

# KU Today

KAGOSHIMA UNIVERSITY NEWSLETTER

Spring  
2018



学部紹介  
特集

Special Issue  
**Faculty of Engineering**



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**KUToday** is a biannual publication to present information about Kagoshima University to a wider international audience. Each edition will feature one faculty for prospective overseas students as well as other topics such as educational programmes, research and alumni information. Some articles are translations from the Japanese-language publication, *Kadai Journal*, upon which *KU Today* is loosely based. Any comments or suggestions about *KUToday* will be warmly received.

PDF files on *KUToday* can be downloaded from  
<https://www.kagoshima-u.ac.jp/en/about/newsletter.html>

### A Note on Names

Following convention East Asian names appearing in *KU Today* are written family name followed by given name.

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### Special Issue

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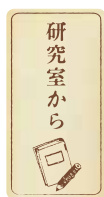


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# Exciting Engineering!!

<http://www.eng.kagoshima-u.ac.jp/english/index.html>



**Watanabe Mutsumi, Dean**

The Faculty of Engineering started as Kagoshima Prefectural College of Engineering established in 1945. The College of Engineering became Kagoshima Prefectural University to be united with the College of Medicine, then, the Prefectural

University became part of Kagoshima University in 1955. Today, the Faculty of Engineering is located on Kōrimoto Campus close to the centre of scenic Kagoshima city which is known as “Naples of the East”.

The Faculty of Engineering is the largest one of the nine faculties in Kagoshima University. Over 20,000 students have graduated from our faculty so far, and many alumni are playing active parts in a wide variety of fields throughout society. One representative alumnus is Dr. Inamori Kazuo, founder and chairman emeritus of Kyocera Corporation. In 1994, Dr. Inamori

funded construction of the university’s Inamori Auditorium, designed by eminent architect Andō Tadao, that is used for seminars, lectures and other university events.

With our mission of “Exciting Engineering – supporting your manufacturing ambitions”, we aim to provide students with the fun of creativity with a global perspective, all the while contributing to the development of manufacturing technology. The Japanese way of manufacturing based on culture and craftsmanship has been the pillar of Japanese industry. We also work to cultivate excellent human resources to lead research in many fields and hope students learning excitement of *monozukuri* (manufacturing) mind based on good Japanese tradition.

Our faculty actively promotes internationalisation in the fields of engineering technology by collaborating with overseas universities, such as National Institute of Technology Karnataka in India, University of Indonesia, College of Engineering of National Cheng Kong University in Taiwan and other universities in joint research and exchanges of students and academic staff.

We are looking forward to welcoming you in the Faculty of Engineering!

## Undergraduate Departments (118/440)

Mechanical Engineering (24/94)
Electrical and Electronics Engineering (22/78)
Architecture and Architectural Engineering (14/55)
Chemical Engineering (10/35)
Chemistry and Biotechnology (14/50)
Ocean Civil Engineering (14/48)
Information Science and Biomedical Engineering (20/80)

(Staff Numbers / Annual Intake)

## Graduate School

Mechanical Engineering (50)
Electrical and Electronics Engineering (45)
Architecture and Architectural Engineering (25)
Chemistry, Biotechnology, and Chemical Engineering (42)
Ocean Civil Engineering (18)
Information Science and Biomedical Engineering (42)

(Annual Intake)

Interdisciplinary Department of Science and Engineering [PhD Course] (24)

## Department of Mechanical Engineering

**Production and Design Engineering, Fluid Engineering, Thermal Engineering, Strength of Materials, Mechanical Materials, Control Engineering**



The Department of Mechanical Engineering provides education and substantial research programmes for design,

production and energy which introduce advanced aspects into normal mechanical engineering subjects to adapt to new industrial techniques.

The Department is organised around research divisions specialising in Production Engineering, Energy Engineering and Mechanical System Engineering. These research divisions are achieved by the research and education based on following field:

Production Engineering: Strength of Materials, Mechanical Materials, etc.

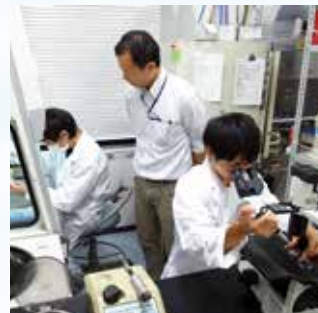
Energy Engineering: Fluid Engineering, Fluid Machinery, Thermal Engineering, Internal Combustion Engine, etc.

Mechanical System Engineering: Dynamics, Measurements, Automatic control, Mechanical Elements, Lubrication, Design, Industrial Processing, Production System, etc.

**The following is a list of the research being carried out in the department:**

- Mechanism and Evaluation of Strength in Fatigue
- Damage Evaluation & Remaining-Life Prediction of High-Temperature Materials
- Interfacial Fracture Mechanics
- Reliability of Electronic Packaging
- Development and Mechanical Properties of Metals, Ceramics and Composites
- Tribology in Metal Forming Process
- Metal Forming Simulation and Computational Mechanics
- Flow Engineering
- Development of Environmental Conservation Apparatus using Fluid Force
- Flow Phenomena of Gas-Liquid Two-Phase Flow in Microchannels and Minichannels

- Diesel Engine Combustion of Various Biofuels
- Computational and Experimental Gas Dynamics and Heat Transfer
- Performance Improvement of the Savonius Rotor
- Numerical study of Turbulent Combustion and Fire
- Vibration Characteristics of Delaminated Materials
- Intelligent Robot Manipulation, Smart Rehabilitation Systems
- Intelligent Manufacturing System
- Instrument and Control Engineering
- Control of Mechanical Systems
- Fracture Mechanics of Delaminations of Laminated Materials
- Measurement-integrated Simulation



**Murakoshi Michio**  
Associate Professor

Performing hearing tests on adults is straight forward because you can ask if they can hear a sound or not. However this is not the case with infants. If they have some trouble hearing, how can we find out what the problem is? The research interests of our laboratory encompass both basic research into hearing mechanics and the application of our findings in the development of hearing diagnostic devices and biomicromachine such as the development of a diagnostic system for newborn hearing screening, the numerical analysis of the hearing organ at the nanoscale level, the structural analysis of molecular motor expressed in the plasma membrane by atomic force microscopy and the development of an implantable drug delivery system for the treatment of hereditary hearing loss.

