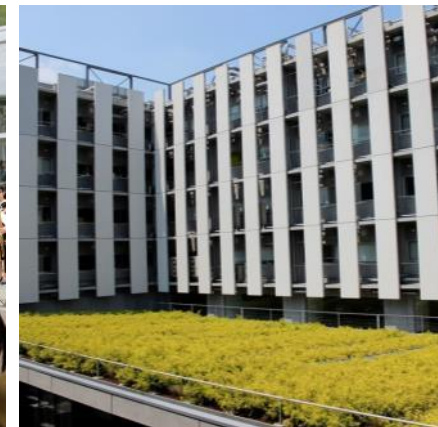
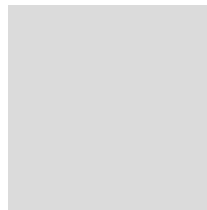


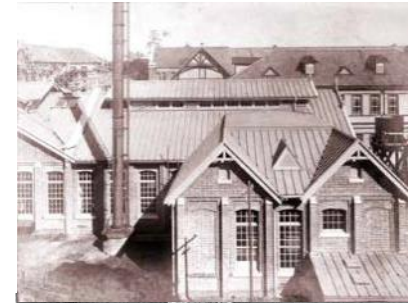
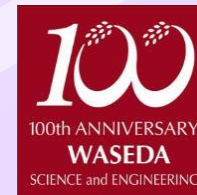
Waseda University School of Advanced Science and Engineering

Toru ASAHI, Dean



History of Science and Engineering Research

- 1882 Tokyo Vocational School founded
- 1902 Renamed to Waseda University
- 1908 The **Department of Science and Engineering was established** and the departments of Mechanical Engineering and Electrical Engineering were established.
- 1920 The University was reorganized as a new university under the new university ordinance, and the Department of Science and Engineering was renamed the Faculty of Science and Engineering. Graduate School of Science and Engineering was established.
- 1949 The new Waseda University is founded under the new system. The First and Second Schools of Science and Engineering were established.
- 1953 Doctoral program established in the graduate school.
- 1967 Moved to the new Okubo Campus (Nishi-Waseda Campus)
- 1968 Abolished the Second Faculty of Science and Engineering. First School of Science and Engineering was renamed the School of Science and Engineering.
- 1979 Environmental Safety Center established.
- 1988 Changed the name of the Casting Research Laboratory to Kagami Memorial Research Institute for Materials Science and Technology.
- 1993 Research Institute of Science and Engineering is renamed the Research Center for Science and Engineering.
- 2004 Center for English Education in Science and Engineering was established.
- 2007 Reorganized into 3 schools of science and engineering.**
- 2008 100th anniversary of the founding of the School of Science and Engineering.** Center for Advanced Biomedical Sciences was established.
- 2009 Okubo Campus is renamed Nishi-Waseda Campus
- 2010 Five majors are established, including Japan's first three joint graduate schools.
- 2011 Department Intermedia Art and Science is established in the Graduate School of Fundamental Science and Engineering



Departments



Fundamental

School of Fundamental Science and Engineering

Department of Mathematics
 Department of Applied Mathematics
 Department of Applied Mechanics and
 Aerospace Engineering
 Department of Electronic and Physical Systems
 Department of
 Computer Science and Engineering
 Department of Communications
 Computer Engineering
 Department of Intermedia Art and Science

Creative

School of Creative Science and Engineering

Department of Architecture
 Department of
 Modern Mechanical Engineering
 Department of Industrial and
 Management Systems Engineering
 Department of Civil and
 Environmental Engineering
 Department of Earth Science,
 Resources and
 Environmental Engineering

Advanced

Graduate School of Advanced Science and Engineering

Department of Physics
 Department of Applied Physics
 Department of
 Chemistry and Biochemistry
 Department of Applied Chemistry
 Department of Life science and
 Medical Bioscience
 Department of
 Electrical Engineering and Bioscience

And graduate school.



Graduate School of Fundamental Science and Engineering

Department of
 Pure and Applied Mathematics
 Department of Applied Mechanics
 Department of
 Electronic and and Physical Systems
 Department of Computer Science and
 Engineering
 Department of Intermedia Studies



Graduate School of Creative Science and Engineering

Department of Architecture
 Department of
 Modern Mechanical Engineering
 Department of Industrial and
 Management Systems Engineering
 Department of Civil and
 Environmental Engineering
 Department of Earth Sciences,
 Resources and
 Environmental Engineering
 Department of
 Business Design and Management



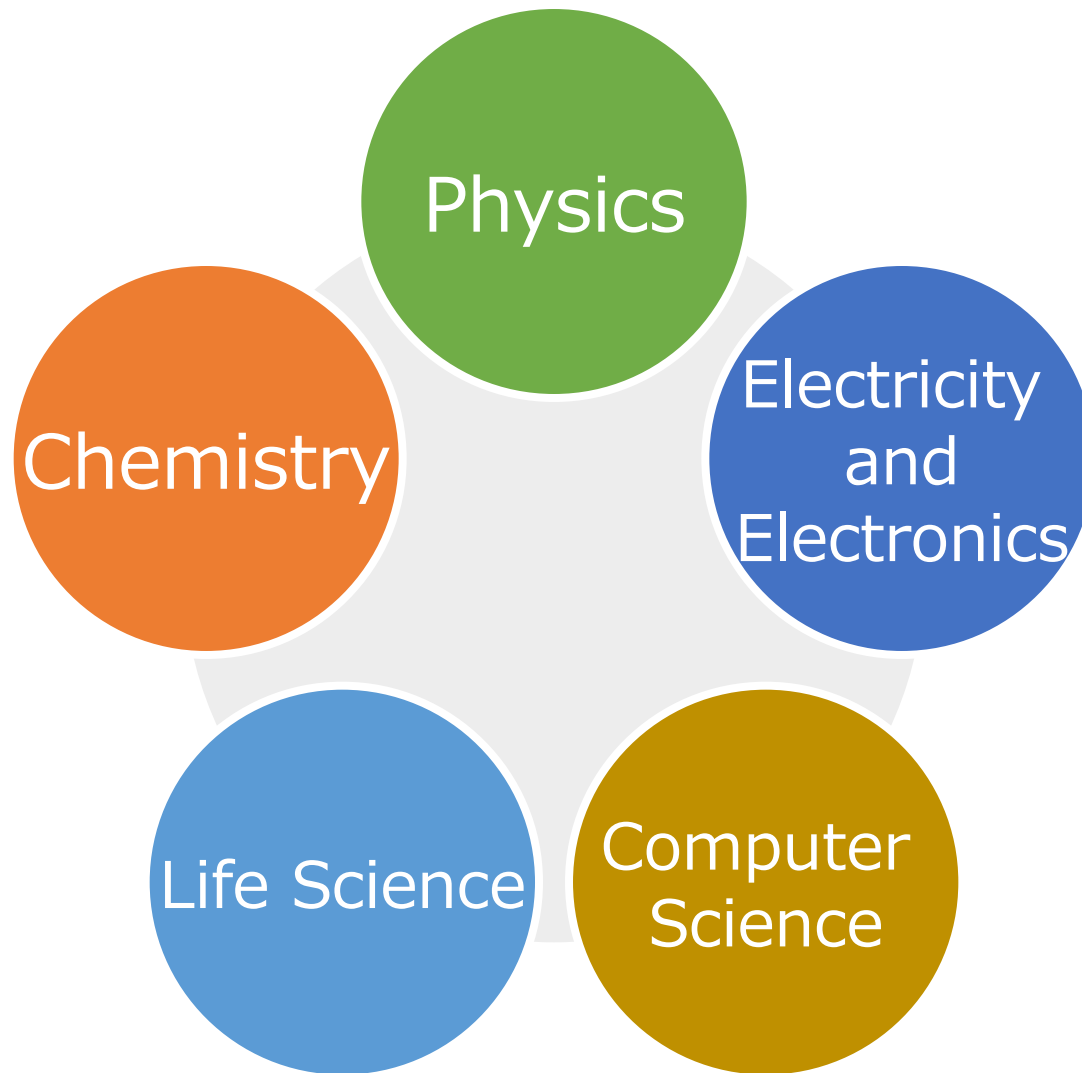
Graduate School of Advanced Science and Engineering

Department of Pure and Applied Physics
 Department of Chemistry and Biochemistry
 Department of Applied Chemistry
 Department of
 Life Science and Medical Bioscience
 Department of Electrical Engineering
 and Bioscience
 Department of Integrative Bioscience and
 Biomedical Engineering
 Department of Nano-Science and Engineering
 Cooperative Major
 in Advanced Biomedical Sciences
 Cooperative Major in Advanced Health Science
 Cooperative major in Nuclear Energy
 Department of
 Advanced Science and Engineering

