- 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
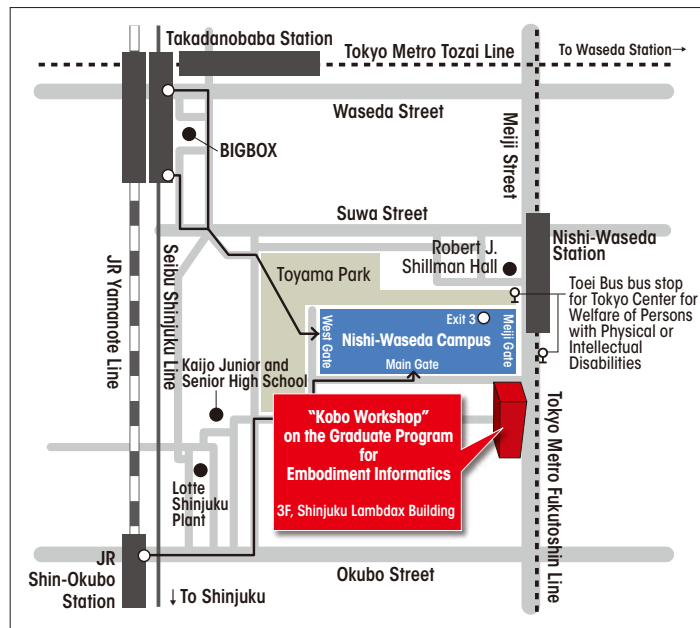
Map of Nishi-Waseda Campus

APPLICATION BENEFITS

COMPUTING BENEFITS
NETWORK BENEFITS

BENEFITS OF EMBODIMENT

Graduate Program for Embodiment Informatics

Graduate Program for Embodiment Informatics

http://www.leading-sn.waseda.ac.jp/
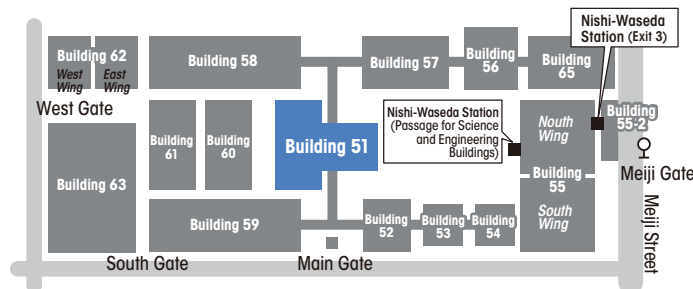
**Administration and Technology Management Center
for the Graduate Program for Embodiment Informatics, Waseda University**

3-4-1 Okubo, Shinjuku-ku, Tokyo 169-8555, Japan
Room 08A, 1F, Building 51, Nishi-Waseda Campus, Waseda University
E-mail: leading-sn-info@list.waseda.jp
Tel: 03-5286-2836 Fax: 03-5286-2847

