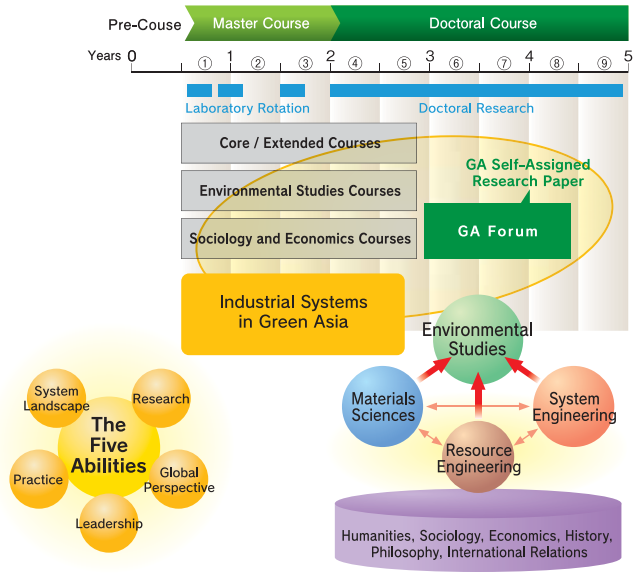


- **5-year joint Masters/Ph.D. Program**
  Program begins 6 months after April enrollment
- **Learning and Growing Together**
  Japanese and international students (in 1:1 ratio) of 20 in total are placed in each class year
- **Financial Aid : Scholarship is provided**

Degree Highlight (1) Liberal Arts and Sciences Interdisciplinary International Education Program

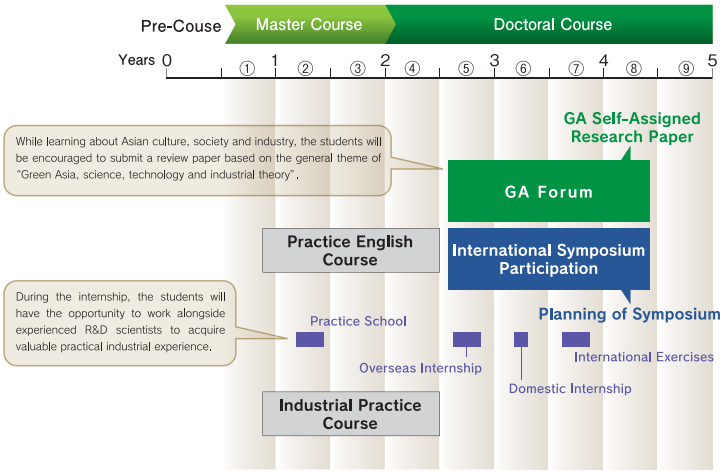
The five-year joint program is designed for students to develop the abilities of research, practice, system landscape, global perspective and leadership in a balanced way. The students and their mentors and tutors should be able to appreciate the apparent development in the learning process.

The abilities of research and system landscape are developed by taking lectures from the core and extended courses in one of the three specialized majors of materials science, system engineering, and resource engineering. In addition, lessons from the topics of environmental science, basic sociology and economics, English practice, and industrial practical training would lay a concrete foundation in acquiring the abilities of system landscape, global perspective, and practice.



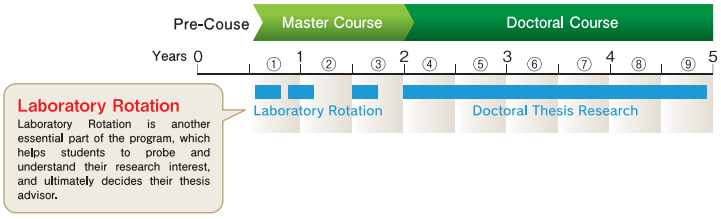
Degree Highlight (2) Domestic & Overseas Internship Programs

By participation in this internship program the students will gain valuable work experience in industrial and/or research institutes throughout Japan and in key overseas locations, thus fostering their practical and leadership abilities. The various activities will be organized as a sequence of practical schools lasting from 2 to 3 months, overseas internships lasting from 2 to 3 months and finally a short domestic internship of duration 2 to 3 weeks. During the practical school, each student will be free to choose from a range of organizations and potential technical mentors and then make detailed plans regarding the execution of the project under the guidance of their chosen mentors. After approximately 2 years the student will have the opportunity to acquire a second period of work experience with the same host organization and technical mentors as chosen previously.



Degree Highlight (3) Laboratory Rotation

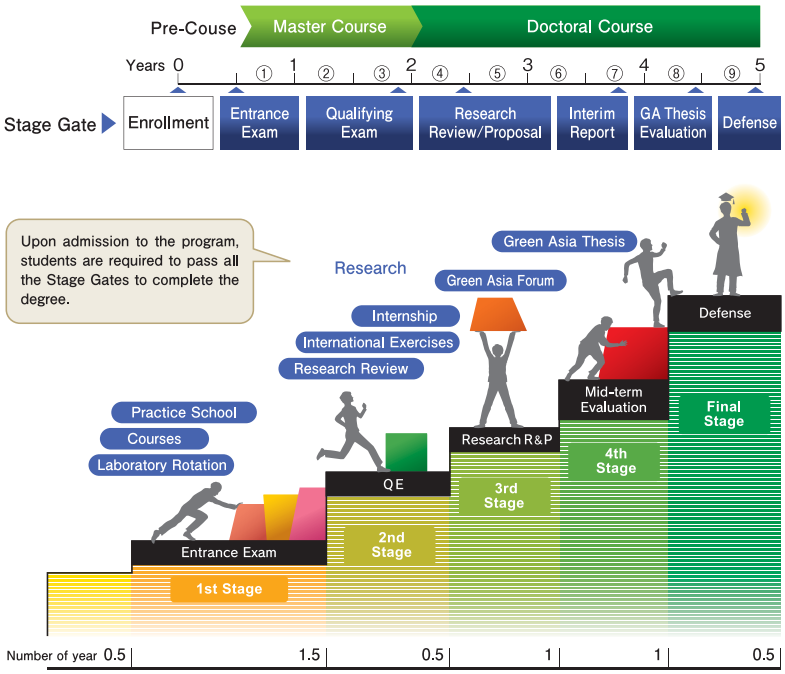
The laboratory rotation system enables students to work in three different research environments for approximately three months at each location. Unlike the conventional master's program, students are encouraged to select multiple research environments and learn to approach problem from diverse research perspectives.



Degree Highlight (4) Stage Gate System

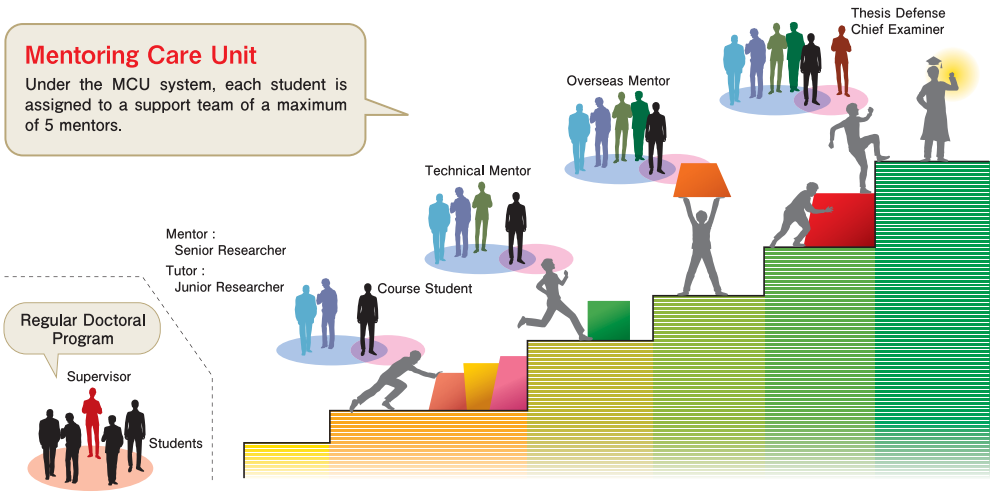
A 5-level Stage Gate System is introduced to ensure the equality of our graduate program. Students are required to pass each Stage Gate to advance to the next level.