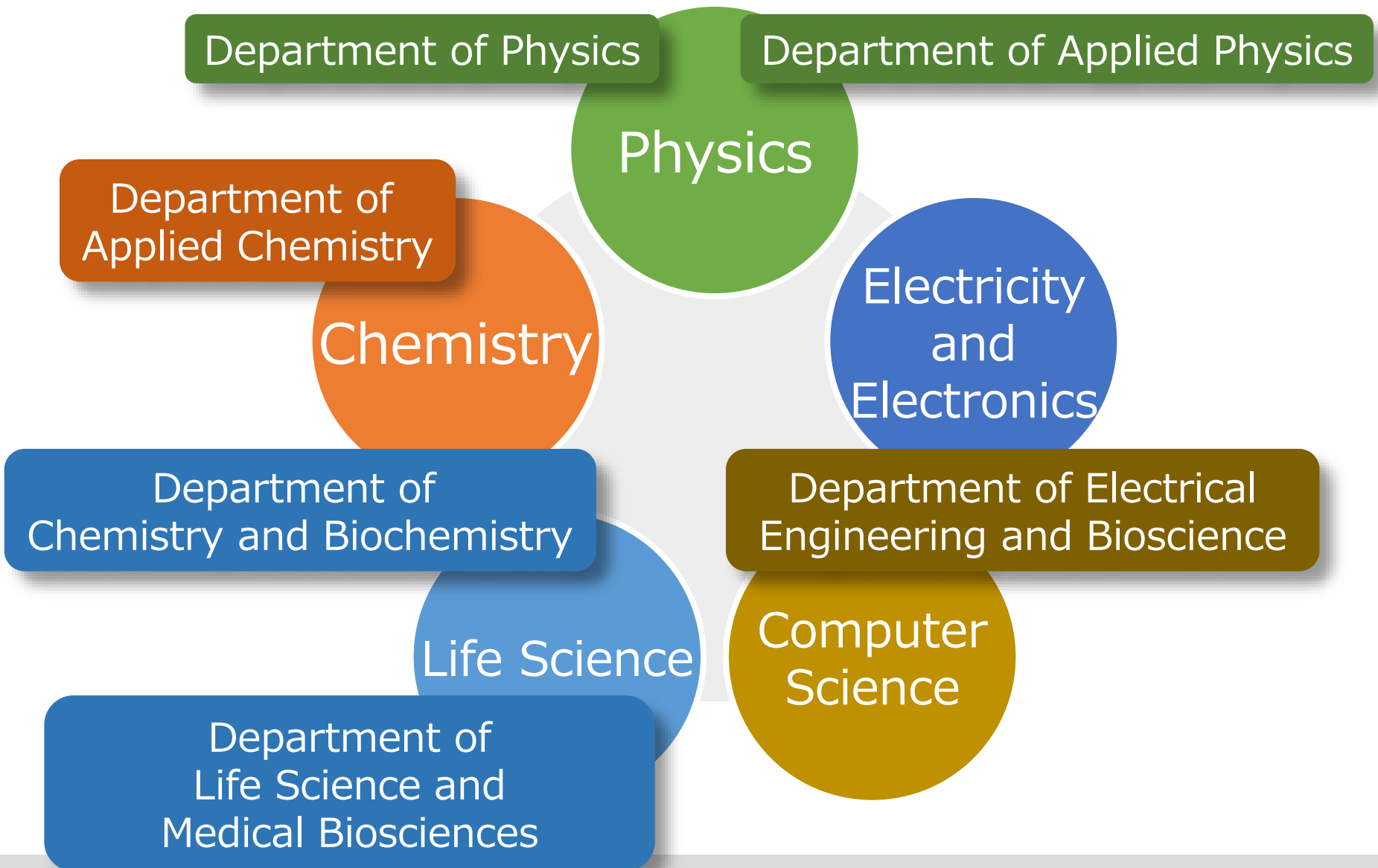
Graduate School of
 Information, Production and Systems

Graduate School of
 Environment and Energy Engineering

What is Advanced Science and Engineering?



What is Advanced Science and Engineering?



Basic education for all three schools of science and engineering

- Classes for basic science and lab courses.
- Language training
- Liberal Arts Education

Specialized education based on natural science

- Unique science and engineering education in each department

Department of Physics

Department of Applied Physics

Department of Chemistry and Biochemistry

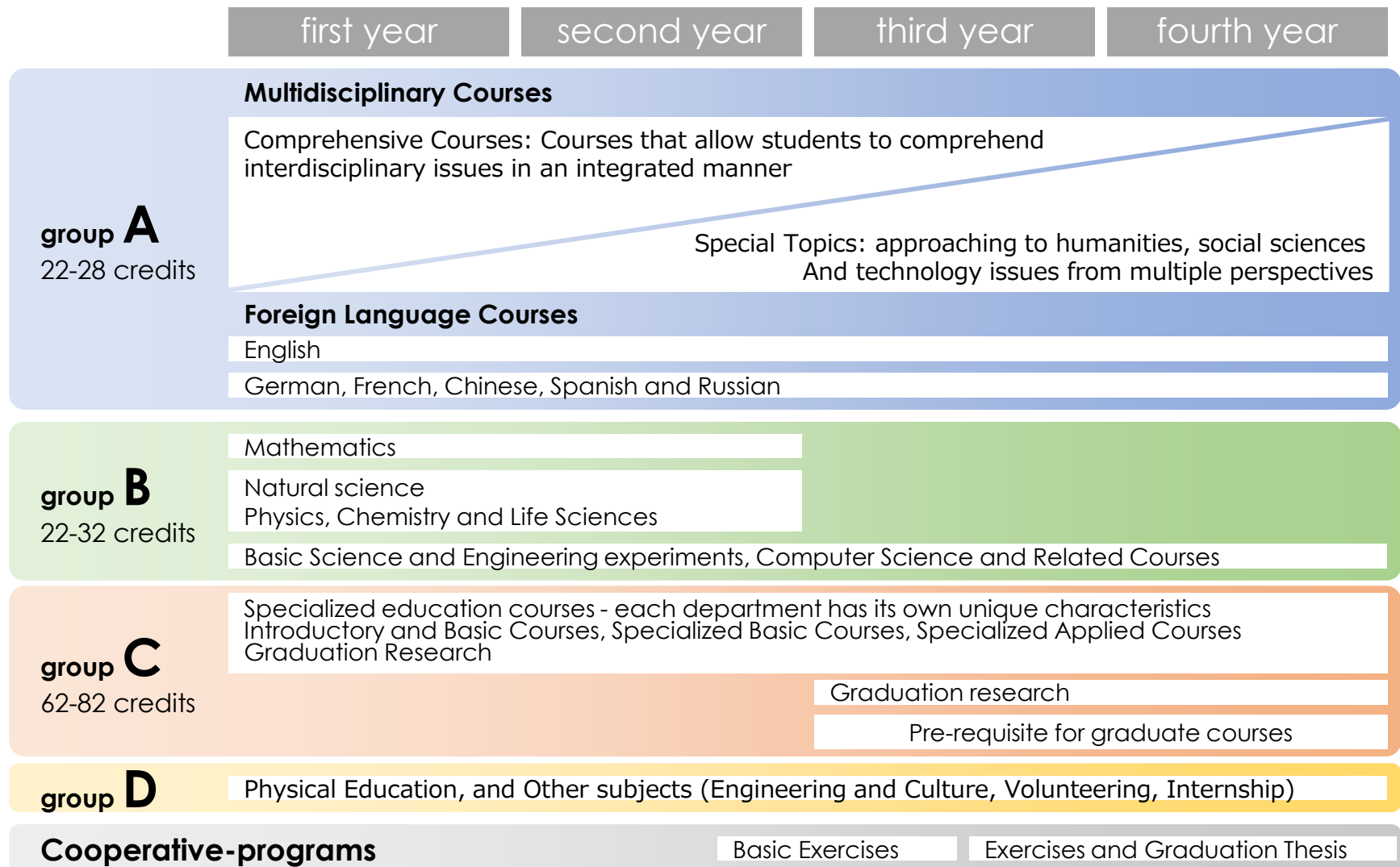
Department of Applied Chemistry

Department of Life Science and Medical Biosciences

Department of Electrical Engineering and Bioscience

Developping basic academic skills in undergraduate course

Stepping up from the basics to expertise through an integrated curriculum



Faculty of Science and Engineering put emphasis on

"experience-based education" that allows students to actually touch things and experience phenomena

Through lab courses and hands-on classes, students can better understand the content of classroom lectures and acquire the basics of techniques needed in the future. Students also experience the actual process of creating things and develop the ability to tackle problems on their own initiative.



Effective English Education

Learn the skills

- ✓ to read scientific papers in English.
- ✓ to present and discuss scientific research in English.



Workplace English 1/2

Advanced Technical Presentation

Advanced Technical Reading and Writing 1/2

Special Topics in Functional English

Concept Building and Discussion 1/2

Technical Writing 1/2

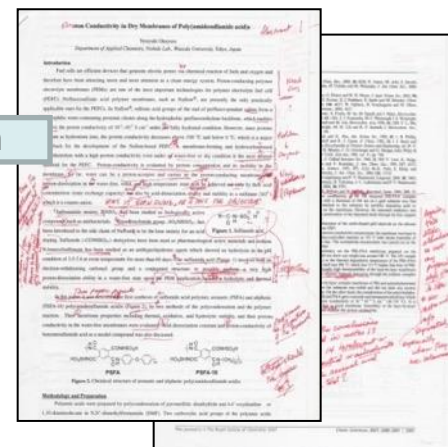
Technical Presentation

Communication Strategies 1/2

Academic Reading 1/2

Academic Lecture Comprehension 1/2

Practical training of English from undergraduate to graduate school.



