

NITech Topics



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2024



Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) in Germany



Yearly School 2024 in Bayreuth (Joint Seminar)

TOPIC
01

Established “Joint Degree Doctoral Program in Energy Conversion Systems” in Collaboration with Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) in Germany

NITech established Joint Degree Doctoral Program in Energy Conversion Systems with Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) in Germany, in April 2024. This program awards a single degree jointly to students who complete the program. Students in the program experience research abroad at FAU for about one year during their second year of the program. Leveraging the strong relationships between both universities and industries, the program aims to cultivate human resources who can create new value in the field of energy conversion systems and work in concert to bring about social innovation toward the realization of a carbon-neutral society.

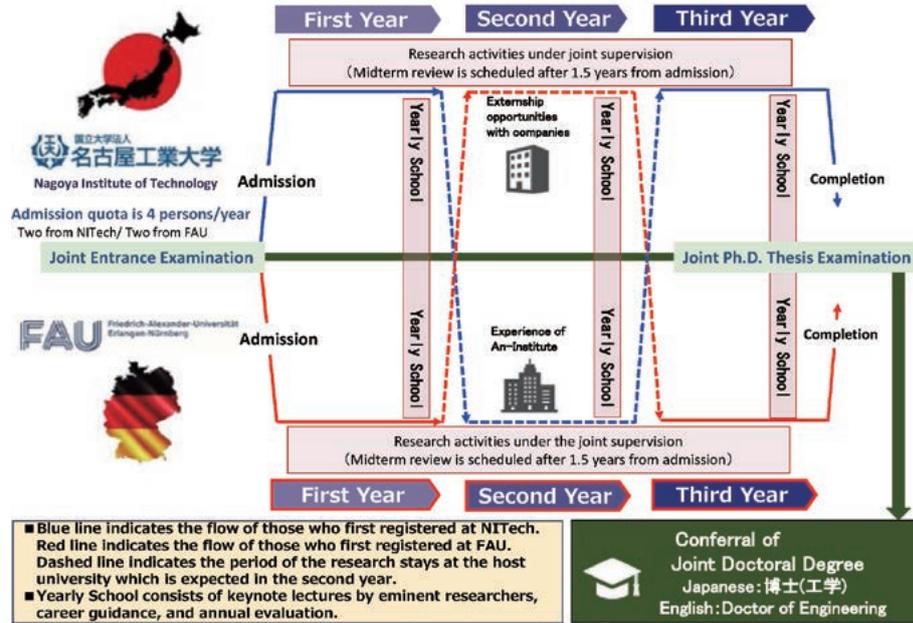
[Purpose of the establishment]

To achieve carbon neutrality by 2050, innovation that solves many global issues, including energy problems, and transforms the economy and society will be essential. To achieve this, it is essential to go beyond partial

optimization of elemental technologies (improvement) to create value through total optimization based on system thinking that connects technology and society (system innovation), and to take the lead in developing the core human resources who will carry this out.

Considering this social background, the joint degree program with FAU will move away from the traditional curriculum structure that assumes an academic-centered image of doctoral human resources and instead focus on training global leaders who will be responsible for creating innovations that will lead to social transformation.

Specifically, we aim to nurture researchers who can lead the world in the field of energy conversion and pioneer new academic fields at higher education institutions and research institutes both in Japan and overseas, as well as researchers and engineers who can lead energy-related businesses at global companies in various industries, including automotive, chemical, and energy.



The outline from admission to completion in NITech and FAU Joint Degree Program in Energy Conversion Systems

TOPIC
02

Established three new composite programs in Graduate School of Engineering

NITech established three new composite programs in the Master's Course, Graduate School of Engineering: "Program of Future Communications", "Program of Carbon Neutrality Science and Engineering" and "Program of Biomedical Science and Engineering." The aim of the establishment is to broaden the multifaceted perspectives acquired through the existing "Advanced Engineering Education Program" and "Creative Engineering Program."