## Department of Electrical and Electronics Engineering

**Electromagnetism, Semiconductor Engineering, Electron Device Engineering, Electric Circuit Theory, Electric Machinery, Electric Power System Engineering, Automatic Control Engineering, Communication Technology and Computer Engineering**





Electrical and Electronics Engineering is playing a leading role in highly-developed science and technology, industry and social life in the 21st century. Our curriculum covers a

lot of subjects in the field of electrical and electronics engineering. Three major research fields of Electronic Device Engineering, Electrical Power Engineering and Communication System Engineering are well organised and students can choose one of the study courses for their research field. Since the students are needed in many fields, almost 100 per cent of students can find jobs after graduation.

### Electronic Device Engineering Course

**Keywords:** Thin film engineering, High temperature superconductors, Surface and interface physics, Electronic materials, Optical materials, Compound semiconductor, Thermoelectric materials, Field-effect transistor, Strongly correlated electron system, Solar cells, Photoemission/inverse photoemission spectroscopy, Molecular beam epitaxy, Conductive polymers, Layered compounds, Carbon materials, Photocatalysis, Conductive nanofibres and nanowires, Transparent conductive oxides, Electron paramagnetic resonance, Frustration in magnetic materials, Birefringence, Organic electronics, Micro cluster physics, Surface and interface physics

### Electrical Power Engineering Course

**Keywords:** Applied superconductivity for electric power system, Anti-soiling technology of photovoltaic modules, Linear drive systems for industry applications, Monitoring and diagnosing superconducting devices, Large superconducting coil for fusion devices, High performance vector control of AC motor drives, Wind

power generation systems, Matrix converters, High efficiency and low loss electrical machines, Utilization and measurement technique of motor core material, Power electronics, Switched-mode power supply, Analysis and control of power systems, Identification and control of nonlinear systems

### Communication System Engineering Course

**Keywords:** Parallel and distributed system, Machine learning, THz, MMIC, Transformation electromagnetics, Electromagnetic metamaterials, Millimeter-wave antenna, Microwave power transmission, Microwave photonics, Photonic network, Optical switching, Analogue-to-digital and digital-to-analogue converters, Time-domain analogue processing, Liquid crystal device



**Watanabe Toshio**  
Associate Professor

Today we enjoy a lot of information with our smartphones and computers, thanks to a worldwide network of optical fibres that enables us to transport massive and high-speed signals. An optical fibre is a thread of silica glass as fine as a hair, through which we can transmit signals of near infrared light over a long distance. In our laboratory, in order to accommodate capacity increase in the future, we are now studying an optical signal transmission using novel optical fibres, an optical node architecture for processing the optical signals efficiently, and an optical switch configuration for routing the optical signals. Come and join us in Kagoshima!

## Department of Architecture and Architectural Engineering

**Architectural Design and Planning, History of Architecture, Environmental Engineering, HVAC Engineering, Structural Engineering, Construction Engineering, Building Material Engineering**



The Department of Architecture and Architectural Engineering has a history of around 70 years producing a large number of graduates who are active both domestically and

abroad. There are around 300 bachelor, master and

doctoral level students learning extensive knowledge and technology that range from building engineering to sociology. The teaching staff at the department consists of leading researchers as well as practitioners who have successful careers in various fields.

The study programmes in the department provide high quality education in diverse subjects such as architectural design and planning, structural engineering and HVAC engineering. This broad range of teaching offers students the opportunity to develop

flexible and in-depth studies according to their interest. In addition, an international exchange is active in order to nurture world-class experts.

**The following research topics have recently been tackled:**

- Building style and landscape in traditional local villages
- Preservation of modern architecture
- Sustainable housing and local community
- Architectural design methods
- Energy saving buildings
- Building service systems adopting to climate change
- Seismic structural design on Reinforced Concrete building
- Hybrid timber construction system
- Sustainable timber construction

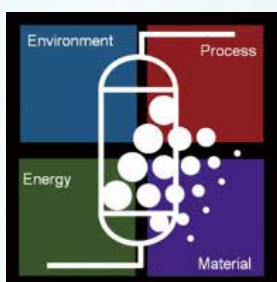
- Optimal structural design based on a computation
- Non-destructive building inspection methods

**Sustainable building design laboratory (Takano laboratory)**

This laboratory considers how building design and construction can be better from environmental aspects. When we think about the living environment, recently the concept of sustainability is often advocated, and this concept will end up as the concept of survivability. Especially, the relationship between building and global environment is a significant issue. In this context, we are studying sustainable building solutions covering building materials and resources. Accumulation of fundamental knowledge is aimed at in order to bring diverse solutions into building design and construction for the future.

## Department of Chemical Engineering

**Transport Phenomena, Thermodynamics, Unit Operation, Chemical Reaction Engineering, Inorganic Chemistry/ Inorganic Materials, Physical Chemistry, Organic Chemistry, Analytical Chemistry**



Our department educates students who enhance the development of chemical engineering and industry through their studies in the fields of environment, energy, process and inorganic materials.

The central feature of our curriculum is that we offer a lot of lectures given by our alumni or corporate people. About half of the students go on to graduate school. Our MSc course curriculum has two years, during which graduate students study further and acquire knowledge and skills to become researchers or engineers with good talents.

Since chemical engineering is a systematic discipline concerned with a way of thinking necessary for chemical engineers to work in a company, it has lots of chances in a variety of fields involving chemical processes. Our graduates get jobs in a number of fields including not only chemical industry but also machinery, electronics, foods, environment, etc. Employment opportunities for our department's students are quite good, which is why almost 100% of them find jobs.

The second feature of our department is the small class size per year (35 students), which allows our staff members to supervise our students in a more effective way. The network established among all of the department's student and teachers is of great assistance in the field of work which comes afterwards. Another noteworthy feature is that we have accepted 11 foreign students since 2009, from China, Korea, Vietnam, Malaysia and Indonesia.

