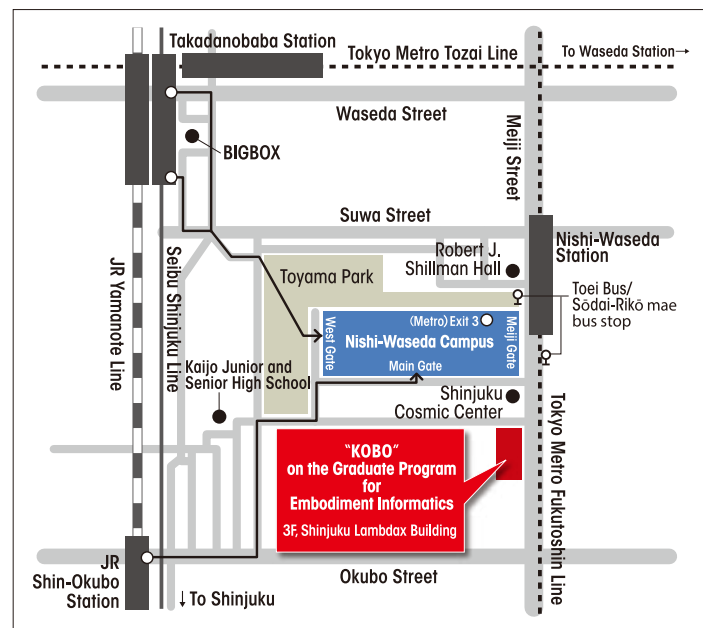
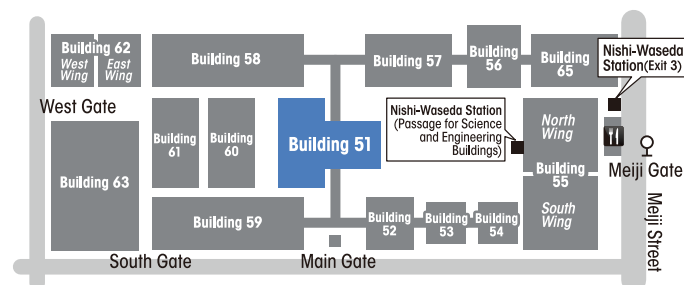


Access to Waseda University Nishi-Waseda Campus / “KOBO”

- Exit 3 (Passage for Science and Engineering Buildings) of Nishi-Waseda Station on the Tokyo Metro Fukutoshin Line (directly connected to the campus)
- 12-minute walk from Shin-Okubo Station on the JR Yamanote Line
- 15-minute walk from Takadanobaba Station on the JR Yamanote Line, the Tokyo Metro Tozai Line and the Seibu Shinjuku Line



Map of Nishi-Waseda Campus



Graduate Program for Embodiment Informatics Faculty of Science and Engineering, Waseda University

<http://www.leading-sn.waseda.ac.jp/>
E-mail: leading-sn-info@list.waseda.jp

Administration office

Room 08A, 1F, Building 51, Nishi-Waseda Campus,
3-4-1 Okubo, Shinjuku-ku, Tokyo 169-8555, Japan
Tel: 03-5286-2836 Fax: 03-5286-2847

KOBO

3F, Shinjuku Lambdax Building, 2-4-12, Okubo,
Shinjuku-ku, Tokyo, 169-0072, Japan
Tel: 03-6233-7801 Fax: 03-5285-0028

WASEDA University

INNOVATION COMPUTING NETWORKS EMBODIMENT Graduate Program for Embodiment Informatics

Work Hard in a Stimulating Academic Environment and Become a Next-Generation Systems Innovation Leader



As work continues apace on a global scale to create new technology, significant innovation is required to ensure this technology excels. In the field of information and communications technology, new industries are being created at a rapid pace. In the field of mechanical engineering, which embodies technology in tangible products, significant contributions are being made to Japan's industrial competitiveness. The integration of these important fields is expected to create new industries and a strong demand for innovative and talented individuals. Our "Graduate Program for Embodiment Informatics" has been selected as part of the Ministry of Education, Culture, Sports, Science and Technology's "Program for Leading Graduate Schools," which aims to "advance the establishment of university graduate schools of the highest caliber by supporting the dramatic reform of their education programs in such a way that they will institute degree programs recognized as top quality around the world."