Undergraduate

Master's Degree

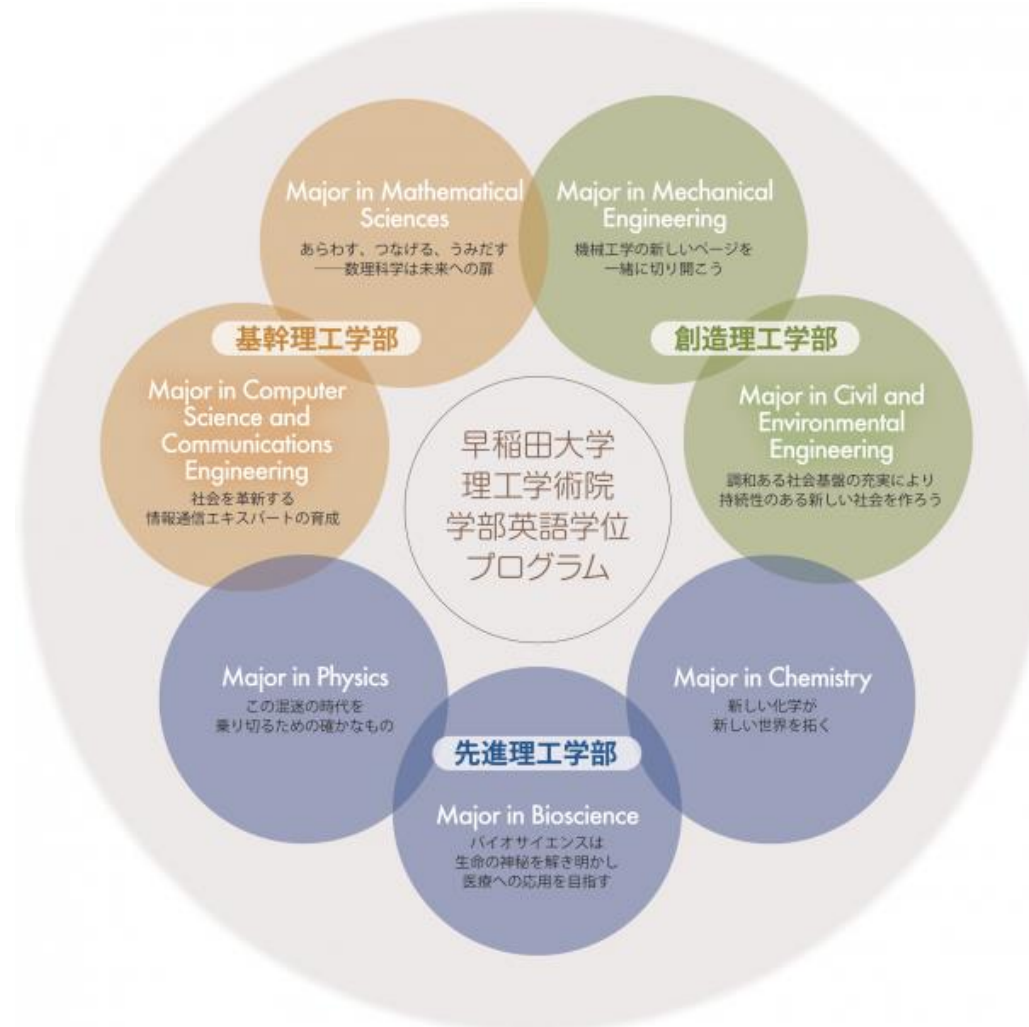
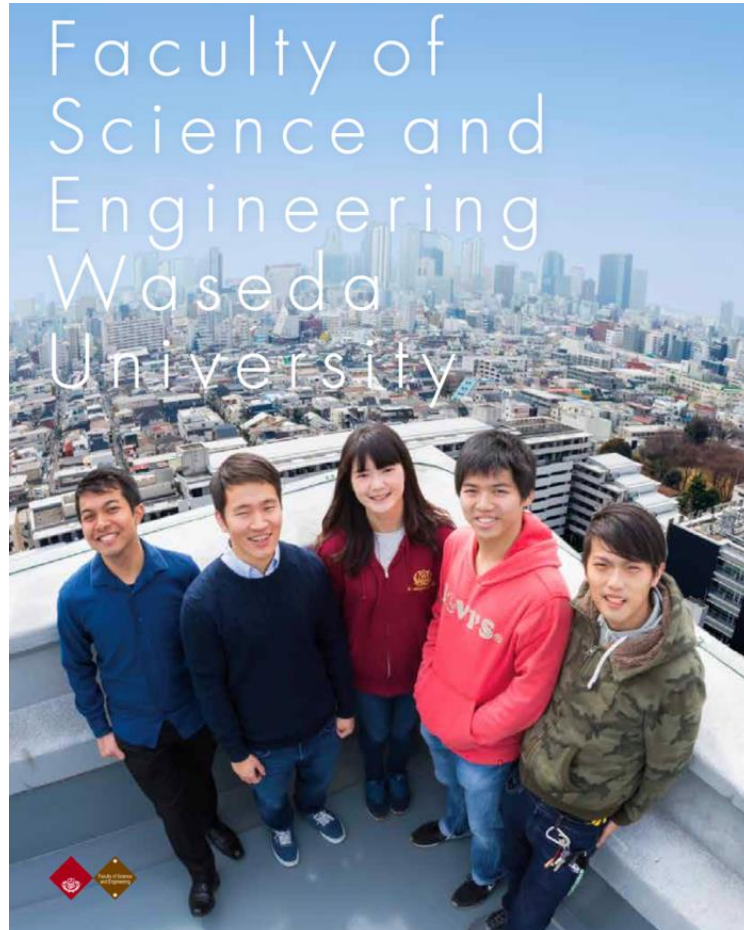
Doctoral Degree

skill

English-based Programs



<https://www.waseda.jp/fsci/en/about/education/english-based/>



Research Ethics

- ✓ Programs given by each department
- ✓ University-wide on-demand content "Introduction to Research Ethics "

グローバルエデュケーションセンター設置科目(秋学期・2単位)

Global Education Center (Fall, two credits)



Waseda e-Teaching Award
審査員特別賞受賞
Special Judges' Award

研究倫理概論

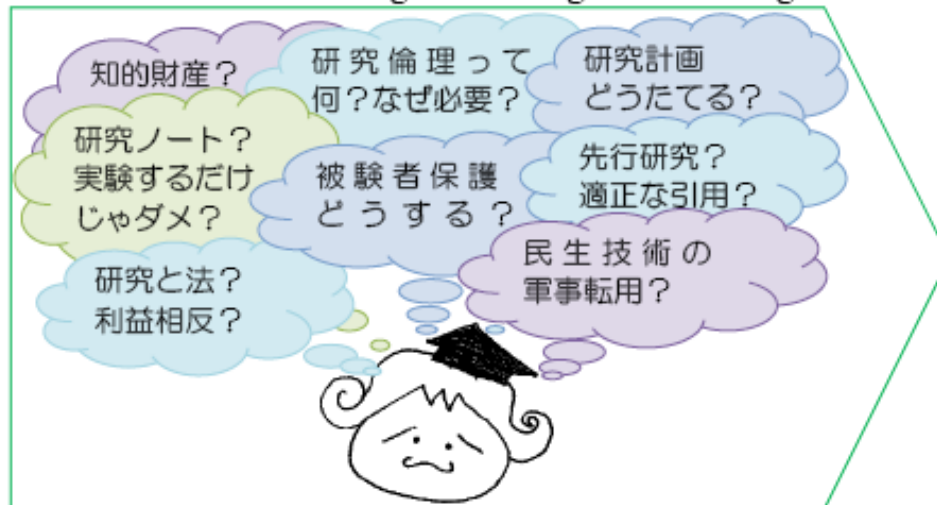
**"Introduction to
Research Ethics"**

対象:全学部の3年生以上、全研究科の大学院生

For: Undergraduates in their third year and above,
graduate students in all graduate courses

研究倫理とは何か？学内外専門家によるフルオンデマンド講義で理解を深める

This course, taught by carefully selected lecturers, provides all its lessons on-demand, so as to reach a wide range of undergraduate and graduate students across different faculties and schools.