**Current research topics include:**

- Multifunctional nano/micro/millicapsules
- Hydrogel for regenerative medicine - cancer biomarkers
- Environmentally-friendly lead-free sealing glass
- Bioremediation using bacteria immobilised in microcapsules
- Development of apatite catalysts aimed at propylene production
- Development of fluidised catalytic reactors for synthetic fuel production
- Biodiesel production process from vegetable oils
- Improvement of photocatalytic activity for environmental clean-up
- Formulation and functionalisation of egg white powders
- Catalytic conversion of biomass into chemical materials and energies
- Development of highly efficient chemical plants and novel functional devices
- Computational flow dynamics and flow visualisation in functional devices
- Application of ultrasound for developing efficient separation methods
- Application of bubbles and foams for minimising environmental impact
- Formation of hydrogen and decomposition of carbon dioxide using electrochemical devices
- Cell performance of solid oxide fuel cells
- Synthesis of functional ceramics through colloidal processing
- Synthesis of high strength porous ceramics and their gas separation performance





## Department of Ocean Civil Engineering

**Oceanography, Coastal Engineering, Environmental Hydraulics, Concrete Engineering, Maintenance of Public Works, Soil Mechanics, Structural Engineering**

With consideration to the unique characteristics of Japan and Kagoshima Prefecture, the Department of Ocean Civil Engineering engages in research and education in the fields of ocean physical phenomena, and environmental preservation, disaster prevention, development of regions from the coasts to the open oceans. Furthermore, the department also conducts research and education in survey, assessment, planning, construction and maintenance of off-shore structures and coastal public works.

Our department was established in 1973 named as the Department of Ocean Development Civil Engineering. At the time, there were five courses: Fundamentals of Ocean Engineering, Coastal Engineering, Ocean Construction Engineering, Planning for Ocean Development and Ocean Structural Engineering. We are currently the only university in Japan, to bear the name Ocean Civil Engineering Department. Now our department is composed of two major courses; Environmental System Engineering which focuses on the environmental preservation, utilisation and development in coastal and off-shore region, and Construction System Engineering, which concentrates

on planning, construction, and maintenance of public works and off-shore structures.

Our educational system is carefully designed to foster the next generation of engineers capable of making free use of the specialised knowledge gained through the study of ocean civil engineering to deal with advances in science and technology with an open mind. Our educational programme has been accredited by the Japan Accreditation Board for Engineering Education (JABEE) since 2004.

We are also endeavouring with international activities; receiving foreign students, sending our Japanese students abroad, and exchanging academic staffs. Over 20 foreign students have taken master/doctorate degrees in our department from various countries such as Bangladesh, China, Korea, Indonesia, India, Iran, and Malaysia. It is worth mentioning that Kagoshima University and the National Institute of Technology Karnataka, India (NITK) have held an academic exchange agreement since 2005, in which our department has taken the initiative. The programme has grown substantially; we send our students to NITK every year, and reciprocally we receive NITK students and staff, and hold international seminars every couple of years.

## Information Science and Biomedical Engineering

### Information Systems Engineering Course

Education is focused on computer-based data processing and networking. Through specialised research and seminars, we develop advanced professional engineers and researchers in the field of information systems engineering.

### Cognitive Biomedical Systems Engineering

Education is focused on cognitive science and somatometric studies. Through specialised research and seminars we develop advanced professional engineers and researchers in the field of cognitive biomedical systems engineering.

Information and Communication Technology (ICT) is the basis for a highly advanced information-oriented society, and demands for ICT is growing to make the world human- and environment-friendly. Particularly in Japan, a labour shortage is expected due to a rapidly ageing population and low birth rates. Therefore, the realisation of a computer-aided society

where people of both genders and all ages are able to use computers efficiently is desired. This leads to the need for information system engineers with the knowledge and ability to apply that knowledge, along with a good understanding of the essence of cognitive science and biological systems as it applies to human beings. Additionally, as there has been great interest in experimenting with robots, cars, and other machines that can think, perceive, and make decisions in the same way as humans, the information science field has great potential for future growth. Therefore, engineers who understand the fundamentals of biological functions and how the human brain processes information are needed. Research and education is divided into three courses: Information Systems Engineering, Brain Cognitive Science, and Biometric Engineering. These courses complement each other and foster highly specialised engineers and researchers.

Our goal in the Department of Information Science and Biomedical Engineering is for students to engage

in academic scholarship, combining fact and theory to gain a fundamental understanding of Information Science and Biomedical Engineering through educational experiments and research. Our students undertake professional development by gaining the knowledge and practical application skills to uncover the mysteries of human cognition, in the service of advancing human culture. We aim to develop in our students the ability to practically apply creative problem solving to the complex field of Information Science Engineering and to ethically address problems of a specialized nature with integrity.

**Research topics include:**

Large scale scene modelling and rendering

- Space-time image analysis
- Automatic 3D map generation
  - Active 3D shape acquisition and rendering
- Capture of 3D shape of moving objects
- Photo realistic rendering using set of micro-facets
  - Acquisition, analysis and synthesis of texture
- Separation of reflected and transparent layers from captured image
- Super-resolution of 3D scenes
  - Utilisation of 3D data on the internet and virtual reality/human computer interaction (VR/HCR) systems
- Route navigation system based on visibility of landscape
- View-dependent information presentation system for 3D objects on the web

## Department of Chemistry and Biotechnology

### New Compounds, Functional Materials, Biotechnologies, Analytical Chemistry, Molecular Measurements Technologies, Medical Drugs, Biomaterials, Clean Energy, Sustainable Environmental Technologies

The Department of Chemistry and Biotechnology aims to enhance chemical knowledge for achieving symbiosis with nature and to create technologies to contribute to the creation of a sustainable society. Students are expected to gain knowledge in chemistry, biology, and their related fields. This department offers two specialised courses, Chemistry for New Materials and Environment Course, which focus on applied chemistry and environmental engineering, and Biofunctional Molecular Chemistry Course, which focus on chemistry for life science and medical materials.

The Department of Chemistry and Biotechnology provides subjects in chemistry, biology, and a wide range of related fields.

**Years 1 and 2**

First year students will study fundamental chemistry, mathematics, physics, Japanese language, and general subjects.

Second year students will study advanced chemistry in the area of organic chemistry, physical chemistry, and bio-related chemistry from faculty members in this department. Laboratory training for students will start in the second semester.

**Year 3**

Students will choose one of the following two courses; Chemistry for New Materials and Environment Course and Biofunctional Molecular Chemistry Course. Students will also become a member of a research laboratory to prepare research for their dissertations.

Students in Material and Environmental Chemistry Course will take subjects about environmental chemistry, chemical measurement, quantum organic chemistry, and industrial organic chemistry to learn synthesis of valuable

materials, techniques of measuring, and technology for environmental analysis.

Students in Biofunctional Molecular Chemistry Course will take subjects about biomaterial chemistry, biofunctional chemistry, molecular biology, and drug engineering to learn functions of bio-related molecules and cells, as well as the basics of drugs and biofunctional materials.