(1) Stage Gate 0: Entrance Examination
(2) Stage Gate 1: Qualifying Examination (QE)
(3) Stage Gate 2: Research Review / Proposal
(4) Stage Gate 3: Interim Report
(5) Stage Gate 4: Green Asia Thesis Evaluation
(6) Stage Gate 5: Defense



Degree Highlight (5) Mentoring Care Unit (MCU) Study Support

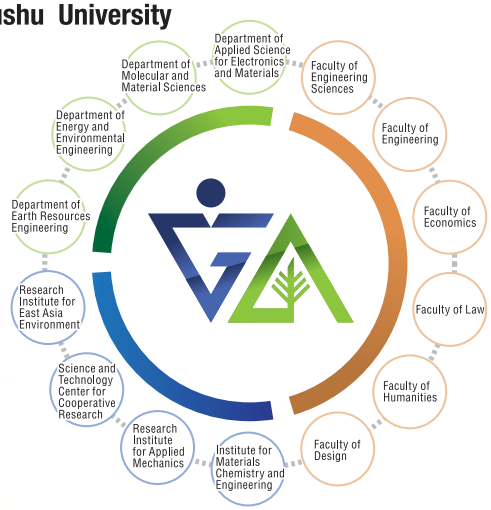
The MCU guidance system is supported by a group of professional personnel. The system is primarily composed of a mentor (senior researcher: program leader), tutor (junior researcher: program assistant), overseas mentor and technical mentor (overseas internship and domestic practice school supervisors).



Partner Organizations

The three departments (Applied Science for Electronics and Materials, Molecular and Material Sciences, and Advanced Energy Engineering Sciences) from the Interdisciplinary Graduate School of Engineering Sciences and the Department of Earth Resources Engineering from the Graduate School of Engineering are the four pillars of this program, which partner with research institutions within the Kyushu University system, as well as private sectors, local governments, and academic institutions overseas. Moreover, we have an extensive partnership network with six collaborative institutions overseas and thirty collaborative institutions in the Asia/Oceania region, which is a significant characteristic of our program.

Kyushu University



Government-Industry-Academia Partnerships

Korea
- Seoul National Univ.
- Pohang Univ. of Sci. and Tech.
- Sejong Univ.
- Pusan National Univ.

Mongolia
- Mongolian Academy of Sciences
- Mongolian Univ. of Science and Technology

China
- Peking Univ.
- Tsinghua Univ.
- Shanghai Jiaotong Univ.
- The Chinese Academy of Sciences

Taiwan
- National Taiwan Univ.

Thailand
- Mahidol Univ.
- Suranaree Univ. of Tech.
- Chulalongkorn Univ.

Vietnam
- Hanoi University of Science and Technology(HUST)

Bangladesh
- University of Dhaka

India
- Indian Inst. of Tech.
- Central Electrochemical Research Inst.
- National Environmental Engineering Research Inst.

Philippines
- Univ. of the Philippines

Malaysia
- Univ. Teknologi Malaysia
- Malaysia-Japan Intl. Inst. of Tech.

Singapore
- National University of Singapore

Indonesia
- Gadjah Mada University
- Institute Teknologi Bandung

Australia
- The Australian National Univ.
- Monash Univ.
- Curtin University of Technology
- The University of Queensland
- The University of New South Wales
- Commonwealth Scientific and Industrial Research Organization

GA Personnel

Hideharu Nakashima

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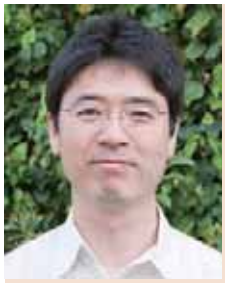

Satoshi Hata
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Specialization: Mechanical Engineering and Thermal Engineering
Research: Development of next generation type energy conversion system; Modification of heat pump system; Heat transfer property of carbon dioxide in supercritical and sub-critical region
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Specialization: Environmental Engineering and Public Health Engineering
Research: Indoor environmental physics; indoor environment chemistry; indoor environment microbiology; public health engineering
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Specialization: Urban Environmental Engineering
Research: Numerical analysis by urban canopy model, Heat island phenomenon, Ecological environmental mitigation effect, Investigation of the exchange process of heat and molecule in the atmosphere of one city, Microatmosphere observation in urban space, Wind tunnel model experiment related to the air flow pattern in urban space, Evaluation methods of sustainable designs in architecture and cities
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Research: Advanced carbon resource disposal and recycling; Reuse of hollow spherical particles from coal emissions; Changing wood biomass and unused, low-quality carbonized hydrogen resources into fuel; Complete recycling of concrete emissions through pyro-processing method; Development of wastewater selection processes
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Research: Isolation and use of micro-organisms for biomineralization; Development of bio-remediation technology using eosinophilic bacteria; Immobilization of arsenic using thermophilic iron-oxide bacteria
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Graduate School of Engineering

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Research: Research and development of sea-based floating compound wind farms; Research and development of small high-efficiency hydroelectric systems using lens watermills; Research on effective utilization of wind energy; Research on local wind condition prediction methods
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Research: Environmental economics based on micro-economic theory; Game Theory analysis of global environmental problems; Effects of uncertainty and irreversibility in environmental policy; Self-restriction in international environmental conventions; Game Theory
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Research: Research on the cultural restructuring process resulting from globalization and the level of relationship between contemporary Japan and the rest of Asia, from the perspectives of cultural anthropology and sociology
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Research: Landscape engineering research regarding water abundance and cleanliness in the waterspace of rivers, watersheds, etc.
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List of Mentors

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Prof. Rudy Sayoga Gautama
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Prof. Megat Johari Megat Mohd Noor

Dean & Professor, Malaysia Japan International Institute of Technology(MJIIT), Universiti Teknologi, Malaysia

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Deputy General Manager, Airconditioning Manufacturing Div. Daikin Industries, Ltd.

Mr. Takahiro Tsuneyoshi
Green Asia International Strategic Comprehensive Special Zone
(Director, Strategic Comprehensive Special Zone Promotion Division, Fukuoka Prefectural Government)

Dr. Tatsuro Harada
Research Planning Group Research Institute Kyushu Electric Power Co., Inc. (Visiting Associate Professor, Kyushu University)

Dr. Manabu Takahashi
Fellow, General Manager, Head of Sheet & Coil Lab, Steel Research Laboratories
Technical Research & Development Bureau Nippon Steel & Sumitomo Metal Corporation

Dr. Yoshiaki Mori
Deputy General Manager, Planning & Administration Department,
Technology Division Sumitomo Metal Mining Co., Ltd.