- Program of Future Communications
[\[https://fcom.web.nitech.ac.jp/en/\]](https://fcom.web.nitech.ac.jp/en/)
- Program of Carbon Neutrality Science and Engineering
[\[https://cn-neutrality.web.nitech.ac.jp/en/\]](https://cn-neutrality.web.nitech.ac.jp/en/)
- Program of Biomedical Science and Engineering
[\[https://biomedscieng.web.nitech.ac.jp/en/\]](https://biomedscieng.web.nitech.ac.jp/en/)

Faculty of Engineering	Graduate School of Engineering	
Advanced Engineering Education Program (Department)	Master's Course	Doctoral Course
Life Science and Applied Chemistry	Department of Engineering (Program)	Department of Engineering
Physical Science and Engineering	Life and Materials Chemistry / Soft Materials / Advanced Ceramics	
Electrical and Mechanical Engineering	Materials Function and Design / Applied Physics	
Computer Science	Electrical and Electronic Engineering / Mechanical Engineering	
Architecture, Civil Engineering, and Industrial	Networks / Computational Intelligence / Multimedia and Human Computer Interaction / Mathematics and Mathematical Science	
	Architecture and Design / Civil and Environmental Engineering / Systems Management and Engineering	
	New	
	Future Communications	
	Carbon Neutrality Science and Engineering	
	Biomedical Science and Engineering	
	Innovation Program	
Creative Engineering Program	Creative Engineering Program	
Fundamental Engineering Program		
		Department of Nanopharmaceutical Sciences
		Joint Degree Doctoral Program in Informatics
		Joint Degree Doctoral Program in Energy Conversion Systems

TOPIC
03

Dr. OBATA Makoto, new President of NITech



14th President of NITech
OBATA Makoto

In April 2024, Dr. OBATA Makoto was appointed as the 14th President of Nagoya Institute of Technology (NITech). Prior to this, he was an Executive Director (Educational Planning, Information) and Vice President.

President OBATA aims to provide opportunities and venues for education and

research that activate the whole brain, including both the left brain, which controls calculation skills and logical thinking, and the right brain, which is related to creativity and imagination.

With a new president, NITech continues to pursue “Engineering with Heart and Mind for Humanity”. This approach not only addresses the demands of rapidly changing times but also positions the university as a leader in building a sustainable society through “Miraizukuri” (social contribution).

Professional Career at NITech

Speciality Field: Civil Engineering, Structural Engineering

- ▶ April 1987, Research Assistant
- ▶ April 1990, Lecturer
- ▶ April 1992, Assistant Professor
- ▶ April 2002, Professor
- ▶ April 2012, Vice President
- ▶ April 2020, Executive Director and Vice President

TOPIC
04

Distinguished Professor KANDORI Hideki received 8th Japan Bioindustry Award 2024

The Japan Bioindustry Award is awarded to individuals or groups who have made significant contributions to the development of the bioindustry or who have achieved outstanding results that are expected to contribute greatly to its future development.

Distinguished Professor KANDORI investigates light response mechanisms of animal and microbial rhodopsins by use of ultrafast spectroscopy and infrared spectroscopy. During such basic research, he also discovered new rhodopsins and engineered rhodopsin functions.

Specifically, he discovered a light-driven sodium pumps, an inward proton pumps, new channelrhodopsins, enzyme rhodopsins, and heliorhodopsins, and created the functions of light-driven potassium pumps, light-driven cesium pumps, and chimeric rhodopsins.

In particular, a novel channelrhodopsin and chimeric rhodopsin are noteworthy as tools that have led from basic research to application developments in visual regeneration.

This is an innovative treatment to restore vision by gene therapy of rhodopsin for diseases such as retinitis

pigmentosa, in which photoreceptor cells are destroyed and vision becomes impaired. However, a problem has become clear: the current treatment does not work under indoor lighting. The two rhodopsins discovered and created by Professor KANDORI have achieved high light sensitivity through their own unique mechanisms, and their excellent properties are paving the way for their clinical application as visual regeneration tools in treatment.

Venture companies related to each rhodopsin have already been established, and preparations are underway for early clinical trials.