求む！研究者を目指す人！

大学院生と大学院進学を考える学部生に

自身のペースで eラーニング

いつでも



Any time

どこでも



Any place

何度でも

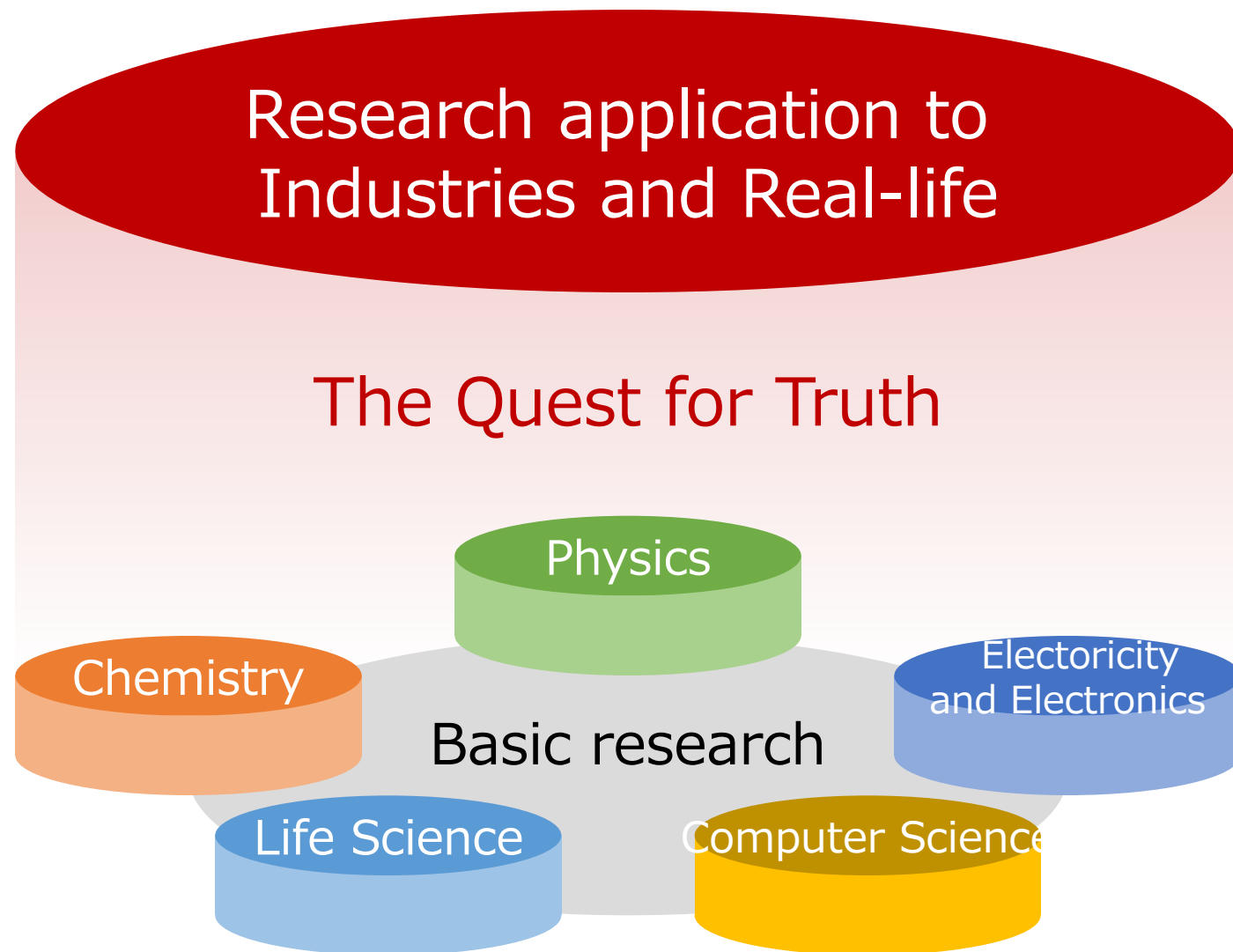


As many times

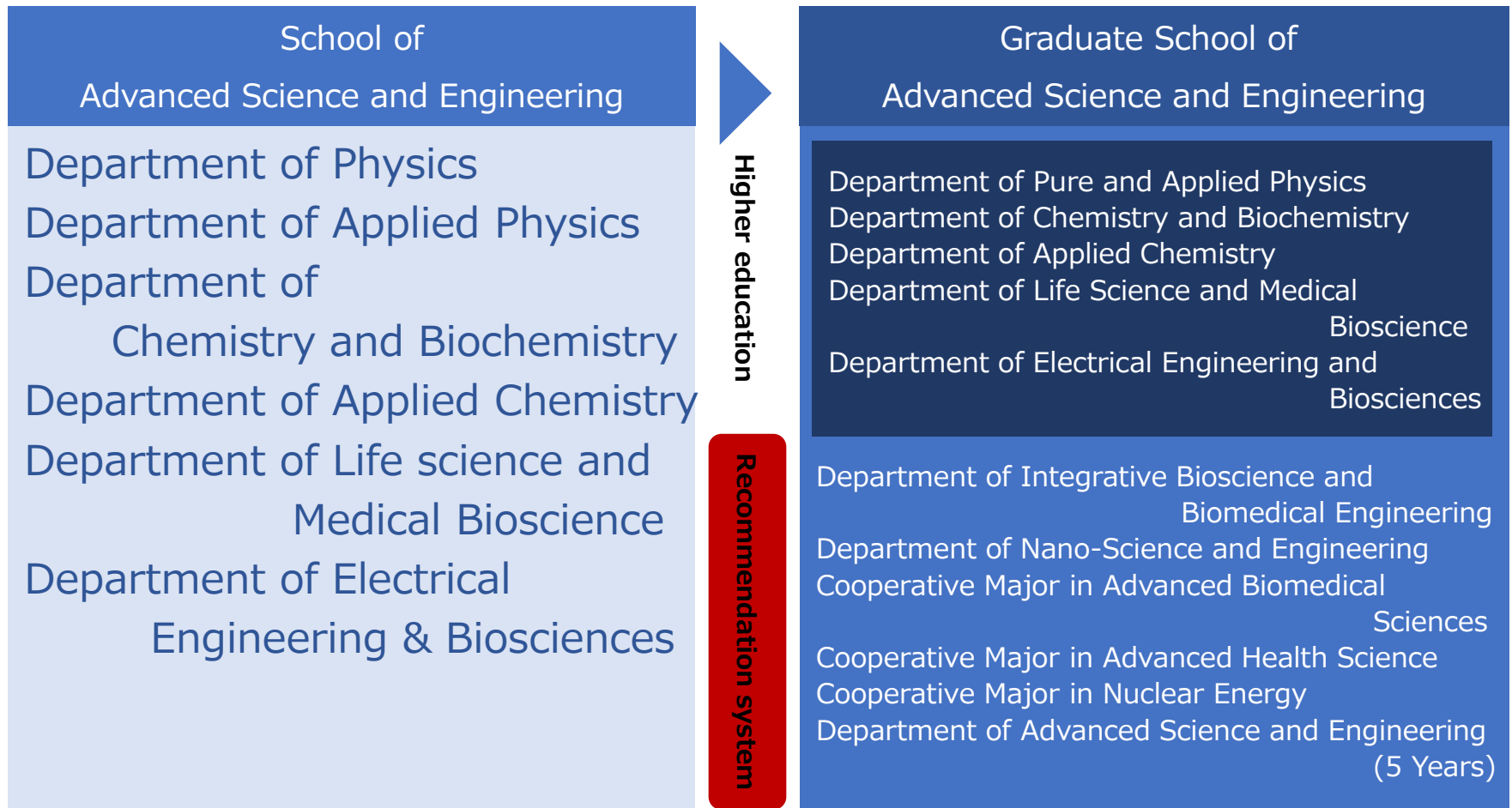
一部英訳有

English translations of some
lectures are available.





6 departments → 11 departments



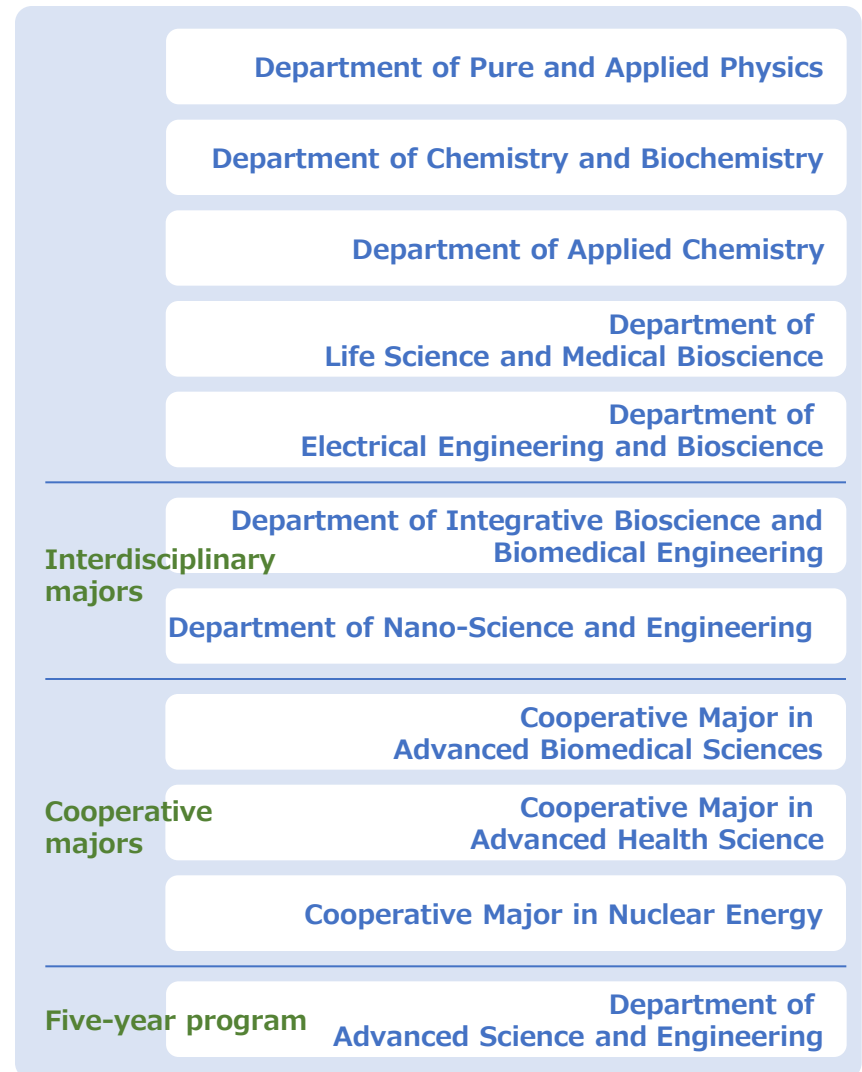
Education and Support for All Three Schools of Science and Engineering

- Integrated English education program from undergraduate to graduate levels
- Career Support through Industry-Academic Collaboration