Dr. Itsuhiro Fujii
Administration & Planning Dept. Corporate Research & Development Ube Industries, Ltd.

Bidyut Baran Saha

Professor, Green Asia Education Center

Specialization:
Thermal Engineering, Heat Transfer Engneering, Engineering of Refrigerating and Air-conditioning

Research:
Thermally powered adsorption cooling and desalination systems; Energy efficiency assessment

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Bidyut Baran Saha obtained his B.Sc. (Hons.) and M.Sc. degrees from Dhaka University, Bangladesh in 1987 and 1990, respectively. After that he had worked as a Bose Fellow at the same institution during 1991 to 1992. He received his Ph.D. degree in 1997 from the Tokyo University of Agriculture and Technology (TUAT), Japan. He joined to the Mechanical Systems Engineering Department of TUAT as an Assistant Professor soon after finishing his Ph.D. degree and had been promoted to Associate Professor in 2000. In 2001, he joined at the interdisciplinary Graduate School of Engineering Sciences of Kyushu University and worked until 2008. In 2009, he joined to the Mechanical Engineering Department of the National University of Singapore as a Senior Research Fellow and Co-PI under a NUS-KAUST special contract program. He joined to the Mechanical Engineering Department of Kyushu University in 2010 as a Professor. Currently he is working at Kyushu University's Program for Leading Graduate School, Green Asia Education Center as a Professor. He has also been working as a Professor at the International Institute for Carbon-Neutral Energy Research (WPI-I^{2}CNER) in the Division of Thermal Science and Engineering since its inauguration. His main research interests are thermally powered sorption systems, adsorption desalination, heat and mass transfer analysis, and energy efficiency assessment. He has published more than 250 articles in peer-reviewed journals and international conference proceedings. He has edited four books and holds ten patents. Recently, he has served as Guest Editor for Applied Thermal Engineering and Heat Transfer Engineering journals. He is the editorial advisory board member of Applied Thermal Engineering journal, editorial board member of Advances in Mechanical Engineering, Open Mechanical Engineering Journal (OMEJ), Open Thermodynamics Journal (OTherJ) and AIMS Energy.

■ **Research Interests**: The breath of his research interests lies mainly within the fields of adsorption (Ad) science and technology for refrigeration and air conditioning, gas storage and desalination applications. These include technological innovation of thermally powered adsorption systems which involve the design, optimization, construction and demonstration of several innovative thermally driven adsorption (solid/vapor) systems, namely, two–stage absorption chiller, three–stage adsorption chiller and conventional multi–bed adsorption chiller. These chillers can re–utilize low temperature waste heat for useful cooling applications thereby reducing the environmental pollution (thermal as well as gaseous emissions) as lower fossil fuel inputs are required at the power station. All three innovative systems use silica gel–water as the adsorbent–refrigerant pair. This pair is well suited to low–temperature heat utilization and is environmentally benign. The first two chillers can exploit waste heat around 50°C in combination with a coolant at 30°C. No other system can produce cooling energy with this extremely low driving source temperature.

■ **Adsorption desalination**: *The availability of " fresh water" as a search for quenching global thirst remains a pressing concern throughout the world especially in Asia, although most of Earth's surface is covered by oceans or saline water*. Adsorption desalination (AD) is a novel method of producing potable water, despite the adsorption cycle, for cooling applications found in chemical, power and co-generation plants. There are several kinds of commercial-scale desalination plants in many water scarce countries, and all of the commercial-scale desalination methods are found to be either highly energy-intensive to maintain the processes of desalination or prone to serious erosion and fouling problems in the evaporating units operating at elevated evaporating temperatures. The AD cycle is proposed to mitigate the shortcomings of the conventional desalination methods. The advantages of the AD cycle are that (1) it employs waste heat at low temperatures for the cycle, temperatures of 85°C or lower; (2) The vaporization of saline or brackish water in the evaporator is kept at a low temperature, typically between 20–25°C, to mitigate problems of corrosion and fouling; and (3) the complete elimination of any bio-contamination by desorption at 65°C or more where any unwanted aerosol-entrained microbes or cells from the evaporator would be killed.

■ **Energy storage systems**: Clean energy has played only a small part in today's energy picture, but it will contribute significantly in the future. Natural gas (NG) is a potentially attractive fuel for automobiles as NG vehicles are environmentally friendly, emitting less carbon dioxide and several other air pollutants. The conventional techniques of using a compressed natural gas (CNG) source are problematic as high pressures are required. So there is great motivation to develop more efficient low-pressure gas storage systems.

An alternative but promising method of storing hydrogen is to employ the adsorption know-how where the adsorbed system utilizes the vapor uptake properties of adsorbent but at a much lower gas pressures. Adsorbate, such as methane or hydrogen, could be stored at lower pressures but sacrificing marginally on the storage capacity. Highly porous activated carbons are used as adsorbent and the adsorbed phase lowers the pressure in the storage vessel and thus providing higher safety. In the adsorbed form, the quantity of methane storage is comparable to most commercial systems employed to date.

Hiroshi Furuno

Associate Professor, Green Asia Education Center

Specialization:
Organic Chemistry

Research:
Fine organic synthesis; Asymmetric catalysis; Rare earth metal complex catalyst; Environmentally-friendly synthetic method; Reusable catalyst; Self-organized polymeric complex catalyst; Ionic liquid as reaction media; Chirality sensing and probing

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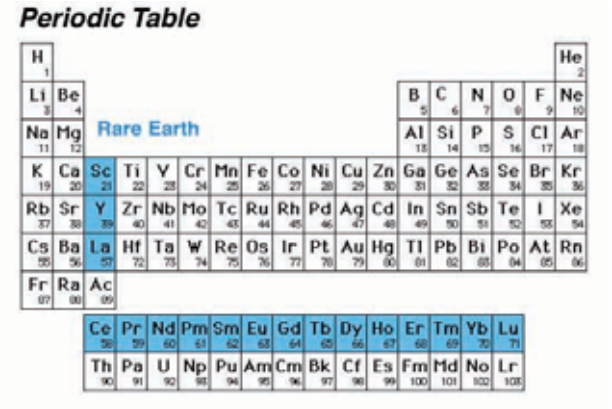
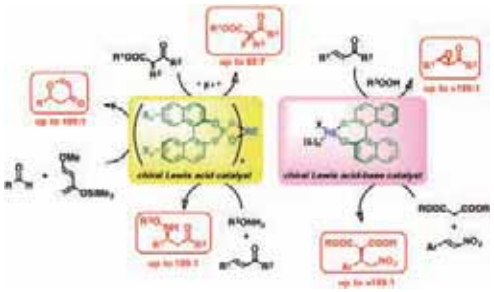
Hiroshi Furuno was born in Sasebo, Nagasaki, Japan in 1971. He received his Ph.D. degree in 2000 from Kyushu University under the supervision of Professor Junji Inanaga. After spending a year (2000) as postdoctoral fellow at Venture Laboratory in Kyoto Institute of Technology, he was appointed as Research Associate at Institute for Fundamental Research of Organic Chemistry (IFOC), Kyushu University. He moved to Institute for Materials Chemistry and Engineering (IMCE) as Research Associate in 2003 due to the reorganization of IFOC, and then became Assistant Professor in 2007. In March 2013, he joined to Advanced Graduate Program in Global Strategy for Green Asia as Associate Professor of Green Asia Education Center.