**Year 4**

Students in the fourth year will start their dissertation research and receive fundamental training as future engineers or researchers. Students are expected to gain advanced knowledge and specialised skill from the research. After completion of their dissertation, students will receive their bachelor's degree. Students may apply to the postgraduate programme.

On the Chemistry for New Materials and Environment Course, the development of valuable materials, technology for measurement of surface, microreactors, and technology for environmental conservation are studied.

On the Biofunctional Molecular Chemistry Course, the new drug development, biomaterials, and diagnostics for maintenance of human health, bio-based materials for establishing a sustainable society, and elucidating homeostatic mechanisms of life are studied.

**The current research topics include:**

- Hybrid Materials
- Environmental Engineering
- Surface Information Chemistry
- Chemistry of Bio-resourced Polymers
- Biofunctional Molecular Chemistry
- Bio-conjugated Molecules





## International Students

Country	Under-graduates	Graduates	Research Students or others	Total
Indonesia	1	1		2
Vietnam	3			3
Malaysia	4	2		6
South Korea	4			4
China	14	10	2	26
Thailand		1		1
Egypt		1		1
Bangladesh		2		2
Nigeria		1		1
Spain			1	1
<b>Total</b>	<b>26</b>	<b>18</b>	<b>3</b>	<b>47</b>

## Ongoing Collaborative Research

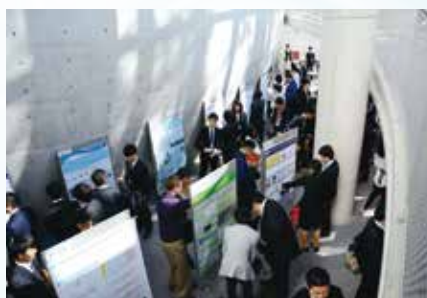
Name	Project Title	Counterpart Country or Region
Suda Yasuo	Study on interaction analysis between heparin and blood proteins and cells	United States
Tsujimura Sei-ichi	Evaluation of the centre of rotation of the human eye in young adults and children	United Kingdom
Kamitani Shunpei	Evaluation of palm oil as metalworking lubricant	Malaysia
Tsujimura Sei-ichi	Investigation of the contribution of the rod/melanopsin driven signals to the pupil light reflex response	United Kingdom
Nishiki Shinnosuke	Modelling of Turbulent Premixed Combustion	Sweden
Suda Yasuo	Study on immunomodulatory adjuvant	United States
Suda Yasuo	Study on super high sensitive detection of Dengue and Chikungunya viruses	Taiwan
Suda Yasuo	Study on super high sensitive detection of viruses related to diseases of poultry and livestock	Canada
Tsujimura Sei-ichi	Brightness is a function of the melanopsin system	Switzerland
Takano Atsushi	Life cycle approach for optimal building design	Finland
Koyama Yusuke	Wartime planning debates on reconstruction in Britain	United Kingdom
Ajisaka Toru	Study on revitalization historical villages - The comparison Firenze to Kagoshima and creative design	Italy
Tsujimura Sei-ichi	Cognitive process based on melanopsin photoreception	Taiwan
Suda Yasuo	Study on super high sensitive detection of viruses	Singapore

## International Workshops

### Suda Yasuo, Wakao Masahiro, Shinchi Hiroyuki, Chemistry and Biotechnology

In order to deepen exchange and cooperation between partner universities through academic research, the Department of Chemistry and Biotechnology run two workshops annually. The Japan-Taiwan bilateral workshop on Nanoscience with National Cheng Kung University and Osaka University has been held since 2009. A joint symposium on biotechnology, nanomaterials, and polymers with North Dakota State University was started in 2015. In 2016, a joint symposium of those workshops was held from 31st October to 3rd November 3rd in the Inamori Auditorium. Approximately 100 faculty members and students from 4 universities participated. Over the two days 18 oral and 68 poster presentations were given on the theme of nano-science. Participants engaged in active debates about their research, and it was great time to understand each other's research projects. We also cultivated cultural exchanges. At the dinner parties, the participants enjoyed

eating Japanese food, drinking *shōchū*, and Kagoshima's traditional folk dance, Ohara-bushi. The last day of the symposium, participants joined in the Ohara Matsuri, which is the biggest annual festival in Kagoshima. Everyone was excited to be taking part in a Japanese festival and enjoyed dancing in happi coats that were originally made for this festival. It became an excellent memory for all the participants. Our relationships get deeper year after year through these workshops. We look forward to continued excellent relations with our partner universities.



## Student Voice

Muhammad Zobayer Bin Mukhlis (Bangladesh) PhD student



Currently, I'm a third year PhD student conducting research on solar cells in the department of Electrical and Electronics Engineering with a MEXT scholarship provided generously by the Japanese government.

Kagoshima University is full of natural beauty, only a few kilometres from the famous Mount Sakurajima. There are world-class researchers working here on practical and advanced research topics. Being here has given me the opportunity to adapt myself to a multicultural environment and to make close relationships with students from many countries.

Although the Japanese language was initially a barrier for me to communicate with my labmates, I could somehow overcome it after completing the preliminary Japanese language course. The students and teachers of my laboratory are very helpful and cooperative. Their sincerity, discipline and politeness are beyond imagination. The Graduate School Office and the International Student office are also always ready to help me in any way possible.

Kagoshima is really a quiet, calm and comfortable place, which provides a better environment to study and live. Though sometimes volcanic ash from Sakurajima spreads around the city, but I think it is exciting to live near the active volcano. There are so many places to see, discover and enjoy. The people are nice, friendly, and always willing to help. I am really enjoying my stay here.

I am deeply grateful to my labmates, teachers and the staff of Kagoshima University, and Kagoshima people for providing an enjoyable environment here. I will return to my home country next year, but my memories will stay with me forever.

I strongly recommend students to take advantage of studying at Kagoshima University!

## Student Voice

Aprilia Lystea Oce Korisano (Indonesia) MSc student in Chemical Engineering



After I graduated from high school, I got a scholarship from my government to study in Japan in 2009. Starting with Japanese language development in Tokyo and moved down to Kagoshima to study chemical engineering. As a foreign student it is really challenging for me to study and understand everything in Japanese. Luckily, my

lecturers and friends are really supportive and help me along the way. Apart studying, I have participated in some of the social activities. Just recently I got an offer to become a member of Kagoshima City Friendship partner. This programme was established to maintain the ties of friendship between a resident foreigner and Kagoshima City even after they have returned to their home country. And through this I hope that I can introduce and bring Kagoshima to my country. And I also hope I can share the knowledge and experiences that I gained here in Indonesia especially in the place where I come from.