Reference: <http://www.jsps.go.jp/english/e-hakasekatei/index.html>



Next-generation Systems Leader

Integration

Integration of embodiment with information

KOBO

The Workshop study space

Graduate Program for Embodiment Informatics

System

Five-year education system



Develop global leaders who can lead innovation with foresight, imagination, and strong leadership skills and accomplishment abilities to work in domestic and overseas industries



MESSAGE

Welcome to Embodiment Informatics

Professor Shigeki Sugano,
 Department of Modern Mechanical Engineering, Graduate School of Creative Science and Engineering
 Coordinator for the Graduate Program for Embodiment Informatics



Japan's *monozukuri* (manufacturing) technology is highly regarded around the world. It creates *mono*, all kinds of tangible products from cars and trains to production equipment. Nevertheless, many world-leading innovators, such as Google, Apple, and KUKA, were first established in Europe and the U.S. Some believe that in the *monozukuri* field Japan lacks human resources with three abilities: foresight, the ability to identify possible areas for innovation; imagination, the ability to integrate advanced technology in a broad range of fields; and leadership and accomplishment abilities. In particular, foresight and imagination are essential in the fields of information and communications technology and mechanical systems to develop new medical, welfare, manufacturing and social infrastructures. Development of human resources in these fields is a priority that researchers, educators, and entrepreneurs need to address.

Of importance here is how information and communications technology should be integrated with mechanical engineering. Both are core technologies in *monozukuri*, so many universities and research institutions have been working to combine them. Merely combining them, however, does not achieve technological innovation or integration. Those who are familiar with programming and networks in the field of information and communications technology need to learn mechanical design, while those who are familiar with mechanical design need to learn methodologies in the field of information and communications technology. In other words, there is a need for talented individuals who have completed a course of comprehensive study in

a new academic and research field integrating these two technological fields.

For example, developing a surgery support system requires high-precision robotic and human interface technologies. If methodologies from the information and communications field, such as networking and high-speed data processing, can be applied to such a system, this new surgery support system will be able to manage large amounts of medical data and instantly provide appropriate therapeutic procedures. This is a typical example of embodiment informatics.

If a student learns the core technologies in one of the fields of information, communication, or machinery, graduates from that department, and then goes on to a graduate school in that field, he or she will gain expertise in that field only. However, if a student goes on to graduate school to study embodiment informatics—a program that integrates these fields—rather than going on to graduate school to study each field individually, he or she can successfully develop foresight, imagination, and the leadership and the accomplishment abilities to achieve breakthroughs. Of course, the study environment is important. If students conduct their studies independently of each other, they cannot generate new ideas in embodiment informatics. For this reason, Waseda University has created an educational space called *KOBO* (Workshop), where all students come together to study and motivate each other. We strongly encourage motivated students to join the Graduate Program for Embodiment Informatics to exhibit how innovative and world-leading Japan's *monozukuri* technology can be.