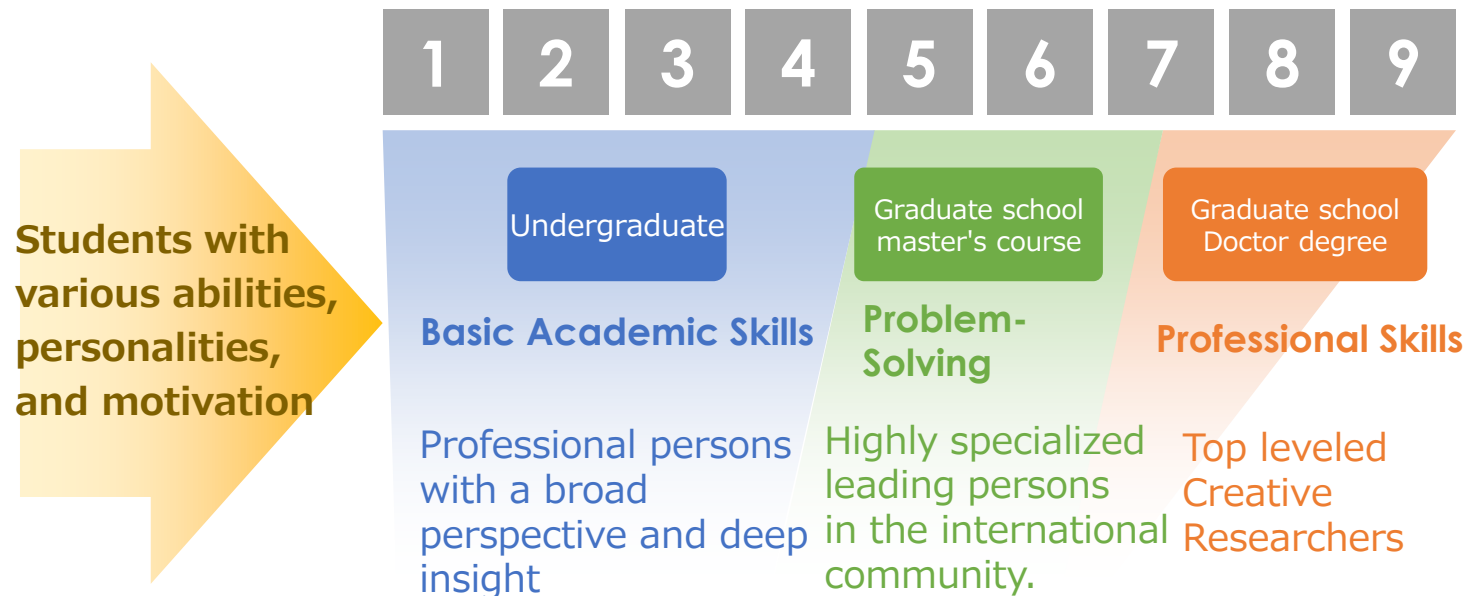
Academic Research beyond Traditional Research Fields

- Expansion into new and interdisciplinary fields
- Interdisciplinary majors and Cooperative majors

Developing professional skills to solve problems in a wide range of fields



- Through a unique education and research program that integrates science, which aims to pursue principles, and engineering, which leads to technologies contributing to society, we educate students with a high degree of expertise and the ability to understand problems from a broad perspective.
- Students can take lecture courses at the graduate school while they are in the undergraduate program so that they can learn efficiently from undergraduate to graduate school.
- Using the skipping grade system, students can obtain a doctoral degree within six years of entering the undergraduate course.



Strengthen important fields through Cooperative Majors and collaborations

medicine

Tokyo Women's
Medical University

health

Tokyo University
of Agriculture and
Technology

nuclear
power

Tokyo City
University

The Center for Advanced Biomedical Sciences (TWIns)



External Collaborators

- RIKEN
- Tsukuba National Institute of Advanced Industrial Science and Technology
- Tsukuba, National Institute for Materials Science (NIMS)
- Japan Aerospace Exploration Agency (JAXA)
- National Center for Neurology and Psychiatry
- Japan Atomic Energy Agency (JAEA)

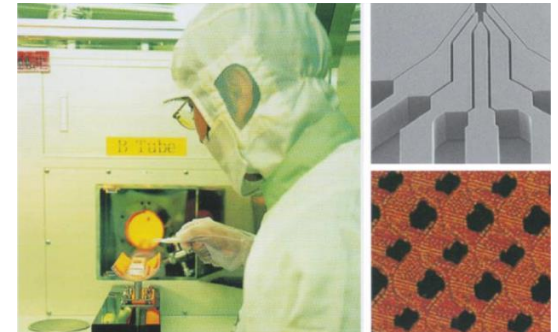
Nanotechnology Research Facility



University Research Center

- Nano-Life Research Institute
- WISE, GCOE, and 21COE programs
- High-tech research centers

- Support for Pioneering Research Initiated by the Next Generation Program (SPRING)
- Moonshot Research and Development Program
- Exploratory Research for Advanced Technology Program (ERATO)
- Program for Creating STart-ups from Advanced Research and Technology (START, SCORE, STARTUP ECOSYSTEM)
- Basis for Supporting Innovative Drug Discovery and Life Science Research (BINDS)
- Doctoral Program for World-leading Innovative & Smart Education (WISE Program)
- Exploration and Development of Global Entrepreneurship for Next Generation Program (EDGE-NEXT)
- Enhancing Development of Global Entrepreneur Program (EDGE)
- Program for Leading Graduate Schools
- Global COE Program
- Strategic Research Center Development Program (Super COE)
- Global 30 Program
- 21st Century COE Program
- Private University Strategic Infrastructure Formation Support Project
- Grant-in-Aid for Scientific Research etc.



Various Scholarship Programs

More than 80% of undergraduates go to master's programs

- Variety of scholarships from the Japan Student Services Organization (JASSO) and private organizations to support undergraduate and graduate students financially
- Most of the graduate students (more than 1,000) can obtain a scholarship if they apply

Many master's students go on to doctoral programs

- People with PhDs are working in various companies
- Students can obtain a "Scholarship for Fostering Researchers in Doctoral Programs"

- Scholarships: loans and grants
- Japan Student Services Organization (JASSO): Loan

On evaluation of activities during the master course

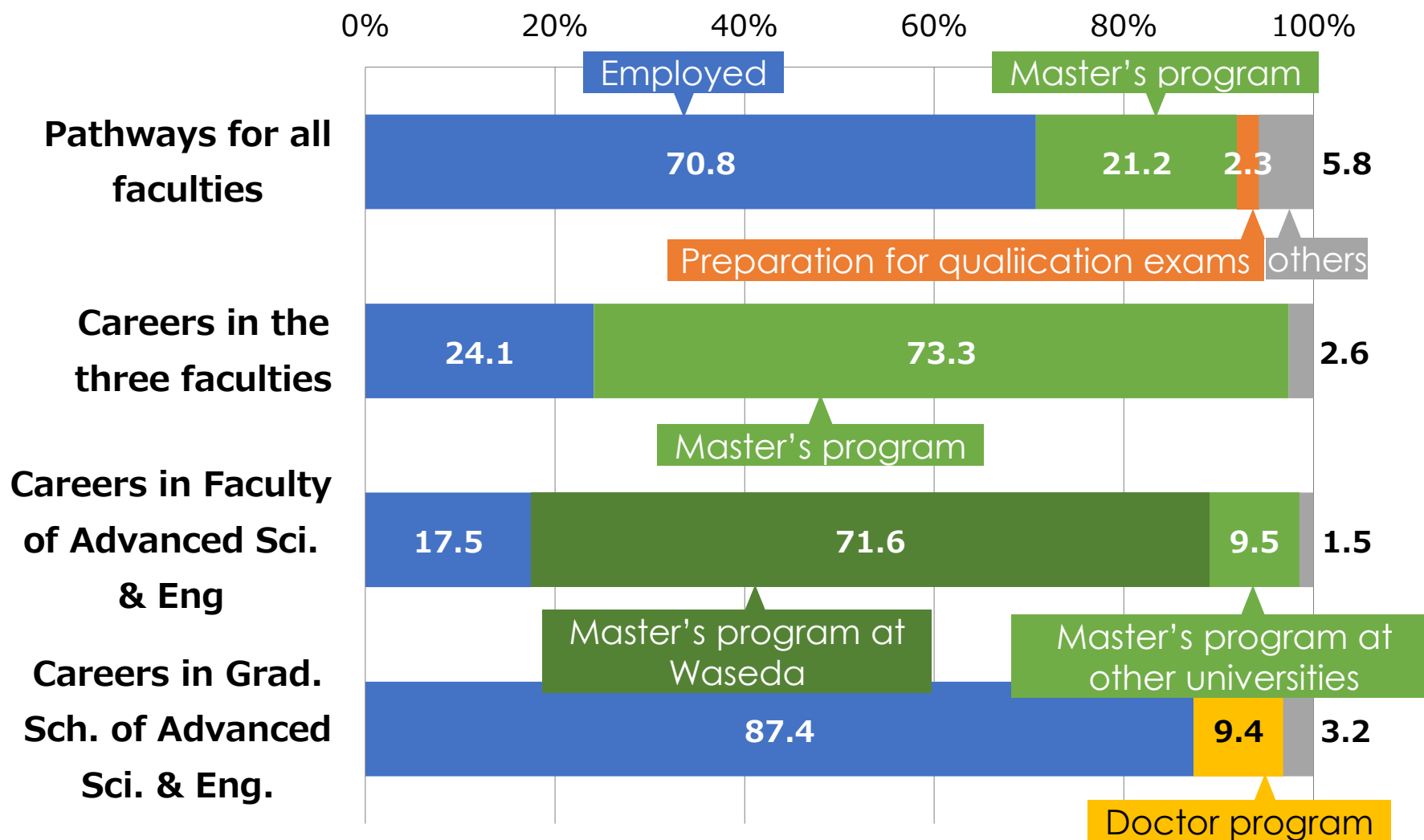
(papers, conference presentations, awards, TA's experience, etc.)