# National Institute of Technology Karnataka (NITK), India

Dhruva Narayana Katpady, (PhD in Engineering, Kagoshima University)  
Research and Development Division, Infratec Co., Ltd.



I spent the best time of my life as a doctoral student and postdoctoral researcher in the department of Ocean Civil Engineering. Work done under the guidance of Prof. Takewaka, Prof. Yamaguchi and Assoc. Prof. Akira on the utilisation of a kind of volcanic deposit as a sustainable construction material

received much appreciation and helped me sharpen my research skills. The department provides the best environment for study and research with dynamic, highly qualified, kind hearted and immensely supportive faculty.

The opportunity given to me owes to the strong and continued MoU between NITK (India), my former alma mater and Kagoshima University. NITK is my alma mater from where I obtained my bachelor's and master's degree. As an institute of national importance, NITK has good infrastructure, motivated and dedicated faculty and provides excellent teaching and learning opportunities attracting brilliant minds. NITK is constantly ranked at the top in quality of education and students every year. The civil engineering department of the institute is one of the founder departments that is most sought after as a one stop shop for all stake holders in the construction industry. The quality of education and research make it a go-to institute for aspiring engineers. The spacious library, computer centres, comfortable accommodation, good food and basic amenities attract students from all over the country and abroad.

The residential campus is self-sufficient and convenient for students and staff. Students enjoy the best facilities provided by NITK for recreation. Apart from good infrastructure, NITK boasts its own beach and is popular for its calm, green residential campus. The most popular events organised by NITK are INCIDENT and ENGINEER. INCIDENT is the main festival of the institute which lasts about 4 days. Students from other institutes join the event. ENGINEER is a technical fest organised every year. During these

events, students organise various beach activities on the NITK beach. Student clubs hold events which make students active throughout the year and keep the campus lively.

I enjoyed being in NITK as a student for five years. The education, guidance from teachers and campus life are still the best memories to cherish in my life. More than seven years in Kagoshima University as a student is also a memorable span and one of the best periods in my life. The academic collaboration of NITK with Japanese universities is getting stronger. Many student exchange programmes under the MoU have helped students build their careers and I am one of them. Students of Kagoshima University have opportunities to visit NITK for internships, short-term research and conferences. I believe that the collaboration between NITK and Kagoshima University will continue for many years to come.



NITK beach activities



Main building (Popular attraction and landmark)





# The GOES Programme

Bo Causer

Specially Appointed Assistant Professor, Global Development Office, Graduate School of Science and Engineering

## Outline of GOES Programme



In 2014, Kagoshima University Graduate School of Science and Engineering established the Global Development Office (GDO),

with the mission of supporting graduate students in their aim to become Global Science and Engineering Professionals who can carry the important role of revitalising Kagoshima and Japan. The Graduate Overseas Engineering & Science (GOES) study abroad programme aims to foster the skills necessary to achieve mutual understanding among researchers and practitioners from all over the world, and was developed in response to the increasing need for Japanese scientists and engineers to contribute to a global body of knowledge that will prepare our planet and its inhabitants for the future.

In the summer of 2015, the first cohort of GOES students travelled overseas to develop their global experience. The GOES programme is designed for students to increase their English language skills and cultural understanding, not only through study at a language school, but by gaining practical experience related to science or engineering. In this way, students have the opportunity to acquire new knowledge and gain a chance to apply their new understanding. America was the first target destination, and since 2015, 40 students have visited California, North Dakota, and New York through the GOES programmes.

## Glocal Education



While studying abroad, students keep an online diary to keep the GDO updated about their progress. This is used as the basis for presentations

that the students give once they return to university. In order to increase awareness about the importance of global skills, the Graduate School of Science and Engineering Global Jinzai Symposium was established.

GOES students are able to showcase the results of their study abroad experience, and share their understanding about becoming a Global Professional. In addition, past GOES participants have contributed to regional development projects for Kimotsuki-chō in Ōsumi, Kagoshima, and Prefectural Industry Club 84 Plaza, a Kagoshima-based business group. The GDO intends to continue working to develop stronger ties between the university and the community to fully realize the potential of “Glocal” education through the GOES programmes.

## GOES California



Students participating in GOES California study English at San Diego State University, American Language Institute (ALI) for 6 weeks

while they stay with a host family who helps them adjust to life in California. Previously, students have also attended English classes at International Gateways, San Jose State University, staying in university dormitories. After the English course, students move to a practical experience placement for 6 weeks. In the past, students have volunteered at a lab at SDSU, science museum, architecture firm, or construction engineering consultancy in San Diego. Other students have volunteered at various Japanese engineering and manufacturing companies located in Silicon Valley, including Canon and Innovation Matrix, both associated with Kagoshima University North America Center. Past iterations of the GOES programme have involved participation in engineering study summer programmes hosted by SJSU and SDSU.

## GOES New York



In 2016 Kagoshima University Graduate School of Science and Engineering established a partnership with the Energy Institute at the



Grove School of Engineering, City College New York, City University New York. Students attended English classes held in the Empire State Building in the morning, and participated in research at Grove CCNY Energy Institute in the afternoons. Thanks to their homestay families, they were able to live securely and comfortably in one of the world's busiest, most expensive cities, while improving both their language and research abilities. They were also able to enjoy travelling with fellow students from the Energy Institute. In addition, thanks to the support of her KU academic supervisor, one student from Architecture and Architectural Engineering was able to experience a short-term volunteer experience in a New York architecture firm.

### **GOES North Dakota**

Graduate students traveling to North Dakota began their programme by joining the three-week P-SEG



programme for undergraduates at North Dakota State University. This gave them the opportunity to become acclimatised to life in America, while providing

invaluable support for the junior students. After the undergraduates returned to Kagoshima, the graduate students remained at NDSU and joined research labs corresponding to their field of study for an additional 7 weeks. Through this experience they became fully integrated in the campus community, enjoying cultural activities with friends from their labs, while increasing their professional skills through guided research.

### **Student Voice**

**Ōtsuki Kazuaki, MSc student in Architecture and Architectural Engineering (GOES California in San Diego)**



There were many chances to talk and listen to others in all my English classes. Also, I was able to talk to a lot of people from different countries in break time, and make many new friends. I like baseball, so I went to watch baseball games with my friends. I travelled to LA and Las Vegas on holiday. I had a lot of good experiences, but if I must choose one thing, I would say it's the memory of my Las Vegas trip. I am happy

that I was able to have the most distant experience from Japan.