"Kobo Workshop" on the Graduate Program for Embodiment Informatics

3F, Shinjuku Lambdax Building, 2-4-12, Okubo, Shinjuku-ku, Tokyo, 169-0072, Japan
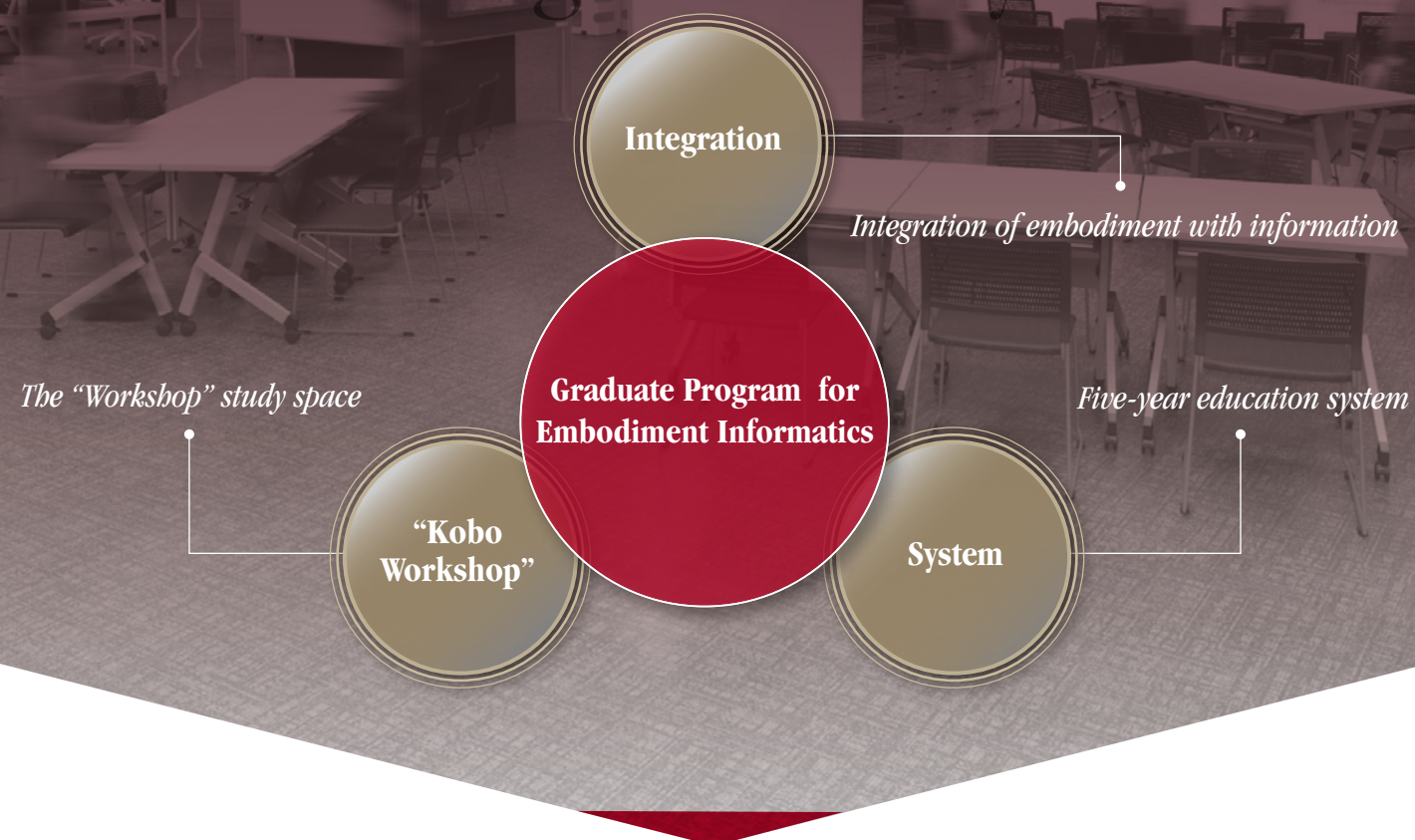
WASEDA

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

As work continues apace on a global scale to create new core 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 machine technology, 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 further new industries and a strong demand for innovative and talented individuals.

This program has been selected as part of the Ministry of Education, Culture, Sports, Science and Technology's work to make significant reforms to graduate school education and to promote establishment of graduate schools suitable for leading universities by increasing the number of internationally-competitive interdisciplinary degree programs of guaranteed quality.

Integration
Graduate Program for Embodiment Informatics
"Kobo Workshop"
System

Integration of embodiment with information

The "Workshop" study space

Five-year education system

Develop global leaders who can lead innovation with foresight, imagination, and leadership and executive ability to send into domestic and overseas industries

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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 executive ability, the ability to forge ahead. 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 in the fields need to address.

Of importance here is how information and communications technology should be connected with mechanical technology. 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 methodology 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 methodology in 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 embodiment informatics.

If a student learns about the core technologies in one of the fields of information, communication, or machinery, graduates from that department, and then goes on to graduate school to study 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 combines 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 executive ability 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 the "Workshop," where all students come together to study and motivate each other. Why not join the Waseda "Workshop" and the Graduate Program for Embodiment Informatics in demonstrating how innovative and world-class Japan's *monozukuri* technology can be?