Professor KANDORI's achievements, based on fundamental research into the phototransduction mechanism of rhodopsin, include the successful discovery and creation of a new rhodopsin that paves the way for medical applications in visual regeneration. These achievements are expected to contribute greatly to the development of bioindustry both in Japan and overseas, and were therefore highly praised as being most deserving of the Japan Bioindustry Award.

Professor TOKUDA Keiichi receives IEEE James L. Flanagan Speech and Audio Processing Award, world's highest academic award in speech technology

Professor TOKUDA Keiichi (NITech Computer Science Group) received the 2024 IEEE James L. Flanagan Speech and Audio Processing Award. This is in recognition of Professor TOKUDA's pioneering contributions to statistical speech synthesis and speech signal processing over many years. The award ceremony took place at the 2024 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2024), held in Seoul, South Korea, from April 14 through 19, 2024.

The IEEE Technical Field Awards (TFAs) are the highest honors in the academic fields of science and technology associated with the IEEE, the world's largest society for electrical and information engineering. The IEEE James L. Flanagan Speech and Audio Processing Award is awarded to researchers and engineers who have made outstanding achievements in the field of speech and audio processing technology.

Speech synthesis basically involves generating spoken language from arbitrary text. In the 1990s, the principal method of was to connect recorded speech waveforms for each character in the text. However, Professor TOKUDA proposed a revolutionary approach to speech generation through "learning," using statistical generative models. His method demonstrated that it is possible to freely generate various voice qualities, speaking styles,

and emotional expressions. Furthermore, by introducing the new concept of speech generation based on statistical models, Professor TOKUDA brought about a paradigm shift in the entire field of speech synthesis, establishing it as a new research area and greatly contributing to the advancement of other related fields. Professor TOKUDA's groundbreaking approach has since become a foundational method for most contemporary speech synthesis technologies. It also constitutes a driving force for cutting-edge neural network approaches in the context of generative AI, commonly referred to as AI speech synthesis.



Prof. TOKUDA receiving the IEEE Technical Field Awards

JST Sakura Science Exchange Program was held

Japan Science and Technology Agency (JST) "Sakura Science Exchange Program" was carried out for 7 days from September 22 to September 28.

Associate Professor HONDA Mitsuhiro (Physical Science and Engineering Group) is the main person of the program, and he conducted it for the second year in a row.

This year, 2 faculty members and 7 students were invited from 3 universities: Tun Hussein Onn University Malaysia, Universiti Teknologi Malaysia, and Monash University

Malaysia, for the exchange program.

On the first day, the participants received an orientation of NITech, a brief explanation about the institute's research technologies and experimental equipments at NITech, and were given a tour of each facility. From the second day onwards, following explanations from Associate Professor HONDA, they experienced the synthesis of photocatalytic thin films using energy-saving, low-environmental-impact processes, as well as the synthesis of advanced thin-film

materials (graphene).

Graduate students from HONDA's laboratory also participated in the experiments as supporters, and the Malaysian students were seen asking them questions constantly.

During their stay, they visited the Nagoya City Science Museum and the SCMAGLEV and Railway Park. They learned about Japan's cutting-edge science and its railway network and systems, which boast world-class safety, thereby increasing their interest in science.

Although it was only a very short period of 7 days, through numerous experiments and subsequent discussions,

they were able to deepen their understanding of the technology for fabricating optically functional thin films for environmental purification, which was the theme of this program. They also used their free time to tour the city of Nagoya and experience Japanese culture firsthand. On the last day at NITech, a video made by the invited students looking back on the seven days was screened, reaffirming that it was a program that allowed the participants to share meaningful time. We look forward to further exchanges between NITech and Malaysia universities in the future.



Group photo at the opinion exchange meeting

TOPIC
07

Faculty and staff exchange through EU Erasmus+ Programme

Erasmus+ Programme is the EU's main education support program, and supports the exchange of students and staff between European and non-European universities. In 2024, the following three exchanges of staff member took place.

○From June 8 to 12, 2 faculty members of NITech participated in the Erasmus+ Programme with Politehnica University Timisoara, Romania.

In 2022, starting from university level partnerships between Politehnica University Timisoara and NITech, we have sent students each other and conducted joint research by faculty members from both universities.