Targeting human resources and the key to their development

Learn from the past and live in the present

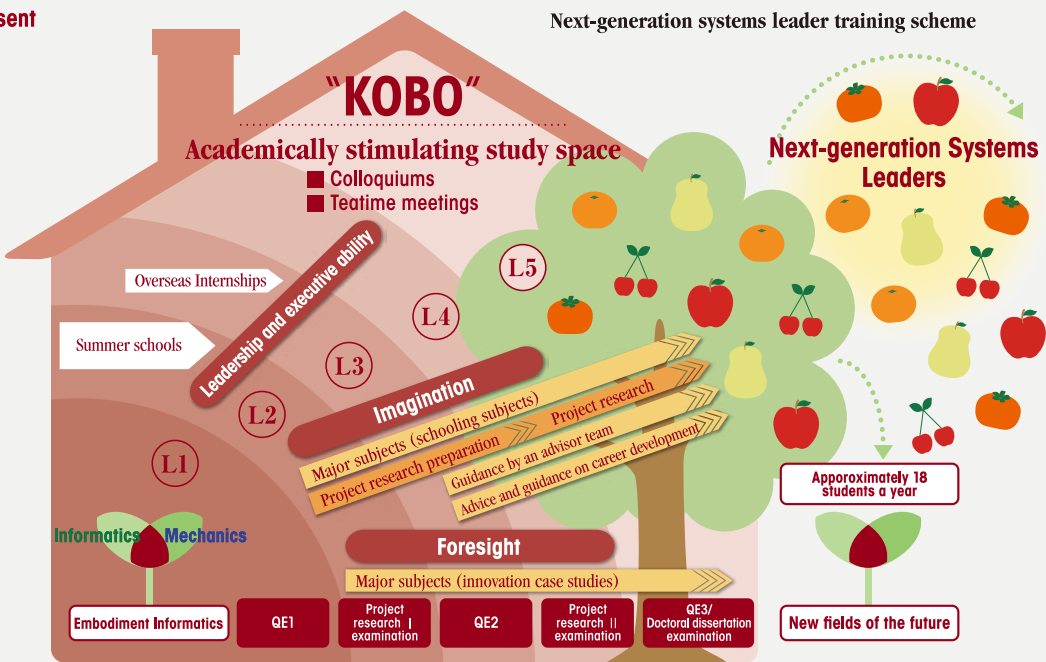
Foresight
 Ability to read the trends of the times from an international perspective and identify challenges for innovation

Know the molds and break them

Imagination
 Ability to find systematic solutions to challenges by integrating advanced information, communications, and machinery technologies

Act as a leader with an understanding of what a leader should be like

Leadership and accomplishment abilities
 Ability to implement plans to overcome challenges by making effective use of human and material resources



The Workshop Study Space

Students study in a shared workshop, which is independent of the laboratories of their academic supervisors, together with other students from different backgrounds. This academically stimulating study environment enables students' ideas and studies to become transparent and interactive, motivating students to devote themselves to their studies and facilitating interdisciplinary activities.



HIROBA



HIROBA means a common space in Japanese. Lectures, colloquia, workshops and other activities that gather students, faculty members as well as guests are held here. A high-fidelity communication system to connect satellite sites (Kita-kyushu campus or others), cutting-edge presentation tools and movable tables are available to help facilitate active discussions.



Lounge



This may be the most relaxing area in KOBQ, equipped with a large monitor for information display, also surrounded by a range of books, magazines, and other study materials. Way-out concepts and/or lively ideas are expected to be generated here, which would lead to novel collaborations.



IDOBATA



IDOBATA, in Japanese, originally denotes a place for small talk. The open and cheerful atmosphere here makes it a place best suited for casual discussions.

Lab.space



In this area, students embody and corroborate their innovative ideas through a trial and error process. Machine tools of various kinds, 3-D printers, and computers help their efforts. "Lab. space" embodies KOBQ.

Personal



Faculty members and admin staff are doing their own work in this relatively quiet area, while sometimes hearing the active discussions of the students in the background.



Future Leaders Studying at KOBQ

Learning to be a leader thru collaborative works

Kei KASE

Department of Intermedia Art and Science
Graduate School of Fundamental Science and Engineering

As a student of the Graduate Program of Embodiment Informatics, I am currently working on a joint project with other students in this program. This project requires us to brainstorm and consolidate our concept with various points of view. Since we are the diversified group composed of students with different backgrounds, it is a great opportunity to share ideas of each field and integrate them into a new concept. Communication born while working with people who have different background leads us to innovation we have never come across. Even though the innovation itself is already valuable to the society, I believe the experience of integration we gain from this program shall be crucial for our future careers.