Targeting human resources and the key to their development

Learn from history and live in the present

Foresight — Ability to read the trends of the times from an international perspective and find challenges to overcome for innovation
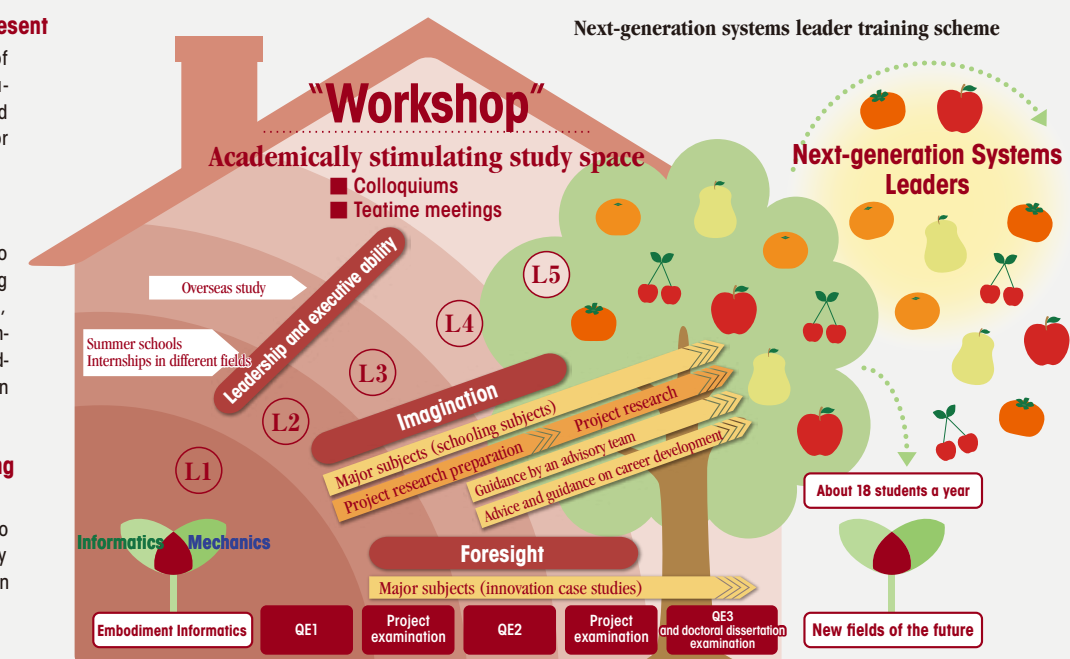
Know the molds and break them

Imagination — Ability to find solutions to challenges by combining advanced information, communications, and machinery technologies, or by considering system configuration in a broad sense

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

Leadership and executive ability — Ability to implement plans to overcome challenges by making effective use of human and material resources

Next-generation systems leader training scheme

"Workshop"
Academically stimulating study space
■ Colloquiums
■ Teatime meetings

Next-generation Systems Leaders

Overseas study

Summer schools
Internships in different fields

Leadership and executive ability

L5
L4
L3
L2
L1

Imagination
Major subjects (schooling subjects)
Project research
Project research preparation
Guidance by an advisory team
Advice and guidance on career development

Informatics Mechanics

Foresight
Major subjects (innovation case studies)

About 18 students a year

New fields of the future

| Embodiment Informatics | QE1 | Project examination | QE2 | Project examination | QE3 and doctoral dissertation examination |

Graduate Program for Embodiment Informatics
The "Workshop" Study Space

Academically stimulating space enabling students to study on their own initiative

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 studies.

"Kobo Workshop"

Lounge

HIROBA

ENT

IDOBATA

Personal

Integration

Integration of Embodiment with Information

Academic field for developing next-generation systems leaders

Place for meeting people

Place for practice and implementation

"Workshop"

Place for discussions

Embodiment Informatics

Application benefits

Information and Communications Technology

Computing benefits

Network benefits

Knowledge in software engineering design

Information and communications architecture

- Global IT industry
- Telecommunications industry
- IT home appliance industry
- Semiconductor industry

Business management

Ethics

Environment and energy

Human factors

Safety

Reliability and sustainability

Benefits of embodiment

Knowledge in mechanical design

Mechanical architecture

- Robotics industry
- Auto industry
- Medical and welfare industry
- Space industry

Mechanical Technology

Embodiment informatics is an academic field that integrates embodiment with information to produce application benefits (the value of problem-solving) in important fields, such as production, medicine, and the environment. At the same time, it aims to create composite value from the computing benefits (benefits of calculation) of information technology, the network benefits (benefits of sharing resources) of communications technology, and the benefits of embodiment (benefits of existence and power) in mechanical technology. The curriculum of this program is designed to enable students to acquire a broad range of engineering knowledge. Mechanics graduates are required to take basic informatics subjects, while informatics graduates are required to take basic mechanics subjects.