○From July 1 to 5, one staff member of NITech participated in the Erasmus+ Programme with Poznan University of Technology (PUT), Poland.

In 2006, starting from department level partnerships between PUT and NITech, we concluded university level partnerships in 2018, and we have sent students each other and conducted joint research by faculty members from both universities.

○From November 16 to 24, one faculty member of NITech participated in the Erasmus+ Programme with Université de Limoges, ENSIL-ENSCI, France.

In 2003, starting from university level partnerships between Université de Limoges and NITech, and we have sent students each other and conducted joint research by faculty members from both universities.

In the future, it is expected that these faculty and staff exchanges will deepen exchanges and strengthen the relationship between the those universities.

TOPIC
08

NITech have deepened exchanges with many overseas universities

Month	Countries	Exchange Partner	Exchange Contents	Number of People
February	Malaysia	Universiti Teknologi Malaysia (UTM)	Faculty and Staff Exchange	15
March	France	France CNRS IRCER (Institute of Research for Ceramics)	Kickoff Meeting	7
May	Spain	Universidad Politecnica de Valencia (UPV)	Faculty and Staff Exchange	4
June	India, Taiwan, Vietnam, Cambodia, Maldives, and Kazakhstan		Sakura Science High School Program	85
July	Italy	University of Bologna	Courtesy Visit	2
July	Korea	School of Computer Science and Engineering of Yeungnam University	Special Lecture	27
September	Malaysia	Universiti Putra Malaysia (UPM)	Laboratory Tour	20
October	Malaysia	Universiti Putra Malaysia (UPM)	Laboratory Tour	17
October	China	Shenzhen University	Signing Ceremony	4

List of visitors in 2024

In 2024, with the impact of COVID-19 gone, many visitors from overseas universities visited NITech.

 July 2024

On July 2024, the Rector Giovanni Molari and the Vice Rector for International Relations Raffaella Campaner from the University of Bologna in Italy visited NITech.

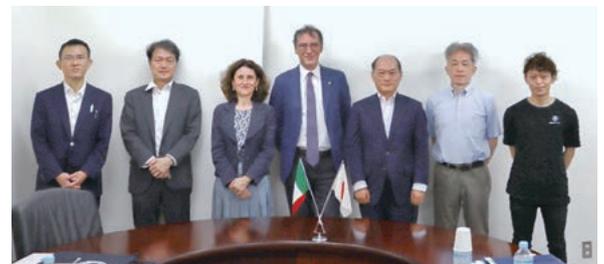
Founded in 1088, the University of Bologna is the oldest university in the Western world. It currently has 31 faculties with 97,000 students (approximately 8,500 international students, including 98 Japanese students).

The connection between Nagoya Institute of Technology and the University of Bologna goes way back in 2008 when Distinguished Professor KANDORI Hideki of the Graduate School of Engineering gave a lecture at the University of Bologna. Currently, Associate Professor KATAYAMA Kota is conducting joint research with Dr. Marco Garavelli.

The President and the Executive Director of NITech welcomed the delegation, and Distinguished Professor KANDORI recounted an episode about his stay in

Bologna, and Associate Professor KATAYAMA explained about the joint research with the University of Bologna. Afterwards, they toured two laboratories. The Rector Giovanni showed great interest in the differences in the teaching methods at the two universities.

This visit led to NITech and the University of Bologna signing an agreement of academic exchange and cooperation in 2025.



University of Bologna

NITech is currently working to further deepen its relationships with universities which concluded the agreement for academic exchange and cooperation, and is also engaging in exchanges with overseas universities that have the potential to further internationalize the university. We will continue to deepen our collaboration and strive to foster global human resources, exchanges of the faculty and staff members and students, and development of international joint research.



UPM students toured solar car club in NITech

New Partnerships in 2024		
January	Chiang Mai University (Thailand)	University Partnership
March	Royal Danish Academy - Architecture, Design, Conservation (Architecture) (Denmark)	Department Partnership
October	College of Civil and Transportation Engineering, Shenzhen University (China)	Department Partnership