I studied American structural design in an engineering consulting firm. I was able to learn differences and similar thinking between America and Japan. The workers were very kind and I enjoyed talking with them and playing ping-pong together at lunch break. My dream is to work at construction sites not only in Japan but also in foreign countries. When I came back to Japan and started looking for a job, I chose the company that can give me a chance to work in foreign countries. I was interested in working in foreign countries before I went to San Diego, but not concretely. However, my dream became concrete through this experience.

### **Student Voice**

**Egawa Machi, MSc student in Chemistry & Biosciences (Goes California in San Diego/San Jose)**



There were lots of people from different countries at the language school, and we talked about different cultures and thoughts. It was interesting to know each other and find new things. I talked with my host mother a lot and it was a special time for me. We had conversations about anything and we shared our thoughts with each other. I liked hanging out with my friends at the beach the best. The beaches in San

Diego are awesome!

During my volunteer training, I learned the procedures of an import company from the overseas side. I made some documents for shipments and joined some meetings. I learned how to negotiate and work with foreigners. I thought it is important to know the difference in cultures and customs. It makes me more interested in Japan and all over the world, especially about politics because of the influence of friends from different countries. I have gained confidence and I also found some parts about myself that I want to keep improving from now. I think that these great experiences definitely influenced me a lot and it was a precious time in my life.



# What artifacts can tell us about our ancestors

**Archaeological research into the historic cultural adjustment of small island communities**

Cut off by the ocean, the Tokara Islands, which stretch for over 160km between the Ōsumi Islands and Amami Islands, are an area that has developed its own natural environment and individual culture that is still evident to this day. This physically demanding geographic environment has hitherto had no archaeological information about it. Several years ago, the discovery of a fragment of pottery on Yokoatejima led Shinzato-sensei to do archaeological research on the islands. (The populated Tokara islands: Kuchinoshima, Nakanoshima, Suwanasejima, Tairajima, Akusekijima, Kodakarajima, Takarajima. The unpopulated: Gajajima, Kogajajima, Kojima, Kannonejima, Yokoatejima)

## *The discovery of Okinawan pottery on uninhabited Yokoatejima*



When Dr. Shinzato of the Research Centre for Archaeology is not involved in doing archaeological surveys on campus whenever

there is construction, cataloguing the artefacts found, researching them, and presenting them to the public, he continues with his own research of the Ryūkyū Islands which stretch from Kyūshū all the way to Taiwan. The first time he went to Yokoatejima, the furthest south unpopulated island of the Tokara chain, was back in October 2014, when he joined a survey there conducted by the Nansei-Toko Observatory for Earthquakes and Volcanoes who were going to collect data about changes in the earth's crust and also do apparatus maintenance.

"When I was strolling around the island I came across this fragment of Okinawan Tsuboya pottery. It was a complete surprise. Just like I had met someone from Okinawa!" It fitted in exactly with reports in the records compiled by Nagoya Sagenta in the mid-19th century covering the Amami Islands and their nature, culture and life, that Okinawans had visited Yokoatejima. It was undeniably like a message from his ancestors for Okinawa-born Dr. Shinzato. That find, led him to conduct a door-to-door survey of all the homes

and surface surveys of the fields on all of the Tokara Islands and publish his findings, enabling him to receive a grant from the Japanese Government in 2015 to start proper research.

## *What these silent objects tell us about people*

"I did field surveys on all of the islands. Getting to the islands from the Kagoshima mainland, there are only two ferries a week. So I would do a survey of one island, go back to Kagoshima and then go back to the next islands again and again. Once I had done all of the islands I did an archaeological dig on Nakanoshima in 2016, which unearthed a lot of artefacts. Amongst them, the Chinese Yue-zhou-yao celadon jug that I found was archaeological milestone. Until then, it had only been found in Fukuoka, Nagasaki and on Kikaijima. Finding it on Nakanoshima proved that there was some cultural exchange line between these places and Nakanoshima." Also on Nakanoshima, stone artefacts, Sue pottery and earthenware from the Yayoi Period (300BCE-300CE) were discovered. "Today not many people live on the Tokara Islands. But 2000 years ago in the Yayoi Period, things were found here from the Amami, Tanegashima, Kagoshima, Kumamoto and Fukuoka areas. People were coming and going from the islands much more than we imagine. This indicates that the islands were a crossroads for island-hopping people. Everything these silent objects continue to tell Dr. Shinzato has probably given him a very vivid picture of our ancestors.

He also found Qing Dynasty pottery on Tairajima from a boat that shipwrecked there in the late 19th century, and Jōmon Period (14,000-300BCE) earthenware and Song and Ming Dynasty Chinese ceramics on Gajajima. As well as analysing the artefacts, he traces their history further using interviews, and ethnological archives and old documents. "When you are trying to verify something, without experience we can't imagine anything. So broadening your experience and learning how to identify artefacts is essential."





### *An archaeologist's calling*



Dr. Shinzato thinks that the calling of an archaeologist is not making some huge historical discovery, but giving people a reason to be

proud of the area they live in. "I put on an exhibition of artefacts at the primary school on Nakanoshima and the children could look at and touch the things. Knowing that their island had this history really blew them away. I was happy that the islanders could take pride in their home. My dream is to be able to make similar exhibitions throughout the islands with things special to each island. There are a lot of people who are interested in archaeology, so for these people as well as researchers the exhibitions would become a kind of tourist attraction. Hopefully I can make this happen."

### *Research Associate*

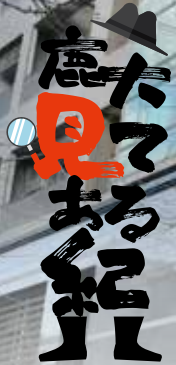
## *Shinzato Takayuki*

Research Centre for Archaeology  
Graduated from Okinawa International University.  
PhD from Kagoshima University in March 2006.

Member of Okinawa Archaeological Society,  
Amami Archaeological Society, Archaeological  
Society of Kagoshima, Society of Archaeological  
Studies, Japanese Archaeological Association,  
Anthropological Society of Nippon.