Furuno has conducted research in the field of synthetic organic chemistry; particularly, focused on the development of catalyst systems with new functions, which can be used for fine organic syntheses, and molecules to realize effective chiral discrimination and control, and asymmetric induction.

For example, rare earth metal ions have been widely used as ingredients essential for various functional materials, e.g., magnets, luminant, solid catalysts for petroleum processing or exhaust emission control, solid electrolytes, superconductors, and hydrogen storing alloys. From the viewpoint of synthetic organic chemistry, they also have unique characteristics such as strongly Lewis acidities, large coordination sphere, and high coordination numbers. However, successful examples of their use for fine organic syntheses have been far more limited than that of other transition metal ions. Thus, Furuno has been trying to develop practical catalyst reaction systems, function of which could be achieved by using rare earth metal ions, particularly, in asymmetric catalysis. Concretely, he designed and synthesized highly-functional rare earth metal complexes that can work as practical Lewis acid and Lewis acid-base catalysts achieving both high activation ability and stereoselectivity.





Also recently, the development of environmentally-friendly methodology has been strongly desired in synthetic organic chemistry. In particular, disposal of expensive and toxic heavy metal complexes and heavy consumption of organic solvents have been recognized as a problem to solve. Furuno has tried to develop recoverable and reusable homogeneous and heterogeneous catalyst systems, to use recoverable reaction media for fine organic syntheses, to develop solvent-free reaction systems, and to combine them to realize new sustainable catalyst system. Furthermore, he has researched for organic molecules that function as chiral discrimination agents or chirality censors.

Andrew M. Spring

Assistant Professor, Green Asia Education Center

Specialization:
Polymer Chemistry and non-Linear Optics

Research:
Design and preparation of high Tg poly(norbornene) derivatives by Ring Opening Metathesis Polymerization (ROMP) for use as electro-optic (EO) polymer hosts for high molecular hyperpolarizability chromophores.

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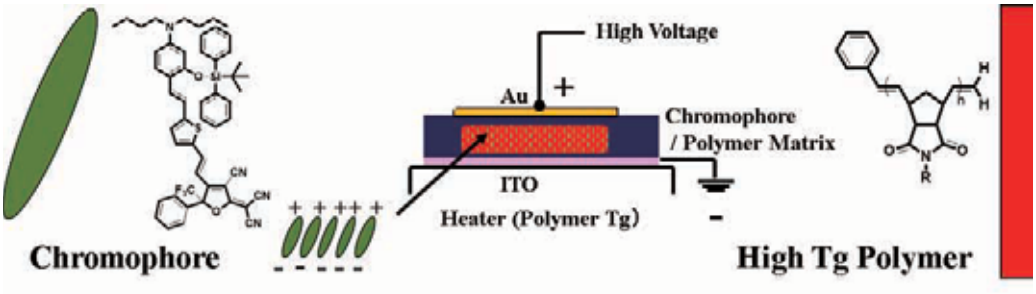
Andrew M. Spring obtained his Master of Chemistry (MChem) qualification in 2006 from the University of Hull in his native East Yorkshire, England. After graduation he aspired to continue his studies to PhD level having decided to focus more specifically on polymer chemistry and organic synthesis. He was awarded his PhD in 2010 from the University of Manchester, England, having researched the synthesis of poly(phenylenevinylenes) (PPVs) *via* microwave assisted ring opening metathesis polymerisation (ROMP). Andrew then chose to leave England and accepted a postdoctoral research position at the University of Florida, Gainesville, USA in 2010. While there he helped develop new polymeric materials prepared by acyclic diene metathesis (ADMET) for the dispersal of carbon nanotubes. Andrew then decided to look for a research position in Japan. Finally he moved to Kyushu University, Fukuoka, in 2011 and joined the Yokoyama research group as a postdoctoral research assistant, where he focused on the synthesis of new norbornene derived polymeric materials for use in non-linear optics. In 2013 Andrew joined the Green Asia Education Centre as an assistant professor.

Current Research Interests:

Organic electro-optic (EO) materials are based upon the EO effect that quantifies the relationship between the refractive index changes (Δn) of the material upon application of an applied electric field (E). The magnitude of this change is related to the materials EO coefficient (r_{33}) as described by the equation; $\Delta n = -1/2n^3 r_{33} E$. Organic and polymeric EO materials have proved advantageous over their classical inorganic counterparts such as $LiNbO_3$ due to a higher r_{33}, fast response times, and easy device fabrication. Potential high-tech applications include telecommunications, THz generators, and photonic nano-micro devices. When considering a potential polymer matrix, we must search for a material with a high chromophore miscibility, good optical transparency, thermal stability, and a controllable glass transition temperature (Tg). The poling of an EO system involves the simultaneous heating of the material to near the polymer Tg and the application of a strong electric field. After the maximum possible chromophore orientation, the sample is rapidly cooled and the electric field removed. If the polymer is a suitable matrix the sample will retain a large degree of chromophore orientation and hence exhibit a high r_{33}.

When mixed with a polymer matrix, chromophore aggregation at higher loading densities is a common problem. Possible solutions involve using a side chain polymer, a bi-chromophore system and a complex polymeric 3D network such as a polymer brush. All these efforts can be used simultaneously to yield a material which can support a high chromophore concentration and prevent the natural thermal relaxation of the system when the electric field is removed.



Yuuichi Orimoto

Assistant Professor, Green Asia Education Center

Specialization:
Quantum Chemistry, Theoretical Chemistry

Research:
Development of highly-efficient calculation method for the electronic structure of huge bio-molecules; Development of quantitative analysis method of intra-molecular orbital interactions (stereoelectronic effects etc.); Quantum chemistry based design of conductive, magnetic, and non-linear optical organic materials

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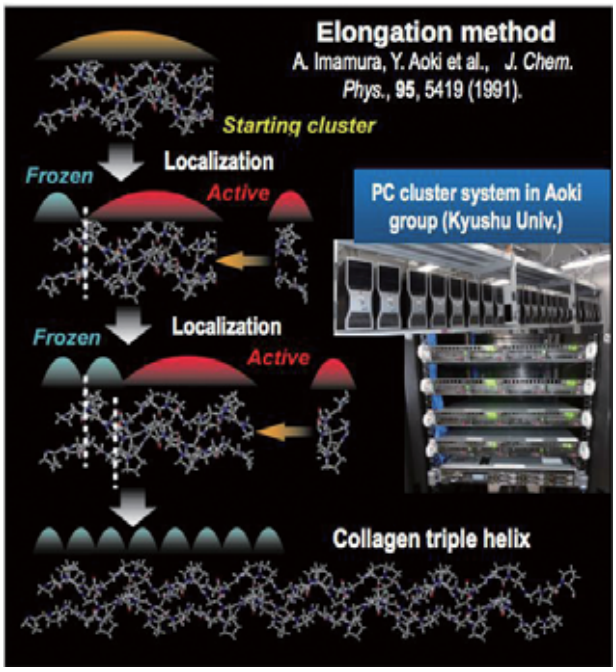
I was born in Hiroshima prefecture located within ca. 300km of Fukuoka. My hometown is very near from Miyajima island (Itsukushima) known as one of the three most scenic spots in Japan. I entered Hiroshima Univ. and studied quantum chemistry & theoretical chemistry under the mentorship of Prof. A. Imamura and Prof. Y. Aoki (she is now Prof. of Kyushu Univ.). My main research topic there was the development of through-space/bond interaction analysis method to quantitatively examine the specific orbital interaction(s) in a molecule for elucidating the mechanism of the electronic property, chemical reaction, etc. I received doctorate of science from Hiroshima Univ. on this topic. After a while, I moved to Kyushu District and worked as a postdoctoral researcher at Fukuoka (Kyushu Univ.) and Saga (AIST, Kyushu) prefectures. And, last year I've joined the GA program as an assistant professor.