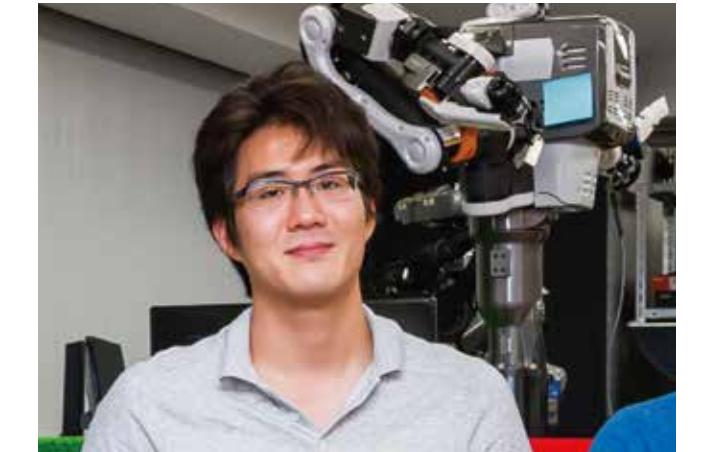


Grow up to be a leading researcher both in academic and industry

Zhengxue CHENG

Department of Computer Science and Communications Engineering
Graduate School of Fundamental Science and Engineering

Through the leading program, I have various valuable experiences, including overseas English training in U.C Davis, colloquiums with different topics, designing a robot prototype at Kobo, 3D printer management and production field work. Not only limited in my own field, I get improved in many aspects, including the widen vision and flexible research ability. Foresight, imagination and leadership abilities will play a critical role in my growth. I believe that leading program will foster a leading researcher both in both academic and industry.



Faculty



Hiroshi G. OKUNO

Title and Organization: Professor, Department of Modern Mechanical Engineering, Graduate School of Creative Science and Engineering
Current Specialty and Degree: Artificial Intelligence, Computational Auditory Scene Analysis, Robot Audition / Ph.D.



Yoshihiko HAYASHI

Title and Organization: Professor, Department of Computer Science and Communications Engineering, Graduate School of Fundamental Science and Engineering
Current Specialty and Degree: Natural Language Processing, Semantic Computing, Information Access Systems / Doctor of Engineering



Alexander SCHMITZ

Title and Organization: Associate Professor, Department of Modern Mechanical Engineering, Graduate School of Creative Science and Engineering
Current Specialty and Degree: Robotics / Ph.D.



Emi TAMAKI

Title and Organization: Associate Professor, Department of Modern Mechanical Engineering, Graduate School of Creative Science and Engineering
Current Specialty and Degree: HCI / Doctor of Interdisciplinary Information Studies



Wei WANG

Title and Organization: Assistant Professor, Department of Modern Mechanical Engineering, Graduate School of Creative Science and Engineering
Current Specialty and Degree: Intelligent Machines, Robot Motion Planning, Compliance Control, Indoor Positioning / Ph.D.



Cheng ZHANG

Title and Organization: Assistant Professor, Department of Computer Science and Communications Engineering, Graduate School of Fundamental Science and Engineering
Current Specialty and Degree: Machine Control Algorithm, Embedded Software, Game Theory, Network Economics, Machine Learning / Doctor of Science