Full or half repayment may be exempted



Career paths for March 2024 Graduates



(Results for March 2019 graduates)

Major employers

Accenture
Asahi Kasei
Ajinomoto
AGC
NTT DATA
Olympus
Kao
Canon
Kyocera
Kirin Beverages
JXTG Energy
Shin-Etsu Chemical Co.
Sumitomo Chemical
All Nippon Airways (ANA)
Sony
SoftBank
Daiichi Sankyo
Dai Nippon Printing Co.

Takeda Pharmaceutical Co.,Ltd.
Terumo.
Power supply development
Denso
Dentsu
Tokyo Gas
Tokyo Electric Power Company
Holdings, Inc.
Mitsubishi Electric Industrial Systems,
Toshiba Corp.
Toray Industries, Inc.
Toyota Motor Corporation
IBM Japan, Ltd.
Oracle Corporation of Japan
Nippon Steel Corporation
Japan Tobacco Inc.
Japan Broadcasting Corporation (NHK)
Nomura Research Institute, Ltd.
Panasonic
Nippon Telegraph and Telephone
Corporation (NTT East)

East Japan Railway Company
(JR East)
Hitachi, Ltd.
Fujitsu
Fujifilm
Honda Motor Co.
Mitsui Chemicals, Inc.
Mitsui & Co.
Mitsubishi Chemical
Mitsubishi Heavy Industries, Ltd.
Mitsubishi Electric
Mitsubishi Materials Corporation
Mitsubishi UFJ Bank
Murata Manufacturing Co.
Morinaga Milk Industry Co.
Yokogawa Electric Corporation
The Lion

and many more

INTRODUCTION TO DEPARTMENT OF PHYSICS

Composition of the Department of Physics

Getting to the Ultimate World

Nuclear and
Elementary
Particle
Physics

Astrophysics

Quantum and
Condensed Matter
Physics

Biophysics

Pursuing New Materials and
New Phenomena

Unraveling Complex
Life Phenomena

Elementary Particle and Astrophysics

- Research on physical laws of the microscopic world such as quarks and neutrinos (quantum theory and particle theory)
- Theoretical and experimental research on the origin and evolution of the universe, black holes, supernovae and other unknown objects based on modern physics (relativity and quantum theory)

Quantum, Condensed Matter Physics, Nonlinear Science, Statistical Physics

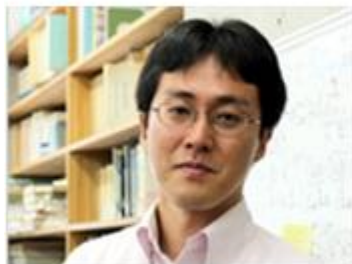
- Study of various properties of solid materials such as superconductivity, superfluidity, Bose-Einstein condensation, magnetism, and dielectricity
- Extraction of universal kinetic structure independent of system details, such as physical systems (mechanical properties and crystal growth of soft matter), chemical systems and biological systems

Biophysics

- Research on the function and structure of proteins (biomolecular machines) that play a role in biological locomotion and energy conversion from both experimental and theoretical perspectives
- Studying the mechanisms (principles) that govern life from the perspective of physics

Advanced Top Runner

第16回



物理学科／物理学及応用物理学専攻

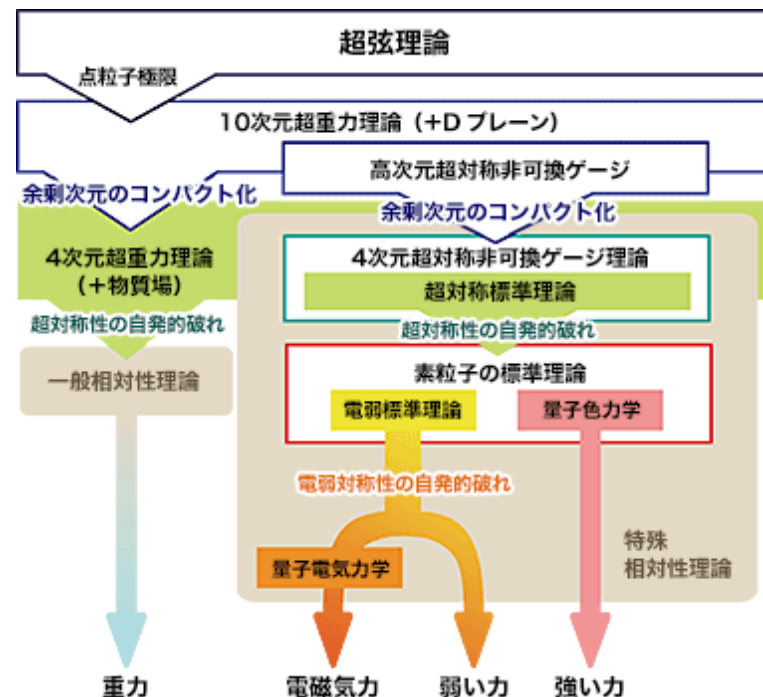
安倍博之 教授

Hiroyuki, Abe

全ての物理現象を表現できる素粒子の
究極的統一理論を求めて

第16回は安倍博之 教授のインタビュー。私たちの世界
に起こるあらゆる物理現象を表現できる素粒子の究極的
統一理論を求めて、理論研究を進めています。

The smallest components of matter are called subatomic particles, which are classified according to their properties into leptons, such as electrons, quarks, which make up protons and neutrons, and gauge particles, which mediate the forces acting between these particles of matter. It is believed that our world exists and all phenomena are caused by the interaction of these elementary particles, but no theory has been developed to explain them all since the beginning of history. Associate Professor Hiroyuki Abe of the Department of Physics is challenging this difficult question from a phenomenological perspective.



INTRODUCTION TO DEPARTMENT OF APPLIED PHYSICS

Research Field (Applied Physics)



Innovate physics and next-generation technologies by leveraging the fruits of physics and research methodologies

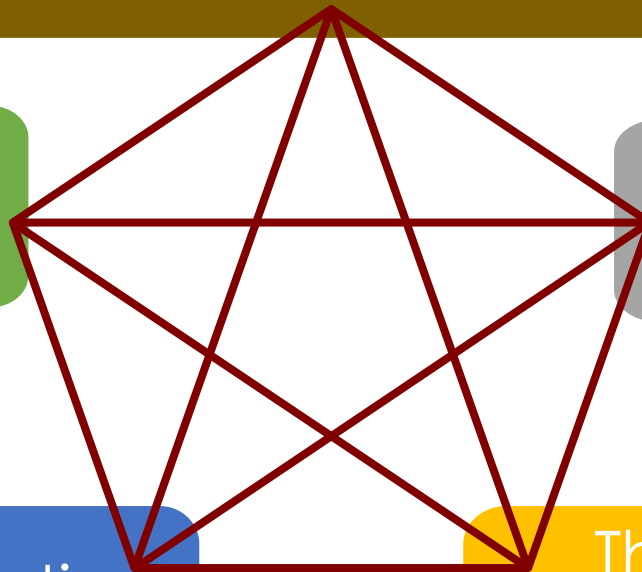
Physics-based Engineering:
Informatics, Photonics, Image Science

Applied
Radiation Physics

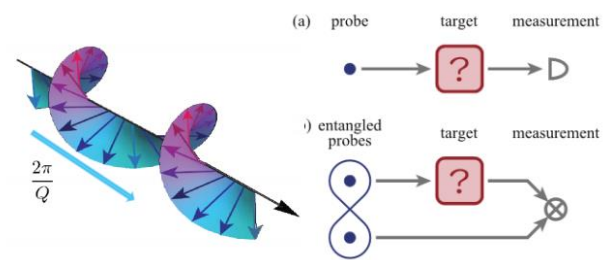
Condensed
Matter Physics

Mathematical
Physics

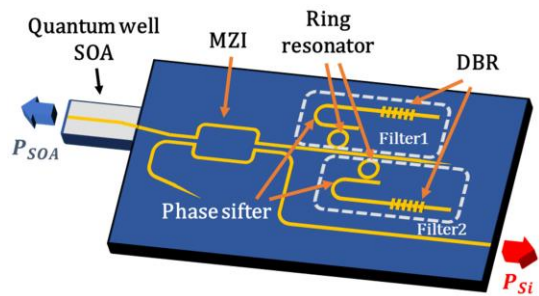
Theory of
Condensed
Matter Physics



Examples of Research Topics (Applied Physics)



Theory for physical behavior of electrons, spins, magnets etc.