In the quantum chemistry field, various chemical phenomena are researched on paper and computers from the microscopic standpoint based on quantum mechanics. Although hard- and software have been developed recently, there are still many difficulties in the conventional treatments.



For example, the electronic structure calculations of DNA, proteins, etc. are still very hard (often impossible) by the limitation of computational costs. This is because conventional methods require $N^{3\sim4}$ order cost, where the N means system size. Under this situation, I'm interested in the functional designs of artificial DNAs as a biomaterial based on elongation (ELG) method developed in Aoki group in Kyushu Univ. [A. Imamura, Y. Aoki et al., *J. Chem. Phys.*, **95**, 5419 (1991).; Y. Aoki et al., *Phys. Chem. Chem. Phys.*, **14**, 7640 (2012)] In the ELG method, the electronic structures of the system are elongated on computer(s) step by step like a polymerization reaction. The method enables us to obtain the electronic structures of huge systems very efficiently (linear scaling $O(N^1)$ cost) while keeping chemical accuracy. Such treatment from the atomic level has a large potential to discover innovative materials and leads to environmentally-friendly material developments.

Finally, I'll do my best to contribute to this GA program and its education towards the further development of Asia and Japan.

Research Profiles

Hajime Miki

Assistant Professor, Green Asia Education Center

Specialization:
Mineral Processing Engineering

Research:
Leaching and flotation behavior of sulfide mineral with electrochemical method

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Hi, my name is Hajime Miki, new assistant professor on Green Asia International Education Center. I am working at Ito campus with Professor Keiko Sasaki, coordinator of GA and Professor Tsuyoshi Hirajima. I would like to introduce myself.

I have graduated Ph.D at Hokkaido University on 2002 then spent in Australia for 9 years then in Chile for 1 year as postdoc. My theme of research is recovery of valuable metal from sulfide mineral by hydrometallurgical process. It is not common in Japan but this process is important method to recover final metal product on mining site and applied to gold, aluminum, copper and zinc etc. with various metals. I have seen various unique minesite in Australia and very large scale copper and lithium mine in Chile, and can feel how these mining influence these country from economic and environmental perspective.

In Kyushu University, I am instructing students in Earth Resource System Engineering department at mineral processing and environment remediation laboratory. Mineral processing is the process in mining that mined ore is separated to valuable and unnecessary product, our laboratory is studying with this topic and this is one of theme. Long relationships with mining and human history is also history of environmental destruction. Human faced on the environmental destruction and remediation from mining for long time. This is one of another theme on our laboratory. After supply resources to society, it will be disposed but it is important to recover valuable materials from these waste from the point of view of the recycle. Various methods are proposed, but technique of recycle and mineral processing is quite similar and to apply these long-survived mineral processing technique in history to recycle is important. Also environmental contamination by waste and environmental remediation technique in society is important, these problem also can be solved by waste water and gas treatment in mining site. Applying mineral processing and mining technology to the recycling and environmental remediation in society must be more and more important.

I stayed in oversea for long time, it was important opportunity to see Japan from outside and to see advantage and issue of Japanese situation and society. Internationalization must be more and more important in future for Japan, it is important to develop leader and researcher to think with global perspective. I have opportunity to join this Green Asia Education Center, I am happy to have this chance to join this education, also I feel responsibility. I will try my best.

Keisuke Yamamoto

Assistant Professor, Green Asia Education Center

Specialization:
Semiconductor Device Engineering

Research:
Development of elementary process technology for realizing high-performance Ge-CMOS, SiC power device. Electrical evaluation of semiconductor structures.yamamoto

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My name is Keisuke Yamamoto, assistant professor of Green Asia Education Center. I studied in Kyushu University and received bachelor and master degrees. In 2012, I received Ph. D degree from department of Applied Science for Electronics and Materials, Kyushu University. During April 2012 to January 2013, I had researched as JSPS young scientist. My research specialty is semiconductor engineering and I study development of material and process technology for next generation semiconductor devices. Recent topics are “application for ultra large scale integration (ULSI)” and “application for power devices”. These details are follows.

• Technology development for Ge CMOS device

Recently, the mainstream of consumer information device shifts to smartphone and tablet PC from conventional cell phone and desktop/notebook PC, respectively. However, semiconductor devices which are used in such devices are still important. On the other hand, “performance enhancement and power consumption decrease” supported by scaling technology of silicon (Si) face a limitation. Therefore, it is required that novel breakthrough from viewpoints of material and structure. I challenge this requirement using germanium (Ge) as a device material. Ge has a higher carrier mobility (lower electrical resistance) than Si. Therefore, Ge is a strong candidate as a material for next generation CMOS devices.

Cleanroom in the Art, Science, and Technology Center for Cooperative Research (KASTEC).

• Fundamental process development for SiC power device

These days, we face global energy problem. In such situation, it is important that not only “how we make electricity” but also “how we consume electricity efficiently”. In order to realize electricity transmission and control with high efficiency, semiconductor device (power device) is used. However, it is difficult to improve efficiency of Si-based power device due to limitation of material property of Si. Silicon carbide (SiC) has wider bandgap and higher withstand voltage than Si. If we can apply SiC to power device, it is possible to realize that high electrical efficiency devices compared with Si. I study development of the fundamental process technology for SiC-based power device.

Both studies are done in the cleanroom (class 1000) in Art, Science, and Technology Center for Cooperative research at Chikushi campus.

I approved the themes of program for leading graduate school and Green Asia, and I joined the Green Asia program. I look forward to experiencing many valued activity and I would like to grow with progress of the program.

Tomoaki Watanabe

Assistant Professor, Green Asia Education Center

Specialization:
Comparative Environmental Politics, International Relations

Research:
International Environmental Politics, Basel Convention on Transboundary Movement of Hazardous Waste, Global Governance on Environmental Standard

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I have studied political science and international relations in the Graduate School of Law, Kyushu University. Before I assume an Assistant professor at the Green Asia program, I have given several lectures on political science and environmental policies in Kyushu University, Saga University and so forth.

Political Science is the subject on how conflicts among citizens those who have different values and opposing interests could be managed. From this point of view, environmental policy reflected not only scientific knowledge but social value.

My study focuses on the Basel convention, concluded in 1989, to prevent transboundary movement of hazardous waste. I examine the political process to make the convention with the conflict between developing countries and developed countries. Paying attention to the agenda of how “environment” norm could be compatible with “free trade” norm, I consider the factors which affect the treaty making process.

In the Green Asia program, I deliverer the lecture titled “Social System 2” approaches environmental problems at national level as well as international relations in terms of political and economic system. Drawing on cultural and economic diversity of Asian countries, we considered and discussed environmental problems. I hope that by learning the way of social scientific thinking students could advance understanding about environmental problems.

Takashi Watanabe

Assistant Professor, Green Asia Education Center

Specialization:
Modern western philosophy

Research:
Environmental philosophy concerning scientific uncertainty and ignorance; Philosophy of science

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I am an Assistant Professor in Green Asia Education Program, Kyusyu University. I hold Ph.D in literature from Kyusyu University.