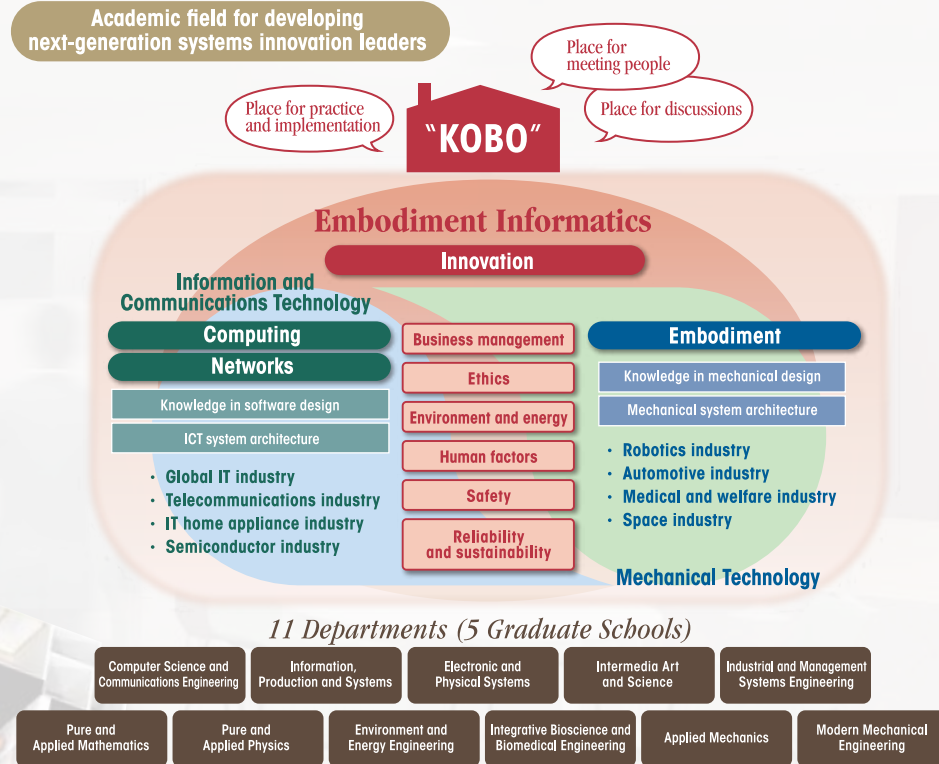


Kazuhiko IWATA

Title and Organization: Researcher, Department of Computer Science and Communications Engineering, Graduate School of Fundamental Science and Engineering
Current Specialty and Degree: Speech information processing / Master of Engineering

Integration of Embodiment with Information

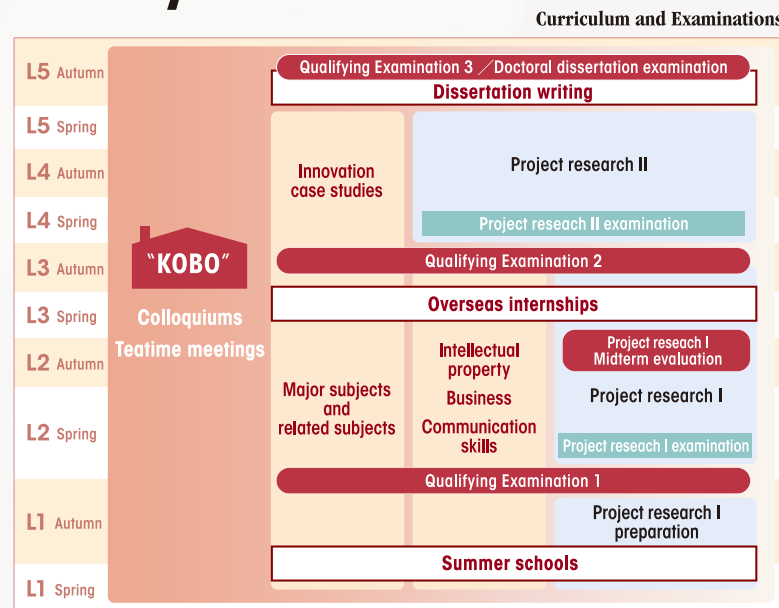
Embodiment informatics is a new academic field that integrates embodiment with informatics to produce benefits for applications (with a focus on problem-solving) in important fields, such as production, medicine, and environment. It also aims to create added values by integrating the benefits of information technology (strength in computing and reasoning), communications technology (strength in networks and sharing resources), and mechanical engineering (strength in embodiment and hardware implementation). The curriculum of this program is designed to enable students to acquire a broad range of engineering knowledge. Mechanical engineering graduates are required to take basic informatics courses, while computer science graduates are required to take basic mechanical engineering courses.