6 Graduate Schools, 11 Departments

| Department of Computer Science and Engineering | Graduate School of Information, Production and Systems | Graduate School of Global Information and Telecommunication Studies | Department of Intermedia Art and Science | Department of Industrial and Management Systems Engineering |
| Department of Pure and Applied Mathematics | Department of Pure and Applied Physics | Graduate School of Environment and Energy Engineering | Department of Integrative Bioscience and Biomedical Engineering | Department of Mechanical Engineering | Department of Modern Mechanical Engineering |

System

Five-year Education System

Curriculum and Examinations

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 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.

L5 Autumn	Doctoral dissertation examination and Qualifying Examination III	
L5 Spring	Dissertation writing	
L4 Autumn	Innovation case studies	Project research II
L4 Spring		Project examination
L3 Autumn	Qualifying Examination II	
L3 Spring	Overseas study	
L2 Autumn	Major subjects and related subjects — Intellectual property / Business / Communication skills	Midterm evaluation / Project research I
L2 Spring		Project examination
L1 Autumn	Qualifying Examination I	Project research preparation
L1 Spring	Summer schools and internships in different fields	

"Workshop" Colloquiums Teatime meetings

Lounge

Hiroba

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 as described below.

◇ **Study Grant Program**
Every student enrolled in this program is provided with a monthly study grant up to 200,000 yen (up to 2.4 million yen annually).
Note that recipients of this study grant cannot receive a scholarship from the Japan Student Services Organization or other organizations, or work part-time or as a teaching assistant or resident assistant. (For more details, contact the Administration Office of the Graduate Program for Embodiment Informatics.)
◇ Students are fully funded for the overseas English study program and the overseas internship program (six months).
◇ In the third to fifth years, students are given a research allowance depending on the details of their research.

Professors and Lecturers

◎Head program supervisor
Shuji HASHIMOTO
Title and Organization:Vice-President and Professor, Department of Pure and Applied Physics, Graduate School of Advanced Science and Engineering, Waseda University
Current Specialty and Degree:Measurement and information engineering / Doctor of Engineering
Researchers and Their Research Themes:Research on robots, AI, and image and sound processing
http://www.shalab.phys.waseda.ac.jp/

◎Program coordinator in charge of overall program promotion
Shigeki SUGANO
Title and Organization:Professor, Department of Modern Mechanical Engineering, Graduate School of Creative Science and Engineering, Waseda University
Current Specialty and Degree:Intelligent mechanics / Doctor of Engineering
Researchers and Their Research Themes:Human-symbiotic robot design and its control
http://www.sugano.mech.waseda.ac.jp/

◎Assistant supervisor and coordinator
Tetsunori KOBAYASHI
Title and Organization:Professor, Department of Computer Science and Engineering, Graduate School of Fundamental Science and Engineering, Waseda University
Current Specialty and Degree:Perceptual computing systems / Doctor of Engineering
Researchers and Their Research Themes:Research on conversation-based human-computer interaction
http://www.pcl.cs.waseda.ac.jp/

◎In charge of cooperation with overseas organizations
Yasuo MATSUYAMA
Title and Organization:Professor, Department of Computer Science and Engineering, Graduate School of Fundamental Science and Engineering, Waseda University
Current Specialty and Degree:Information engineering / Doctor of Engineering,Ph.D.
Researchers and Their Research Themes:Creation of machine learning algorithms and their application to ICT
http://www.wiz.cs.waseda.ac.jp/

◎In charge of cooperation with businesses
Shigeki GOTO
Title and Organization:Professor, Department of Computer Science and Engineering, Graduate School of Fundamental Science and Engineering, Waseda University
Current Specialty and Degree:Information engineering / Doctor of Engineering
Researchers and Their Research Themes:Network security and management
http://www.goto.info.waseda.ac.jp/

◎In charge of QE and project examination
Kazunori UEDA
Title and Organization:Professor, Department of Computer Science and Engineering, Graduate School of Fundamental Science and Engineering, Waseda University
Current Specialty and Degree:Information engineering / Doctor of Engineering
Researchers and Their Research Themes:Very high-level programming languages and software verification
http://www.ueda.info.waseda.ac.jp/