Research topics: Prehistory of the Ryūkyū Islands,  
burial practices in the Ryūkyū Islands, exchange  
and trade between the Ryūkyū Islands and  
surrounding areas





## Division of Instrumental Analysis

*Sawada Tsuyoshi, Associate Professor, Research Support Centre*

High-performance analytical instruments are required nowadays to carry out research in the various fields of fundamental and applied sciences. In Kagoshima University, the members of the Division of Instrumental Analysis have been managing and maintaining a number of analytical instruments to facilitate usage by all researchers and students.

The main office of the Division of Instrumental Analysis is located on the sixth floor of the Science and Engineering Laboratory Building beside the Ginkgo Tree Avenue on the Kōrimoto campus.



Science and Engineering Laboratory Building (left) and the entrance of the Division of Instrumental Analysis (right)

“Over the past decade, the cost of research has escalated.” says Associate Professor Sawada Tsuyoshi, who is the division leader of the Division of Instrumental Analysis,

“Analytical instruments are especially expensive to obtain and maintain. But all researchers, including professors and students, actively make use of all these analytical instruments for their research. Therefore, we must support these researchers and provide these expensive analytical instruments.”

Six people work in the Division of Instrumental Analysis, one associate professor, two technical specialists, two part-time technical assistants, and one part-time administrative staff member, to maintain the 54 analytical instruments in Kagoshima University (Fig. 2).



Fig. 2 Laboratory in the Science and Engineering Laboratory Building

In 2016, the total number of users of this division was approximately 7300, while the total operating time of our instruments was approximately 15000 hours. There are many types of analytical instruments in the two buildings, namely the Science and Engineering Laboratory Building and the Kagoshima University Innovation Centre.

The history of the Division of Instrumental Analysis dates to 2001. In that year, the Centre for Instrumental Analysis was established in Kagoshima University. In 2014, it was reorganised as the Division of Instrumental Analysis in the Natural Science Centre for Research and Education, and was subsequently reorganised as one division of the Research Support Centre, Institute of Research Promotion, Kagoshima University, in April 2017.

The analytical instruments in this division are classified into four categories. Examples of instruments belonging to these categories are shown below.

### 1. Magnification of microscopic objects

There are five scanning electron microscopes (SEMs) on the sixth floor of the Science and Engineering Laboratory Building, and one transmission electron microscope (TEM) in the Innovation Centre Building (Fig. 3).





Fig. 3 JEOL JEM-3010 Transmission Electron Microscope (TEM)

This TEM (JEM-3010) can magnify objects 1.5 million times, thus making it possible to view nano-scale objects. These instruments can be used to analyse electrical devices, organic materials, ash or sand from volcanoes, and metal nanoparticles. Therefore, these instruments are highly suited for researchers from diverse fields. This division also has a scanning probe microscope, an X-ray guide tube microscope, and a laser microscope.

## 2. Structural analysis of atoms or molecules

This category includes the X-ray photoelectron spectrometer (XPS, Fig. 4), fluorescence X-ray spectrometer, and a CHN elemental analyser. These instruments determine the types and ratio of elements in or on the samples.



Fig. 4 Shimadzu AXIS-ULTRA DLD X-ray photoelectron spectrometer

## 3. Spectroscopy: Investigation of the color of materials

Every material has a unique color depending on its light absorption or emission characteristics. This division has an ultraviolet and visible spectrophotometer, an infrared spectrophotometer (Fig. 5), and a fluorescence spectrophotometer.



Fig. 5 JASCO IRT-3000 infrared spectrophotometer

## 4. Mass measurement of objects or molecules

There are not only electric balances, but also mass spectrometers. The electric balances can measure masses to 0.1 mg. This division also has a gas chromatography mass spectrometer (Fig. 6) and a liquid chromatography mass spectrometer, which can determine molecular weight.



Fig. 6 Agilent 5975C gas chromatography mass spectrometer

“We also train users to operate analytical instruments” continues Dr. Sawada about the other roles and responsibilities of this division. The members of this division provide information on analytical instruments.

“We convene a customer training programme for analytical instruments.”

They conduct a customer training programme or a small symposium several times annually (Fig. 7).



Fig. 7 Customer training program on the liquid chromatography mass spectrometer in 2017

This division is open to all researchers—not just those who belong to Kagoshima University, but also those who belong to other universities or industries. If you require any information about an analytical instrument, please do not hesitate to contact them. They will provide technical information through training in equipment operation and introduce modern instrumental analysis techniques.

Web address of the Division of Instrumental Analysis:  
<http://www.cia.kagoshima-u.ac.jp>

## Kagoshima study trip for Tsinghua University students

In August 2017, eighteen students from Tsinghua University in China came to Kagoshima on a study trip. Tsinghua University has a comprehensive MOU agreement with Kagoshima Prefecture and the students were joined by sixteen students from Kagoshima who studied languages at Tsinghua University as recipients of the Kagoshima Prefecture Scholarship for Tsinghua University. Six of these students came from Kagoshima University, eight from the International University of Kagoshima and one each from Shigakukan University and the Immaculate Heart College. Furthermore, eight of these students were scheduled to begin studying Chinese at Tsinghua University from September 2017. During the study trip, they learned about Kagoshima's geography and history through lectures and collaborative learning and went on an excursion designed

to teach them about Meiji Japan's industrial revolution heritage (Iron and steel industry, shipbuilding, coal industry) through visits to the Shōko Shūseikan Museum, Sengan-En garden, the Terayama charcoal kilns and the Sekiyoshi sluice gate. On the last day the participants did group presentations in Japanese about the results of their study.

The participants from Tsinghua University were not only from the Japanese Language Department, there were students from various fields such as Computers, Design Studies, Biology, Medicine, Law, Comparative Literature etc. Nevertheless, they all studied Japanese and the study trip was held in Japanese. During the group activities with Japanese students, they were actively interacting while communicating in Chinese and Japanese.



Collaborative learning



The excursion (coordinator: Professor Ishizuka, Faculty of Law, Economics and Humanities)



Visiting the Sekiyoshi sluice gate (explanation by Associate Professor Kobayashi, Faculty of Law, Economics and Humanities)



Group presentation

## Students pick up Excellent Poster Award at Taiwan - Japan bilateral workshop



Ata Yurina

On 3<sup>rd</sup>-6<sup>th</sup> September, the Taiwan-Japan Bilateral Workshop 2017 Poster Session was held at the National Cheng Kung University in Tainan City, Taiwan. Kagoshima University students Ata Yurina and Yanagie Makoto (MSc students Chemistry, Biotechnology and Chemical Engineering Course) both received the Award for Excellent Student Poster Presentation.