Five-Year Education System

This program encourages project-based learning (PBL) and offers students an attractive curriculum consisting of various coursework and laboratory work. Students are expected to acquire knowledge and experience required of a global leader through frequent interaction with professors and engineers in overseas institutions and industries as well as through collaboration with domestic and overseas companies and research institutions.

During the five-year course, the program gives students three qualifying examinations (QE) with clear evaluation criteria to check their study progress. In addition, an examination committee (advisory team), which consists of a chief academic supervisor, one or two assistant academic supervisors, and two external supervisors for the program (one from government or industry and one from overseas), guarantees the quality of each student.



Various Career Paths

As various companies and research institutions are involved in QE, project examination, research guidance, internships, overseas study, and other programs, students can get valuable opportunities to interact with domestic and overseas companies and research institutions from early on in their study in this program. This interaction provides students with more job opportunities than conventional job search efforts based on university recommendations or their own applications, enabling students to choose various career paths. Students enrolled in this program are entitled to a study grant and other financial assistance.

◆ Our program has various assistive measures including study grants. Please see our website for details.

Professors and Lecturers

[① Title and Organization ② Current Specialty and Degree ③ Research Themes]

Head program supervisor



Shuji HASHIMOTO

- ① Vice President
- ② Measurement and information engineering / Doctor of Engineering
- ③ Research on robots, AI, and image and sound processing

Program coordinator



Shigeki SUGANO

- ① Professor, Department of Modern Mechanical Engineering, Graduate School of Creative Science and Engineering
- ② Intelligent mechanics / Doctor of Engineering
- ③ Human-symbolic robot design and its control

Program sub-coordinator



Tetsunori KOBAYASHI

- ① Professor, Department of Computer Science and Communications Engineering, Graduate School of Fundamental Science and Engineering
- ② Perceptual computing systems / Doctor of Engineering
- ③ Research on conversation-based human-computer interaction

In charge of curricula



Toshiyasu MATSUSHIMA

- ① Professor, Department of Pure and Applied Mathematics, Graduate School of Fundamental Science and Engineering
- ② Information theory / Doctor of Engineering
- ③ Information theory and its applications



Hiroyuki KAWAMOTO

- ① Professor, Department of Applied Mechanics and Aerospace Engineering, Graduate School of Fundamental Science and Engineering
- ② Precision Engineering / Doctor of Engineering
- ③ Dynamics of electromagnetic particles and applications in image formation and space exploration



Tetsuya SATO

- ① Professor, Department of Applied Mechanics and Aerospace Engineering, Graduate School of Fundamental Science and Engineering
- ② Aerospace propulsion engineering / Doctor of Engineering
- ③ Research on air-breathing engines for hypersonic aircraft



Eiji IWASE

- ① Associate Professor, Department of Applied Mechanics and Aerospace Engineering, Graduate School of Fundamental Science and Engineering
- ② Micro-electro-mechanical Systems / Doctor of Information Science and Technology
- ③ Flexible micro-devices and optical micro-devices



Masao YANAGISAWA

- ① Professor, Department of Electronic and Physical Systems, Graduate School of Fundamental Science and Engineering
- ② Information engineering / Doctor of Engineering
- ③ Integrated system design, information and communications system design, and bioinformatics



Nozomu TOGAWA

- ① Professor, Department of Computer Science and Communications Engineering, Graduate School of Fundamental Science and Engineering
- ② Information engineering / Doctor of Engineering
- ③ Integrated system design, circuit design, and information and communications system design



Shigeru SHIMAMOTO

- ① Professor, Department of Computer Science and Communications Engineering, Graduate School of Fundamental Science and Engineering
- ② Information and telecommunications / Doctor of Engineering
- ③ Wireless access, air and space communications, and human body communications