I joined the Green Asia Education Program in January 2013. Before the appointment, I had been at Kyushu University, Kurume University, Seinan Gakuin University and other colleges around Fukuoka as a part time lecturer since 2008.

My main field of study is Western Philosophy, especially Rousseau's political philosophy, Husserl's phenomenology and his successors such as Heidegger's works, and also Derrida's philosophy such as the theory of deconstruction and of messianicity.

During graduate school and the first few years after finishing my doctorate, I worked primarily with Rousseau's theory of conscience and of justice. For the past five years, my work has focused on the environmental problems, and this has in turn involved me in the study of philosophy of science.

Recently I am interested in the problems concerning scientific uncertainty and ignorance, and have been taken with studying them from both a philosophical and an ethical point of view, which lead me to the far more important problems of science and technology regarded as the tools for the environmental protection activities.

I am also interested in the recent movements in anglo-american eco-phenomenology, and I am now involved in translating important works of north american environmental phenomenologists.

If you wish to contact with me for any reason, please feel free to send me an e-mail at watanabe.takashi.280 <at> m.kyushu-u.ac.jp (please replace <at> by @). I do welcome any inquiries (especially concerning philosophy, ethics and environmental problems) from GA students.

GA Afternoon Colloqium

Program-Vice Coordinator
Professor, Department of Energy and Environmental Engineering
Interdisciplinary Graduate School of Engineering Sciences, Kyushu University

Jun Tanimoto

Sleep after toil, port after stormy seas,
Peace after war, death after life does greatly please.

This is a part of "The Faerie Queene", by Edmund Spenser (1552-99), who closely observed anti-England riots in Ireland, which made him write the epic. I have been recognizing you may wonder how this relates to "GA Afternoon Colloquim". I would like to say, however, they are deeply related each other.

Green Asia (GA) Program imposes students so much obligations to study; many classes covering major, minor and even social science as well as language, and, let alone, to be concerned on research that is requisite for obtaining PhD degree. That is because the program is primarily designed for significantly excellent students: kind of elite. They must be omnipotent, or at least, I do believe they should know; "noblesse oblige" that was said by José Ortega y Gasset in "La rebelión de las masas".

Changing a full marathon race of 42.195 km distance, he/she cannot sprint throughout the race, from the beginning up to the goal. Sometimes, one needs breathing, a disport or, say, a relief. Let us say; Make haste slowly. This is exactly why we decided to put a "breathing time" in the program for easing the students, which is "GA Afternoon Colloqium".

Fortunately, wide variety of professors in terms of their specialties have committed in the Green Asia Program. Not only top-shelf science and engineering, but also law, economics, humanity even sociology. Then, what we had thought about is how it works if one of those professors whose field is far from those of the students comes to a

Colloquium

classroom in Friday afternoon, and shares some time with the students for mutual interaction by his/ her colloquial talk touching some of general topics. We had expected this kind of atmosphere, refereeing to “freedom of study”, somehow reverberates to generate something meaningful to let the students attain a more highly philosophical stage.

Before making this realize, a question comes up to the mind of all of the committee members being responsible for GA Program. What it would be, actually? No one has any germ of idea. To the end, there is no choice than I manage to try, because I am the first breeder of it. Then, I did it. My talk was entitled, “by what reasons we must acquire the ability of communication through English - Lingua franca versus indigenous language”. This might be funny to the audience, simply because I am just a professor specialized on building physics, urban climatology, complex science and statistical physic. But, indeed, in all seriousness I am telling here that I have been a novelist, more amazingly, dealing with romantic stories, which is my real specialty than science!!!

Report of Workshop

Hajime Miki
Green Asia International Education Center
Assistant Professor, Ph.D of Engineering

After kick-off meeting of leading program, workshop has been held on Dazaifu with two days and one night schedule. Attendances were invited oversea students from collaboration school of Green Asia (12 people), Green Asia course students (6 people), monitor students (6 people) and academic staff (6 people), total 30 people. Purpose of this workshop was to develop global perspective with exchange opinion and situation of each country. Developing friendships were also important purpose.

All members are directly ride on bus just after kick-off meeting and went to hotel in Dazaifu (Hotel Grandia Dazaifu). Oversea invited students seems impressed with Japanese culture in hotel such as Tatami room, no chair, no shoes in hotel and goods in hotel. At meeting room in hotel, explanation by Professor Tanimoto about the purpose of this workshop then first day is over. This hotel is famous with natural spa, but no oversea students seems to come to this great public spa, unfortunately. On second day, we all gathered on meeting room and discussions were held, which was the main event of this workshop. Members are divided to four groups including 2 Japanese students then discussions were held about issues and situations of each country such as environmental problem, mineral and energy resources, educations and research situations. After lunch, all opinions are summarized then presentation were done by Green Asia course students in English. Opinions in each groups were various, but major topics were systems of their country such as methods of long-view strategy of government and as the results resources are taken by oversea company and environmental contaminations. To solve these situations, summarization were achieved to know about situation with each country and carry out research with various subject then improve little by little. Through these discussion from various country students, it was proved that normal knowledge of education, industry, resource and politics situation for one country is not known to other country and we could know these situation and opinions, it must be very good opportunity for course students and invited oversea students as well.

After workshop, there are not much time left but we went to see Dazaifu Shrine, which is one of the most important shrine in Japan, it was built around 1000 years ago and still believed to fulfil the education dream. Sightseeing was organized with several groups in few Japanese students, oversea students seems very satisfied with various shops and atmosphere of shrine. It was very cold and snowing, but for some students it was first experience to see snow, it seems enjoy it as well. Everyone exchanged e-mail and promised to see again. It is important to communicate with collaboration school, but this workshop is one of the most important opportunity to cultivate friendships each other in student level. We all appreciate with the people of planning this event, Professor Tanimoto, Professor Otaki and many organization and cooperation from the office of Green Asia.

Report of short trip in Singapore and Thailand

Keisuke Yamamoto
Assistant Professor of Green Asia Education Center

Beginning of 2013, 2 short term trips to overseas were held. They were the first opportunities of overseas trips for Green Asia program.

● Singapore (as "Industrial System I")

In January 29 – February 3, 6 GA course students, 10 academic staffs, and members of global COE "Nobel Carbon Resource Sciences" attended short trip in Singapore. In this trip, we visited 2 major locations of "National University of Singapore (NUS)" and "Mitsui Phenol Singapore (MPS)". NUS, which is one of the overseas collaborative university of GA program is the oldest higher learning institute in Singapore, as well as the largest university in the country in terms of student enrolment and curriculum offered. In NUS, we had research introductions from NUS and KU, and laboratories and campus tour. MPS is phenol production base of Mitsui chemical group. MPS is in the Jurong Island which is artificial island and the largest industrial area in Singapore. Watching complete facilities of NUS and MPS (Jurong island), we admired the policy of Singapore investing education and research and development.

● Thailand

In February 25 – March 2, 6 GA monitor students and academic staffs went on the short trip in Thailand. We visited "Mahidol University "and "UBE GROUP THAILAND". Mahidol University is also overseas collaborative university of GA program. In this trip, we visited 2 campuses of Phayathai and Salaya. In Phayathai campus, Mahidol University and KU students introduced their own researches with their teaching advisors. In Salaya campus, we visited Research Institute for Languages and Cultures of Asia (RILCA). We came in touch with the history and traditional culture of Thailand. UBE GROUP THAILAND which was established in 1990 is a local subsidiary of UBE industry. Since 2004, they have done R&D activities besides production. In UBE GROUP THAILAND, we attended factory tour and exchanged each opinion.