Two-Wavelength Tunable Laser

Theorem: F. Machihara, and Ozawa

We have a unique pair of global solutions

$(u, v) \in C(\mathbb{R}, H^{1/2} \times H^{1/2})$ of

$$(SRS) \begin{cases} i\partial_t u + \sqrt{m_u^2 - \Delta} u = \lambda \bar{u} v, \\ i\partial_t v + \sqrt{m_v^2 - \Delta} v = \frac{\lambda}{c} u^2, \\ u(0, \cdot) = u_0, \quad v(0, \cdot) = v_0 \end{cases}$$

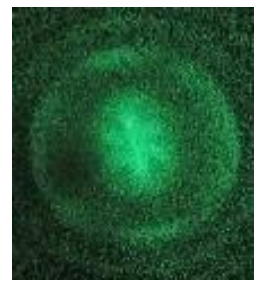
with $(u_0, v_0) \in H^{1/2} \times H^{1/2}$.

Moreover, let

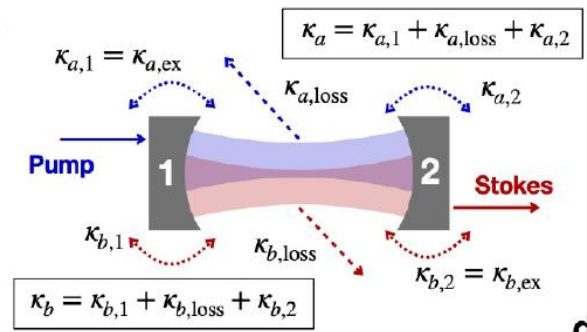
- $(u_{0,n}, v_{0,n}) \subset H^{1/2} \times H^{1/2}$ converge (u_0, v_0) in $H^{1/2} \times H^{1/2}$.
- $(u_n, v_n) \in C(\mathbb{R}, H^{1/2} \times H^{1/2})$ be sol's of (SRS) for the initial data $(u_{0,n}, v_{0,n})$.

Then $(u_n, v_n) \rightarrow (u, v)$ in $H^{1/2} \times H^{1/2}$ locally uniformly in time.

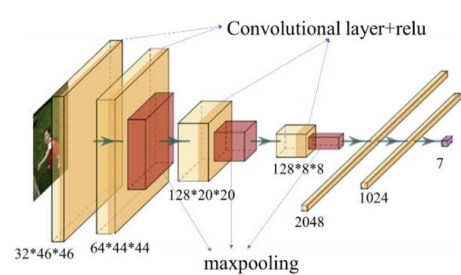
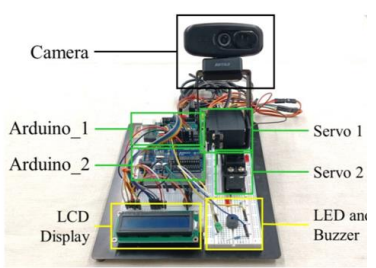
Describe and predict new physical phenomena with mathematics



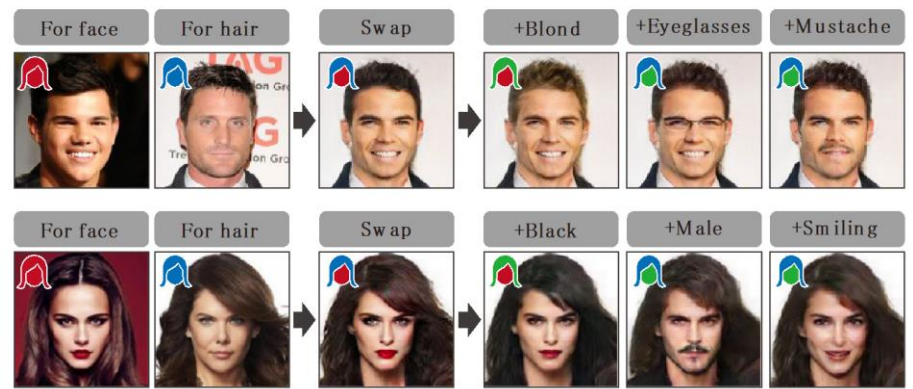
Imaging of wave function by Attosecond laser



Brillouin lasing in short fiber Fabry-Perot resonators



Deep Learning-Based System for Real-Time Face Tracking and Expression Recognition



Anatomy Based Facial Animation and Fat Simulation

Advanced Top Runner

第19回



応用物理学科／物理学及应用物理学専攻

片岡 淳 教授

Jun, Kataoka

**X線・ガンマ線で宇宙を見る技術と、
医療・産業機器への展開**

第19回は片岡淳教授のインタビュー。未知なる宇宙を解き明かすことを目指して天文衛星に搭載する放射線検出器の開発を進めると共に、産業機器への技術応用も実践しています。

Ordinary astronomical telescopes use visible light to observe the moon and stars, but in order to observe special astronomical objects such as giant black holes and neutron stars at greater distances, high-temperature gases that are invisible to the human eye but exist in space, and explosive phenomena, electromagnetic waves such as X-rays and gamma rays, which have a higher energy than visible light, are used to observe the moon and stars. (a type of radiation) is advantageous. In the field of high-energy astrophysics, Professor Jun Kataoka of the Department of Applied Physics is developing radiation detectors and optical sensors to observe unknown celestial objects and reveal their true nature.

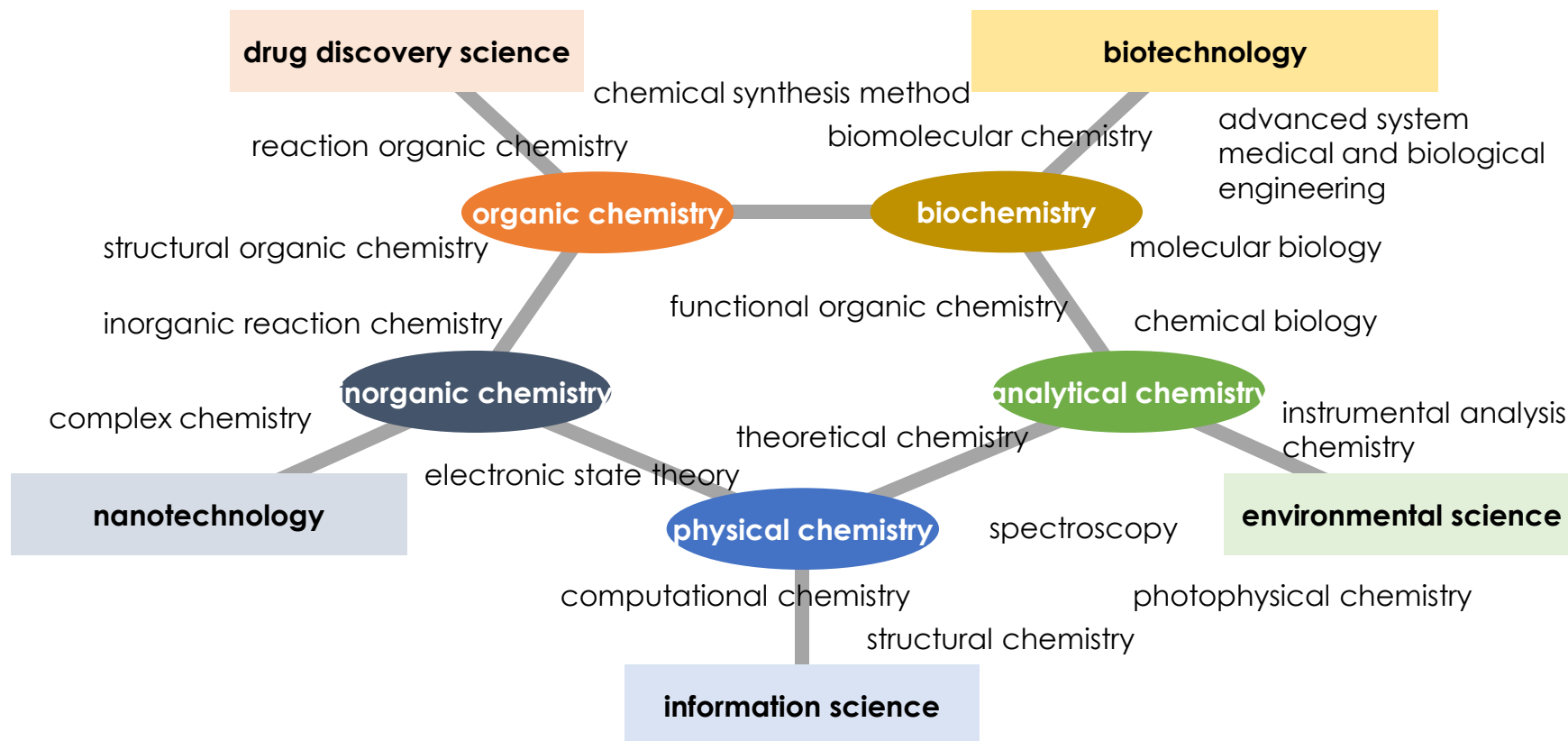
Exploratory Research for Advanced Technology Program (ERATO) Kataoka Project



https://www.jst.go.jp/erato/research_area/ongoing/jpmjer2102.html

INTRODUCTION TO DEPARTMENT OF LIFE SCIENCE AND MEDICAL BIOSCIENCE

Related Areas and Curriculum



Learn a wide range of "chemistry"

Fundamental Law of Matter and Energy

The starting point for cutting-edge science and technology

Science of molecules to create new materials

Elucidation of chemical and biological phenomena at the molecular level

"Central Science"

Basis for collaboration with engineering, life sciences, pharmaceutical and natural sciences

Aiming to foster creative excellence

Advanced Top Runner

第22回

NEW



化学・生命化学科／化学・生命化学専攻

中尾 洋一 教授

Yoichi, Nakao

食べ物から「体にいい」物質を見つけ出す

第22回は中尾洋一教授を紹介します。海に潜って海洋生物から薬のもとになる化学物質を探したり、「健康を保てる」とされる発酵食品の機能性を探るなどして、「体にいい」を化学的に解明しようと研究されています。

It is often said that traditional fermented foods are good for you, such as "drinking miso soup every day will keep you healthy" and "Natto is good for you". In the world of food chemistry, which is based on nutrients, many explanations are based on the function of minerals, vitamins, etc. Recently, catechins and isoflavones are said to be good for you. However, are they really the only reasons why catechins and isoflavones are "good for you"? Isn't there more hidden in food that we don't know about? Based on this idea, we are searching for chemical substances in fermented foods that are considered to be "good for you" and "keep you healthy" that have some effects on living organisms (i.e., have biological activity).