Yanagie Makoto

In the poster session, 50 presentations were made. The presenters had to give a short 3-minute speech in English as well

as an hour of poster presentation. The contents of their research, the appeal of their poster and the clarity of the explanation of their research were all rated highly as well as their answers to multiple questions and inquiries by the judges. As a result, their posters were selected for two of the seven Awards for Excellent Student poster presentation given at the workshop.

The contents of their presentations are listed below.

Yurina Ata, Yoshiaki Manabe, Hiroyuki Shinchi, Masahiro Wakao, Yasuo Suda

### **Preparation of Sugar Chain-immobilized Fluorescent Carbon Nanoparticles**

<http://www.cb.kagoshima-u.ac.jp/lab/suda-lab/>

Makoto Yanagie and Yoshirō Kaneko

### **Preparation of Tough Hybrid Hydrogels Using Water-soluble Cyclotetrasiloxane and POSS Containing Polymerizable Side-chain Groups as Cross-linkers**

<http://yoshiro-kaneko-lab.jimdo.com/>



## Vietnam Academy of Social Sciences members' visit

In October, a group from the Vietnam Academy of Social Sciences (VASS) led by Nguyen Thanh Ha, VASS Director of International Affairs, came on a courtesy visit to President Maeda Yoshizane together with Visiting Professor Ho Thi Hoang Hoa from the Inamori Academy.

VASS was founded in 1953 as a research institute in social sciences directly under the government of Vietnam. It signed an academic exchange agreement with Kagoshima University in 2007 and since then international and study exchange activities have been actively pursued with the Inamori Academy as well as the general education / overseas training course titled "The Spirit of Enterprise: learning abroad in Vietnam". The VASS members, in addition to participating in a week-long Social Science Institute training



During the meeting



Director Nguyen and President Maeda



Commemorative photo

at the Inamori Academy, made a courtesy visit to Dr. Maeda in order to further strengthen the future relationships between VASS and Kagoshima University. Professor Iwai Hisashi, Dean of the Faculty of Agriculture, Professor Takekuma Akira, Director of the Inamori Academy, and Professor Yamaguchi Toshinobu, Director of the Inamori Academy Vietnam Office also attended the meeting and discussed the purpose of the visit and future plans for exchange activities. It is expected that the academic exchange efforts of both institutions will benefit greatly from this visit.

## President of Isfahan University of Medical Sciences visits President Maeda



Commemorative photo, front row, from left: Vice President Baba, President Changiz, President Maeda, School of Nursing and Midwifery Associate Professor Shahriari. Back row, from left: Professor Takezaki, Professor Marutani, International Affairs Director Dr. Mir Mohammad Sadeghi, Professor Suzuki

In October, the President of the Isfahan University of Medical Sciences, Tahereh Changiz, and her colleagues paid President Maeda Yoshizane a courtesy call.

Kagoshima University's Department of Medical and Dental Sciences had already concluded an inter-university academic exchange agreement with the Isfahan University of Medical Sciences in April 2017. In the future, there are plans to implement international nursing projects on regional and home nursing care at the School of Nursing and Midwifery of the Isfahan University of Medical

Sciences and the Department of Health at the Kagoshima University Faculty of Medicine and this visit was part of the preparations.

In the conference, Professor Maeda gave an introduction to Kagoshima University. After that Professor Marutani Miki from the Kagoshima University Faculty of Medicine explained the purpose and results of this visit. President Changiz then expressed her gratitude for the invitation: "We had the opportunity to visit the city's facilities and hospitals. It was a very fruitful visit. We were deeply moved by the kindness of the people of Kagoshima."

In addition to Professor Marutani, Vice President Baba Masanori (International Planning Promotion Officer), Professor Suzuki Eiji (Director of the Kagoshima University Global Centre), Professor Takezaki Toshirō (Graduate School of Medical and Dental Sciences) and Associate Professor Morita Toyoko (Global Centre) were also present and participated in a congenial discussion about the achievements of the exchange and the continuation of academic exchange activities in the future.

After the meeting, a further meeting was held with Professors Unedaya Keiko and Nakatani Sumie from Global Centre in order to exchange opinions and discuss not only academic exchanges to contribute to regional medical care at both universities but also more concrete plans about HR exchange including students and teachers. As a result of this visit, further cooperation between the two universities can be expected.





# Eco-tours in Ōsumi's forests and villages

*Inokura Yōji, Associate Professor, Takakuma Experimental Forest*



Eco-tour in the university's experimental forest

Takakuma Experimental Forest is in Tatumizu in the northern part of the Ōsumi Peninsula. It has a hundred years of history and includes planted and natural broad-leaved evergreen forest as well as various other flora and fauna. Over the last 15 years, the chance to experience the forest and its nature has helped cultivate rich sensibilities and intellectual curiosity in local children, while at the same time giving an opportunity to university students to improve their communication skills and learning through their guidance and support for the children.

In 2006, the schools in the local village of Ōno closed, and Ōno ESD Nature School was established utilising the old school facilities. At the Nature School, a programme centred on the research forest and the area around Ōno was started and managed by the university in cooperation with the locals, and from that time onwards students began meeting local people and learning about and experiencing the culture and lifestyle of the rural communities.

In 2013 an NPO called Morinchu Club was founded. Students and graduates involved with Ōno have developed the experimental forest and the life in the Ōno area as a local resource and by starting a new social business have set as their goal to establish

sustainable rural communities. Students participate in the management of the project, share various ideas and are endeavouring to create new job opportunities through trial and error learning.

In particular, one of the jobs the budding NPO is working on is the eco-tour. We have made the research forest and beautiful fields as well as the skills we developed there available to the general public. A river tracing tour of the Kushira River, full of freshness in the summer; a walking tour in the experimental forest showing both the nature and people's livelihoods, a place to explore the history of the cultivation of the Ōno area and a walking tour centred on its lifestyle; we have a programme full of the charms of Ōsumi's forests and villages. At the same time, I would like to train student interpreters and provide practical learning for entrepreneurs in rural areas.

NPO Morinchu Club website  
<http://morinchu-club.or.jp/>

## **PROFILE: Inokura Yōji**

Born in 1959 in Yamaguchi Prefecture. PhD in Agriculture. He manages the experimental forest as a full-time member of teaching staff while at the same time working to create sustainable rural communities and encourage learning about and experiencing the forest environment together with the students through the Nature School and its activities.



Eco-tour around the village of Ōno



Front Cover: A city tram at the Kōgakubumae (Faculty of Engineering) stop

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