In these short trips, we visited collaborative universities and companies. Through the trips, we obtained lots of results such as students communication and exchanges of opinion. Based on these experiences, we progress GA curriculum to more meaningful.

We acknowledge all staffs and students in NUS, MPS, Mahidol University, and UBE GROUP THAILAND.


Singapore (NUS)


Thailand (Mahidol Univ.)

Conference Organization

Bidyut Baran Saha

A series of national and international conferences were organized or co-organized by the Kyushu University Program for Leading Graduate School, Green Asia Education Center on the boarder topics of energy, material science and environment. International Symposium on Innovative Materials for Processes in Energy Systems (IMPRES) 2013 is one of the co-organized conferences of our program. IMPRES is a sequel to its predecessors which was held at Kyoto Research Park, Japan, in 2007 and Furama Reverfront Hotel, Singapore in 2010. The conference had primary focus on innovative materials for processes in energy systems for fuel cells, heat pumps and related gas-solid interactions. The amount of research in progress in those topics impelled IMPRES2013 to be organized during September 4 to September 6, 2013 at I^2CNER Building, Ito Campus of Kyushu University. The theme essentially remained and it was observed that a large number of papers were presented on materials for chemical and sorption heat pumps, (liquid + vapor, solid + vapor and desiccant), the other dominant area being energy conversion, fuel cells and storage devices.

The technical program includes four keynote lectures and 115 contributed papers (13 oral sessions, one poster session) along with three special sessions on Core Research for Evolutional Science and Technology (CREST). All 115 contributed papers included in the conference proceedings were carefully chosen after peer review among 135 submitted papers from authors of 23 countries around the world. As of the IMPRES2013 keynote speakers, Prof. Takao Kashiwagi a distinguished professor of Tokyo Institute of Technology (TITech), Japan presents the first keynote paper entitled 'Present Status of Energy Policy in Japan Focusing on Distributed Power Generation'. Prof. S. Srinivasa Murthy an emeritus professor of Indian Institute of Technology, Madras presents the second keynote paper entitled, 'Advanced Materials for Solid State Hydrogen Storage: Thermal Engineering Issues'. Prof. Yuri I. Aristov who is currently working as the Head of Research Laboratory of Energy Accumulating Materials and Processes of Boreskov Institute of Catalysis, Novosibirsk, Russia presents the third keynote paper on 'Adsorbent Optimal for Adsorptive Cooling/Heating: Concept and Realization' and the fourth one on 'Two-phase Flow and Boiling Heat Transfer in Small Diameter Tubes was presented by Prof. Hideo Mori, who holds the position of vice dean at the Faculty of Engineering, Kyushu University. I believe that IMPRES2013 was professionally rewarding and personally enjoyable to all participants.

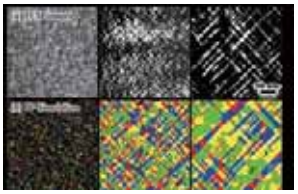
Photographs of IMPRES2013
Top: Group photo of participants.
Bottom left: Prof. Akira Harata during opening ceremony.
Bottom right: Prof. Bidyut B. Saha presented best paper awards during closing ceremony.

Students Research

Hiroshi Akamine

Applied Science for Electronics and Materials, M2

Lab Rotation is one of the main programs for master course students of Green Asia. In that program we can freely select a host laboratory and learn its research themes for about three months. In my case, for example, the Nonlinear Physics Laboratory was suitable for my interest because some approaches with a computer simulation method were needed for my research in order to clearly explain invisible factors underlying in phase transformations in alloys. During the period of Lab Rotation, I could proceed with both themes in my own and host labs in parallel, which was the good way for me to advance my research from two related aspects, experimental and theoretical. The experiences in Lab Rotation gave me many beneficial instructions, for example, the way to start the simulation and develop the models and some knowledge about the latest trend in the area of Nonlinear Physics. Finally, I would like to express my great appreciation for their kind instructions.



Hiroki Gima

Applied Science for Electronics and Materials, M2

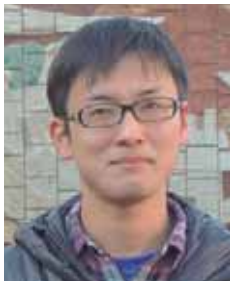
My research topic is fabrication of the nitrogen-doped ultrananocrystalline diamond film. They have unique optical and electrical properties owing to a large number of grain boundaries. Therefore, this material is new candidate material for semiconductor devices. However, the structure of them is very complex, and the details of its origin are unknown. Thus, I was joined crystal physics and engineering laboratory (Nishida-Itakura Laboratory) to obtain the method of nanoscale analysis. In particular, it's to learn the observation technique of Transmission Electron Microscopy (TEM). First, I was acquired about Focused Ion Beam processing (FIB) as sample processing method for cross-sectional surface observation. As a result of TEM observing the cross-sectional surface of sample, I was able to observe the diamond nanograins. In addition, that of nitrogen is segregated around the diamond nanograins was obtained in chemical composition analysis. Though, these data will not be exact, it's necessary to use low energy TEM in order to obtain more accurate data in the future. Although, it was a good opportunity to make the step-up my research. I want to make use of these experience in the future research life. Finally, I'd like to express my gratitude to Prof. Minoru Nishida, Assoc. Prof. Masaru Itakura, Ass. Prof. Masatoshi Mitsuhara, Ass. Prof. Farjami Sahar and Mr. Hiroshi Akamine and all of the staffs and students belonging to the Nishida-Itakura Laboratory.

Tsuyoshi Sato

Energy and Environmental Engineering, M2

Now we are trying to solve environmental problems from a scientific view point, however, approach through the position of humanities is also important to understand environmental problem, especially, eco-politics is directly related to actualize scientific production. So, in Lab. rotation program, I'm studying about international and domestic eco-politics aiming to find the best way for utilizing scientific fruits for our society.

In this study, I learned the importance and difficulty of decision–making of society for environmental problem, for example, global warming is the most important problem of modern world but attitude of each nation is not monolithic. Same impediment exist in local scales, such as the construction of geothermal power plant, but social decision–making is primary and inescapable problem for not only politicians but also scientist because we must play an important role for the achievement of sustainable development for our future. In the remaining term, I'll do my best effort to acquire the ability which is necessity for next-generation scientists.