Ikuro CHOH

- ① Professor, Department of Intermedia Art and Science, Graduate School of Fundamental Science and Engineering
- ② Media design / Doctor of Art
- ③ Media design, User interface design

In charge of curricula



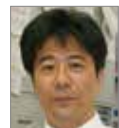
Hiroyasu IWATA

- ① Professor, Department of Modern Mechanical Engineering, Graduate School of Creative Science and Engineering
- ② Neurorobotics / Doctor of Engineering
- ③ Neuro-rehabilitation assistive RT and Next generation cancer treatment robots



Shingo TAKAHASHI

- ① Professor, Department of Industrial and Management Systems Engineering, Graduate School of Creative Science and Engineering
- ② Systems theory / Doctor of Science
- ③ Systems theory and social simulation



Takeshi IKENAGA

- ① Professor, Department of Information, Production and Systems, Graduate School of Information, Production and Systems
- ② Image signal processing systems / Doctor of Information and Computer Science
- ③ Image information processing algorithms and systems



Shinji KIMURA

- ① Professor, Department of Information, Production and Systems, Graduate School of Information, Production and Systems
- ② Information Science / Doctor of Engineering
- ③ VLSI Design Verification & Optimization



Yushi KAMIYA

- ① Professor, Department of Environment and Energy Engineering, Graduate School of Environment and Energy Engineering
- ② Engineering, electrical and electronic engineering, electric power engineering, power conversion, and electrical machinery / Doctor of Engineering
- ③ Research and development of electric vehicles friendly to both people and the environment

In charge of evaluation of students



Tetsuya OGATA

- ① Professor, Department of Intermedia Art and Science, Graduate School of Fundamental Science and Engineering
- ② Cognitive robotics / Doctor of Engineering
- ③ Informatics for emergent interaction systems

In charge of QE and project examination



Shinichi OISHI

- ① Professor, Department of Pure and Applied Mathematics, Graduate School of Fundamental Science and Engineering
- ② Guaranteed accuracy in numerical computation / Doctor of Engineering
- ③ Guaranteed accuracy in numerical computation and its applications in science and engineering



Kazunori UEDA

- ① Professor, Department of Computer Science and Communications Engineering, Graduate School of Fundamental Science and Engineering
- ② Information engineering / Doctor of Engineering
- ③ Very high-level programming languages and software verification



Hiroshi ISHIKAWA

- ① Professor, Department of Computer Science and Communications Engineering, Graduate School of Fundamental Science and Engineering
- ② Computer vision / Ph.D.
- ③ Computer vision and medical image processing



Mitsuo UMEZU

- ① Professor, Department of Integrative Bioscience and Biomedical Engineering, Graduate School of Advanced Science and Engineering
- ② Medical equipment engineering / Doctor of Engineering and Doctor of Medicine
- ③ Medical equipment engineering and regulatory science

In charge of career paths and internships



Hayato YAMANA

- ① Professor, Department of Computer Science and Communications Engineering, Graduate School of Fundamental Science and Engineering
- ② Big Data Analysis / Doctor of Engineering
- ③ Big data analysis and analysis techniques



Jin KUSAKA

- ① Professor, Department of Modern Mechanical Engineering, School of Creative Science and Engineering
- ② Fluid-Thermo dynamics with chemical reaction, transport phenomena, internal combustion engines, catalyst for automobile, fuel cell, Li-ion battery simulation / Doctor of Engineering
- ③ Research on thermal energy reaction engineering



Makoto YOSHIDA

- ① Professor, Department of Modern Mechanical Engineering, Graduate School of Creative Science and Engineering
- ② Engineering materials and manufacturing engineering / Doctor of Engineering
- ③ Transport equipment and energy materials engineering

In charge of cooperation with businesses



Shigeki GOTO

- ① Professor, Department of Computer Science and Communications Engineering, Graduate School of Fundamental Science and Engineering
- ② Information engineering / Doctor of Engineering
- ③ Network security and management