◎In charge of cooperation with businesses
Hironori KASAHARA
Title and Organization:Professor, Department of Computer Science and Engineering, Graduate School of Fundamental Science and Engineering, Waseda University
Current Specialty and Degree:Advanced computing systems / Doctor of Engineering
Researchers and Their Research Themes:Multi-core parallelizing compilers for low power high performance computing
http://www.kasahara.elec.waseda.ac.jp/

◎In charge of cooperation with overseas organizations
Tatsuo NAKAJIMA
Title and Organization:Professor, Department of Computer Science and Engineering, Graduate School of Fundamental Science and Engineering, Waseda University
Current Specialty and Degree:Distributed interactive systems / Doctor of Engineering
Researchers and Their Research Themes:Research on digital-physical hybrid platforms
http://www.dcl.cs.waseda.ac.jp/

◎In charge of QE and project examination
Hiroshi ISHIKAWA
Title and Organization:Professor, Department of Computer Science and Engineering, Graduate School of Fundamental Science and Engineering, Waseda University
Current Specialty and Degree:Computer vision / Ph.D.
Researchers and Their Research Themes:Computer vision and medical image processing
http://hi.cs.waseda.ac.jp/index.php/ja/

◎In charge of curricula
Nozomu TOGAWA
Title and Organization:Professor, Department of Computer Science and Engineering, Graduate School of Fundamental Science and Engineering, Waseda University
Current Specialty and Degree:Information engineering / Doctor of Engineering
Researchers and Their Research Themes:Integrated system design, circuit design, and information and communications system design
http://www.togawa.cs.waseda.ac.jp/associate_professor.html

◎In charge of career paths and internships
Hayato YAMANA
Title and Organization:Professor, Department of Computer Science and Communications Engineering, Graduate School of Fundamental Science and Engineering, Waseda University
Current Specialty and Degree:Big Data Analysis / Doctor of Engineering
Researchers and Their Research Themes:Big data analysis and analysis techniques
http://www.yama.info.waseda.ac.jp/

◎In charge of QE and project examination
Shinichi OISHI
Title and Organization:Professor, Department of Pure and Applied Mathematics, Graduate School of Fundamental Science and Engineering, Waseda University
Current Specialty and Degree:Guaranteed accuracy in numerical computation / Doctor of Engineering
Researchers and Their Research Themes:Guaranteed accuracy in numerical computation and its applications in science and engineering
http://www.oishi.info.waseda.ac.jp/

◎In charge of curricula
Toshiyasu MATSUSHIMA
Title and Organization:Professor, Department of Pure and Applied Mathematics, Graduate School of Fundamental Science and Engineering, Waseda University
Current Specialty and Degree:Information theory / Doctor of Engineering
Researchers and Their Research Themes: Information theory and its applications
http://www.matsu.mgmt.waseda.ac.jp/

◎In charge of curricula
Hiroyuki KAWAMOTO
Title and Organization:Professor, Department of Applied Mechanics and Aerospace Engineering, Graduate School of Fundamental Science and Engineering, Waseda University
Current Specialty and Degree:Precision Engineering / Doctor of Engineering
Researchers and Their Research Themes:Dynamics of electromagnetic particles and applications in image formation and space exploration
http://www.kawamoto.mech.waseda.ac.jp/kawa/

◎In charge of curricula
Tetsuya SATO
Title and Organization:Professor, Department of Applied Mechanics and Aerospace Engineering, Graduate School of Fundamental Science and Engineering, Waseda University
Current Specialty and Degree:Aerospace propulsion engineering / Doctor of Engineering
Researchers and Their Research Themes:Research on air-breathing engines for hypersonic aircraft
http://www.waseda.jp/sem-sato/tetsuya_sato/

◎In charge of evaluation of students
Tetsuya OGATA
Title and Organization:Professor, Department of Intermedia Art and Science, Graduate School of Fundamental Science and Engineering, Waseda University
Current Specialty and Degree:Cognitive robotics / Doctor of Engineering
Researchers and Their Research Themes:Informatics for emergent interaction systems
http://ogata-lab.jp/

◎In charge of QE and project examination
Masakatsu FUJIE
Title and Organization:Professor, Department of Integrative Bioscience and Biomedical Engineering, Graduate School of Advanced Science and Engineering, Waseda University
Current Specialty and Degree:Medical, Rehabilitation and Healthcare Engineering / Doctor of Engineering
Researchers and Their Research Themes:Research on Healthcare Robot based on Organ Dynamics
http://www.fujie.mech.waseda.ac.jp/