Takanori Hanada

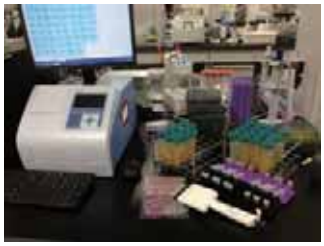
Applied Science for Electronics and Materials, M2

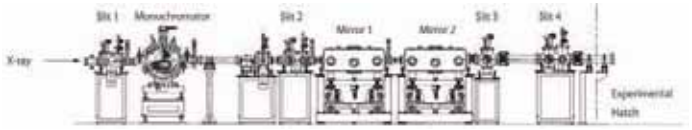
I'm really indebted to Prof. Mizuno for helping me get started in the Laboratory Rotation for 3 months (from January to March in 2013). I had focused on the theme of fabricating and evaluating graphene which is a monolayer of graphite. I was motivated by the realization of "All Carbon Solar Cell" comprised of semiconducting PN homo junction composed of UNCD/a-C:H (ultrananocrystalline diamond/hydrogenated amorphous carbon composite films) on the top of the graphene layer as the substrate. The experiment was conducted by the method of graphene formation on the surface of a Silicon Carbide (SiC) substrate by pyrolysis under vacuum condition. As the experimental result, Low Energy Electron Diffraction (LEED) pattern of the graphene could not be observed attribute to the surface condition of SiC. It would be absolutely essential to hydrogen passivation in order to clean up SiC surface. From the Current-Voltage measurement in which the electrode probe was directly attached on the sample, it could be observed that the conductivity of the SiC surface was increased. It was electrically confirmed the existence of conductive graphene layer. The next step is to fabricate PN homo junction consist of UNCD/a-C:H on the top of graphene layer, estimate the built-in potential and calculate the incident photon-to-current conversion efficiency by Air Mass 1.5 Solar Simulator. The Laborotation activity at Mizuno Laboratory was the good opportunity to collaborative investigation and created the synergistic effect on my research topic. I would like to use this space to thank prof. Mizuno, all of the staffs and students belonging to the Mizuno Laboratory.

Yusei Masaki

Earth Resources Engineering, M2

Good morning everyone. I am one of the first generation students of GA program. Here, I would like to introduce my experiences in laboratory rotation. The main purpose of this meaningful system is to acquire the knowledge in other fields. Therefore, this opportunity could provide me with precious "experience" and it must lead me to next step. I really appreciate to GA program having such as special system, due to making me grow up. This time, I had learned the principle, measurement and analysis method for XPS (X-ray photoelectron spectroscopy) and XAFS (X-ray adsorption fine structure) under Professor. Keiko Sasaki and associate Professor. Maiko Nishibori in Kyushu University by laboratory rotation. These analysis methods would give us significant results. In the near future, what I had learned this time must be very useful to me. In GA program, various kinds of interesting lectures, internships and symposiums are prepared for us, so we need to enjoy and utilize these contents for our future!





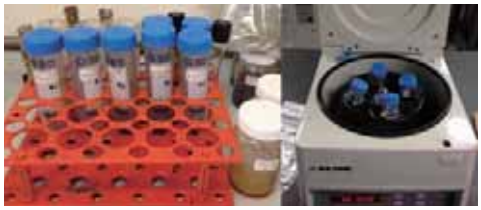
Beam line of Kyushu University (BL06) at Kyushu Synchrotron Light Research Center

Shinji Matsumoto

Environmental and Resource Department, M2

Wide Experience and Extensive Knowledge

Hello, I am Shinji Matsumoto and now second year of Green Asia program. The purpose of this program is to develop creative students who can lead people in any situation and it requires wide experience and extensive knowledge in a wide range of fields. The GA students can gain them through the Lab-Rotation system in this program. They can select laboratories in which they want to learn and they can acquire knowledge in a different field from their studies. I have learned about acid extraction method focusing chemical properties for rocks in the other lab for about three months through the system. I had not had the background about it since we focused on physical properties of rocks in mining area in our lab. The experience allowed me to widen my area of research and to look at things from a different point of view before. I also could have opportunities for networking with researchers and students during the system.



Sequential Extraction by Strong Acid

Students List

2013/9/30

Course Entry	No.	Name	Nationality	Faculty	Department	Grade	Mentor
Oct. 2013	1	Rina Takizawa	Japanese	IGSES	ASEM	M1	Ken Itakura
	2	Kazuhiro Tanabe	Japanese	IGSES	ASEM	M1	Ki-ichi Hamamoto
	3	Zhang Jianxun	Chinese	IGSES	ASEM	M1	Seong-Ho Yoon
	4	Ryota Yoneda	Japanese	IGSES	ASEM	M1	Reiji Hattori
	5	Natsuhiko Hamada	Japanese	IGSES	ASEM	M1	Ki-ichiro Uchino (Kazuaki Hanada)
	6	Masahito Tanaka	Japanese	SGEng	ERE	M1	Tsuyoshi Hirajima Keiko Sasaki
	1	Zahara Faizah Zayda	Indonesian	IGSES	ASEM	M1	Jun-ichiro Hayashi
	2	Mostafa Mahmoud Atia Tarek	Egyptian	IGSES	ASEM	M1	Tsuyoshi Yoshitake
	3	Shuhaimi Anis Syazwani	Malaysian	IGSES	ASEM	M1	Koyo Norinaga
	4	Imansyah Ryan	Indonesian	IGSES	ASEM	M1	Ki-ichi Hamamoto
	5	Azizah Intan Pangesty	Indonesian	IGSES	MMS	M1	Mitsugu Todo
	6	Tungjiratthitikan Pennapa	Thai	IGSES	MMS	M1	Hideo Nagashima
	7	Khanam Marzia	Bangladeshi	IGSES	EEE	M1	Takahiko Miyazaki
	8	Animesh Pal	Bangladeshi	IGSES	EEE	M1	Bidyut Baran Saha
	9	Sendy Dwiki	Indonesian	SGEng	ERE	M1	Hideki Shimada
Oct. 2012	1	Hiroshi Akamine	Japanese	IGSES	ASEM	M2	Minoru Nishida
	2	Hiroki Gima	Japanese	IGSES	ASEM	M2	Tsuyoshi Yoshitake
	3	Takanori Hanada	Japanese	IGSES	ASEM	M2	Tsuyoshi Yoshitake
	4	Tsuyoshi Sato	Japanese	IGSES	EEE	M2	Jun Tanimoto Aya Hagishima
	5	Shinji Matsumoto	Japanese	SGEng	ERE	M2	Hideki Shimada
	6	Yusei Masaki	Japanese	SGEng	ERE	M2	Naoko Okibe

Faculty
IGSES: Interdisciplinary Graduate School of Engineering Sciences
SGEng: Graduate School of Engineering Sciences

Department
ASEM: Applied Science for Electronics and Materials
MMS: Molecular and Material Sciences
EEE: Energy and Environmental Engineering
ERE: Earth Resources Engineering

Contact and Events

Contact Information

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Events

November 22, 2013
Dr. A. Shukla, IISc, India, Dr. S. Gopukumar, CSIR, India
(Seeds and Needs of Rechargeable Battery in India)

November 29-30, 2013
Kyushu University International Seminar on Global Strategy for Green Asia & Soriko (IGSES) Seminar 2013

December 2, 2013
The 10th International Symposium on Novel Carbon Resource Sciences (co-host)

December 6, 2013
Green Asia Colloqium 6　Toshihito Toyoshima (Sumitomo Metal Mining Co., Ltd)

December 7, 2013
IGSES Enrolment Procedure

January 14, 2014
GA Entrance Examination (2nd Offer)

January 25, 2014
NCRS Forum /
GA Lecture Series
Prof. Tamio Oguchi, Osaka University
Prof. Hisanobu Wakita, Fukuoka University

February 10, 2014
Deadline for international course application

February 10-14, 2014
Short term internship at MJIIT

March 25, 2014
Graduation Ceremony

Kyushu University Program for Leading Graduate Schools
Advanced Graduate Program in Global Strategy for **Green Asia**

BULLETIN 2013

Bulletin 2013 is a promotional publication which aims to give a general overview of the Green Asia Program. Published on a annual basis in November, this issue volume one, details the key objectives of the program, staff profiles, program features and current overseas and domestic activities.

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