Hironori KASAHARA

- ① Professor, Department of Computer Science and Communications Engineering, Graduate School of Fundamental Science and Engineering
- ② Advanced computing systems / Doctor of Engineering
- ③ Multi-core parallelizing compilers for low power high performance computing



Shigeo MORISHIMA

- ① Professor, Department of Pure and Applied Physics, Graduate School of Advanced Science and Engineering
- ② Information engineering / Doctor of Engineering
- ③ Authoring system to support content creation, direction and appreciation using computer vision and graphics technologies

In charge of cooperation with overseas organizations



Tatsuo NAKAJIMA

- ① Professor, Department of Computer Science and Communications Engineering, Graduate School of Fundamental Science and Engineering
- ② Distributed interactive systems / Doctor of Engineering
- ③ Research on digital-physical hybrid platforms



Takuro SATO

- ① Professor, Department of Computer Science and Communications Engineering, Graduate School of Fundamental Science and Engineering
- ② Telecommunications / Doctor of Engineering
- ③ Ubiquitous communication networks



Atsuo TAKANISHI

- ① Professor, Department of Integrative Bioscience and Biomedical Engineering, Graduate School of Advanced Science and Engineering
- ② Robotics / Doctor of Engineering
- ③ Development of humanoid robots and robots for medical use, disaster response, and outdoor use



Takeshi YOSHIMURA

- ① Professor, Department of Information, Production and Systems, Graduate School of Information, Production and Systems
- ② Optimization technologies / Doctor of Engineering
- ③ Research on optimization technologies for VLSI design automation

In charge of cooperation with businesses (partner company), Advisor in charge of projects

Kenjiro FUJII

- ① Board Director, Marking Systems and Hoist Systems Division, Hitachi Industrial Equipment Systems Co., Ltd.
- ② Automation and networks / Doctor of Engineering

In charge of cooperation with domestic public research institutions

Kazuhito YOKOI

- ① Director of Intelligent Systems Research Institute, National Institute of Advanced Industrial Science and Technology (AIST)
- ② Robotics / Doctor of Engineering

In charge of curricula and career paths

Noriaki ITO

- ① Representative Director, President Consulting Co., Ltd. Visiting Professor, Tokyo University of Agriculture and Technology
- ② Business management / Bachelor's degree

In charge of cooperation with businesses (partner company), and advisory and career paths QE and degree examination

Makoto IWAMURA

- ① Head Researcher/Research Fellow, Secure Platform Laboratories, Nippon Telegraph and Telephone Corporation
- ② Information engineering / Doctor of Engineering

Toshiaki YASUE

- ① Advisory Researcher, IBM Research-Tokyo, IBM Japan, Ltd.
- ② Information engineering / Doctor of Engineering

Takuya OIKAWA

- ① IT consultant
- ② Web platform technology / Bachelor of Engineering

In charge of cooperation with overseas organizations (partner organization) International cooperation, Examination committee

Jing Xiao

- ① Worcester Polytechnic Institute, Deans' Excellence Professor(Director)
- ② Robotics, haptics, and intelligent systems / Ph.D.

Martin Buss

- ① Professor, (Chair), Department of Electrical Engineering and Information Technology, Technische Universität München
- ② Robotics and Control / Dr.-Ing

In charge of cooperation with overseas organizations (partner organization), QE and degree examination

Giovanni De Micheli

- ① Professor, Electrical Engineering & Computer Science, École Polytechnique Fédérale de Lausanne (EPFL)
- ② Electronic circuit design / Ph.D.

Jan M. Rabaey

- ① Professor, Electrical Engineering and Computer Science, University of California, Berkeley
- ② Electronic circuit design / Ph.D.

Frank Soong

- ① Principal Researcher, Microsoft Research Asia
- ② Speech modeling and recognition / Ph.D.

In charge of cooperation with overseas organizations, QE and degree examination

Peilin Liu

- ① Professor, IC & System Research Center, Shanghai Jiao Tong University
- ② Multimedia processing / Ph.D.