◎In charge of QE and project examination
Mitsuo UMEZU
Title and Organization:Professor, Department of Integrative Bioscience and Biomedical Engineering, Graduate School of Advanced Science and Engineering, Waseda University
Current Specialty and Degree:Medical equipment engineering / Doctor of Engineering and Doctor of Medicine
Researchers and Their Research Themes:Medical equipment engineering and regulatory science
http://www.umezu.mech.waseda.ac.jp/

◎In charge of cooperation with overseas organizations
Atsuo TAKANISHI
Title and Organization:Professor, Department of Integrative Bioscience and Biomedical Engineering, Graduate School of Advanced Science and Engineering, Waseda University
Current Specialty and Degree:Robotics / Doctor of Engineering
Researchers and Their Research Themes:Development of humanoid robots and robots for medical use, disaster response, and outdoor use
http://www.takanishi.mech.waseda.ac.jp/top/

◎In charge of career paths and internships
Jin KUSAKA
Title and Organization:Professor, Department of Modern Mechanical Engineering, School of Creative Science and Engineering, Waseda University
Current Specialty and Degree:Fluid-Thermo dynamics with chemical reaction, transport phenomena, internal combustion engines, catalyst for automobile, fuel cell, li-ion battery simulation / Doctor of Engineering
Researchers and Their Research Themes:Research on thermal energy reaction engineering
http://www.f.waseda.jp/jin.kusaka/

◎In charge of career paths and internships
Makoto YOSHIDA
Title and Organization:Professor, Department of Modern Mechanical Engineering, Graduate School of Creative Science and Engineering, Waseda University
Current Specialty and Degree:Engineering materials and manufacturing engineering / Doctor of Engineering
Researchers and Their Research Themes:Transport equipment and energy materials engineering
http://www.yoshida.mech.waseda.ac.jp/

*Associate Professor until March 2014

◎In charge of curricula
Hiroyasu IWATA
Title and Organization:Professor*, Department of Modern Mechanical Engineering, Graduate School of Creative Science and Engineering, Waseda University
Current Specialty and Degree:Neurorobotics / Doctor of Engineering
Researchers and Their Research Themes:Neuro-rehabilitation assistive RT and tele-operated medical care robots
http://twendyone.com/

◎In charge of curricula
Shingo TAKAHASHI
Title and Organization:Professor, Department of Industrial and Management Systems Engineering, Graduate School of Creative Science and Engineering, Waseda University
Current Specialty and Degree:Systems theory / Doctor of Science
Researchers and Their Research Themes:Systems theory and social simulation
http://www.sys.mgmt.waseda.ac.jp/

◎In charge of cooperation with businesses
Shigeo MORISHIMA
Title and Organization:Professor, Department of Pure and Applied Physics, Graduate School of Advanced Science and Engineering, Waseda University
Current Specialty and Degree:Information engineering / Doctor of Engineering
Researchers and Their Research Themes:Authoring system to support content creation, direction and appreciation using computer vision and graphics technologies
http://www.mlab.phys.waseda.ac.jp/

◎In charge of cooperation with overseas organizations
Takuro SATO
Title and Organization:Professor, Department of Communications and Computer Engineering, School of Fundamental Science and Engineering, Faculty of Science and Engineering, Waseda University
Current Specialty and Degree:Telecommunications / Doctor of Engineering
Researchers and Their Research Themes:Ubiquitous communication networks
http://www.sato.gits.waseda.ac.jp/

◎In charge of curricula
Shigeru SHIMAMOTO
Title and Organization:Professor, Department of Global Information and Telecommunication Studies, Graduate School of Global Information and Telecommunication Studies, Waseda University
Current Specialty and Degree:Information and telecommunications / Doctor of Engineering
Researchers and Their Research Themes:Wireless access, air and space communications, and human body communications
http://www.sl.giti.waseda.ac.jp/

◎In charge of cooperation with overseas organizations
Satoshi GOTO
Title and Organization:Professor, Department of Information, Production and Systems, Graduate School of Information, Production and Systems, Waseda University
Current Specialty and Degree:Multimedia LSI / Doctor of Engineering
Researchers and Their Research Themes:Research on multimedia services and LSI implementation
http://www.f.waseda.jp/goto/

◎In charge of curricula
Takeshi IKENAGA
Title and Organization:Professor, Department of Information, Production and Systems, Graduate School of Information, Production and Systems, Waseda University
Current Specialty and Degree:Image signal processing systems / Doctor of Information and Computer Science
Researchers and Their Research Themes:Image information processing algorithms and systems
http://www.f.waseda.jp/ikenaga/

◎In charge of curricula
Yushi KAMIYA
Title and Organization:Professor, Department of Environment and Energy Engineering, Graduate School of Environment and Energy Engineering, Waseda University
Current Specialty and Degree:Engineering, electrical and electronic engineering, electric power engineering, power conversion, and electrical machinery / Doctor of Engineering
Researchers and Their Research Themes:Research and development of electric vehicles friendly to both people and the environment
http://www.f.waseda.jp/kamiya/

◎In charge of cooperation with businesses (partner company), Advisor in charge of projects
Kenjiro FUJII
Title and Organization:Administrative Officer, Manager of Marking Systems and Hoist Systems Division and Head of Taga Administrative Division, Hitachi Industrial Equipment Systems Co., Ltd.
Current Specialty and Degree:Automation and networks / Master of Engineering

◎In charge of cooperation with domestic public research institutions
Kazuhito YOKOI
Title and Organization:Deputy Director of Intelligent Systems Research Institute, National Institute of Advanced Industrial Science and Technology
Current Specialty and Degree:Robotics / Doctor of Engineering

◎In charge of curricula and career paths
Noriaki ITO
Title and Organization:Representative Director, President Consulting Co., Ltd.
Visiting Professor, Tokyo University of Agriculture and Technology
Current Specialty and Degree:Business management / Bachelor's degree

◎In charge of cooperation with businesses (partner company), and advisory and career paths QE and degree examination
Makoto IWAMURA
Title and Organization:Head Researcher/Research Fellow, Secure Platform Laboratories, Nippon Telegraph and Telephone Corporation
Current Specialty and Degree:Information engineering / Doctor of Engineering

◎In charge of cooperation with businesses (partner company), and advisory and career paths QE and degree examination
Toshiaki YASUE
Title and Organization:Advisory Researcher, IBM Research-Tokyo, IBM Japan, Ltd.
Current Specialty and Degree:Information engineering / Doctor of Engineering

◎In charge of cooperation with businesses (partner company), and advisory and career paths QE and degree examination
Takuya OIKAWA
Title and Organization:Senior Engineering Manager, Google Japan Inc.
Current Specialty and Degree:Web platform technology / Bachelor of Engineering

◎In charge of cooperation with overseas organizations (partner organization) International cooperation,Examination committee
Jing Xiao
Title and Organization:Professor, Department of Computer Science College of Computing and Informatics, University of North Carolina at Charlotte
Current Specialty and Degree:Robotics, haptics, and intelligent systems / Ph.D.

◎In charge of cooperation with overseas organizations (partner organization), QE and degree examination
Giovanni De Micheli
Title and Organization:Professor, Electrical Engineering & Computer Science, Ecole polytechnique Federale De Lausanne (EPFL)
Current Specialty and Degree:Electronic circuit design / Ph.D.

◎In charge of cooperation with overseas organizations (partner organization), QE and degree examination
Jan M. Rabaey
Title and Organization:Professor, Electrical Engineering and Computer Science, University of California, Berkeley
Current Specialty and Degree:Electronic circuit design / Ph.D.

◎In charge of cooperation with overseas organizations, QE and degree examination
Peilin Liu
Title and Organization:Professor, IC & System Research Center, Shanghai Jiao Tong University
Current Specialty and Degree:Multimedia processing / Ph.D.

◎In charge of cooperation with overseas organizations (partner organization), QE and degree examination
Frank Soong
Title and Organization:Principal Researcher, Microsoft Research Asia
Current Specialty and Degree:Speech modeling and recognition / Ph.D.

◎In charge of cooperation with overseas organizations (partner organization) International cooperation,Examination committee
Martin Buss
Title and Organization:Professor, (Chair), Department of Electrical Engineering and Information Technology, Technische Universitaet Muenchen
Current Specialty and Degree:Robotics and Control / Dr.-Ing