A variety of marine life



INTRODUCTION TO DEPARTMENT OF APPLIED CHEMISTRY

8 Research Field (Applied Chemistry)



Practical Applications of Theories

- Practical Chemistry as Solutions for Sustainable Society
- Integration of Interdisciplinary Fields Based on Chemistry

Education and Research

- “Lecture-Practice-Experiment” Cycled Programs to Master Practical Chemistry
- Cutting-edge Research in 8 Research Divisions Related to Energy, Materials, Biotechnology, and Carbon Neutrality
- Great Research Facilities Supported by National Grants and Industrial Collaborations

Our History and Tradition

- since 1917, Active and Strong Network of >10,000 alumni.
- Our own scholarship programs

Advanced Top Runner



応用化学学科／応用化学専攻

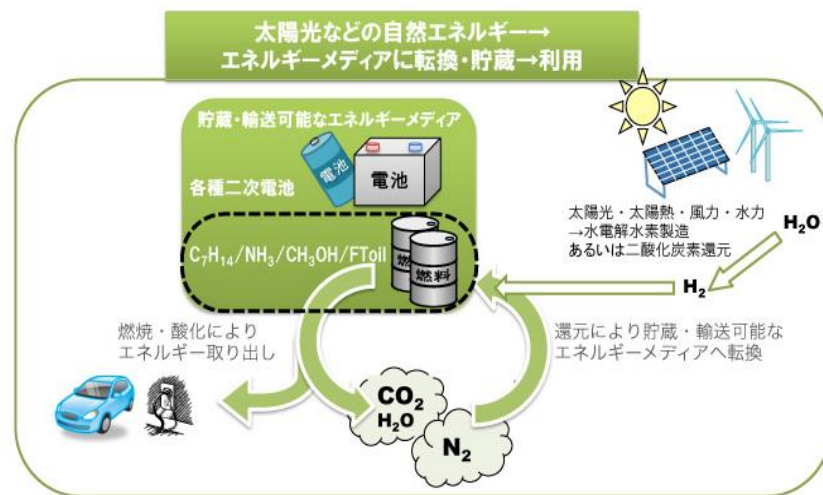
関根 泰 教授

Sekine Yasushi

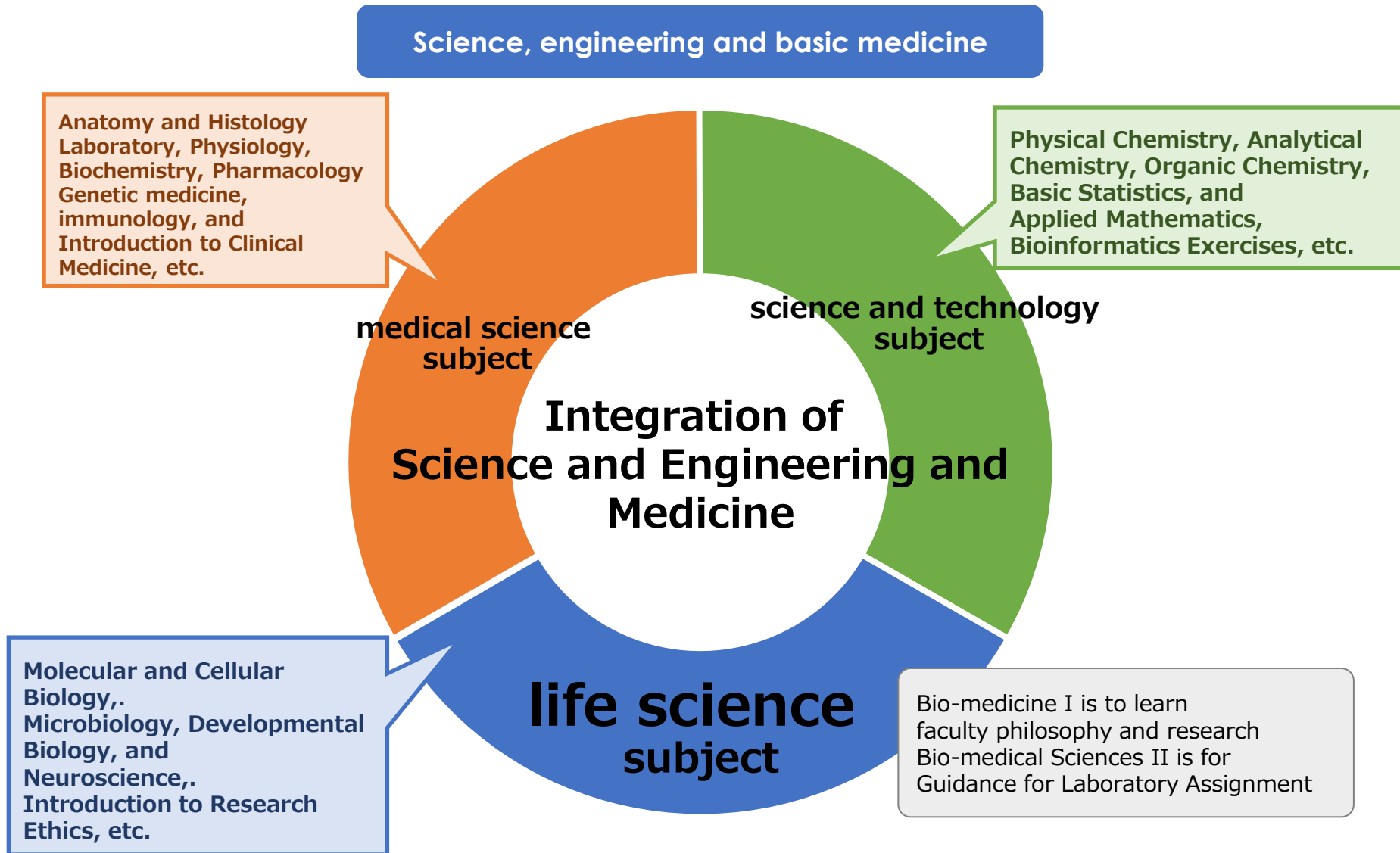
触媒反応の低温化で、エネルギーと環境の
未来を拓く

Prof. Sekine has proposed an “Non-conventional” catalytic process that can operate at temperatures as low as 100°C in which an electric field is applied to the catalyst layer. He is challenging the development of catalytic processes to solve the time and space constraints of renewable energy, such as ammonia and biomass.

Exploration of Non-conventional Catalytic Process for Transformation, Storage, and Utilization of Renewable Energy



INTRODUCTION TO DEPARTMENT OF LIFE AND MEDICAL SCIENCES



We train our students to be global leaders in life sciences, medical sciences, and medical engineering

- Students are required to complete a good balance of science and engineering, life science, and medical subjects and experiments to develop the academic ability to understand biological phenomena from cells to individuals.
- This is a **6+3 year intensive education and research program that includes doctoral courses in** collaboration with domestic and international educational and research institutions and corporate researchers.
- Faculty members from various backgrounds are fused together in an open laboratory to develop **international researchers with a pioneering spirit that creates new fields.**

**For more information, please visit the Department of Life Science and Medical Biosciences website.
(<http://www.biomed.sci.waseda.ac.jp/>).**

Advanced Top Runner

第20回



生命医科学科／生命医科学専攻

竹山 春子 教授 Haruko, Takeyama

海洋微生物の有用性を解明し、資源として
活用するマリンバイオテクノロジーを
日本から世界へ

第20回は竹山春子教授のインタビュー。多くの可能性を秘めた宝箱である海から、私たちの生活・健康に有用な微生物を見出して資源として利用するために、国内外の研究者とマリンバイオテクノロジーの研究を進めています。

Most of the microorganisms on Earth have not been successfully cultivated and, as a result, their properties and characteristics are not known. In particular, since many microorganisms in the ocean are even more difficult to culture than those on land, the ocean is expected to be a treasure chest with many hidden possibilities. Professor Haruko Takeyama of the Department of Life Science and Medical Biosciences is engaged in research and development of marine biotechnology for the microorganisms of the sea, using cutting-edge technologies such as genetic engineering, Raman spectroscopic analysis technology and microfluidic devices.

The Moonshot Research and Development Program Goal 5
“Construction of circulating production platform by environmental control based on Soil Microbe Atlas”



<https://www.microbe-soil.sci.waseda.ac.jp/2021/06/08/84/>

INTRODUCTION TO DEPARTMENT OF ELECTRICAL ENGINEERING AND BIOSCIENCE

Human body is information bodies connected with electrical signals

- Combining life sciences and electrical and electronic information fields
- Four vertices in the four domains of life, electricity, electronics and information
- Challenging both "research in depth in each field" and "research that spans multiple fields"

Various research fields

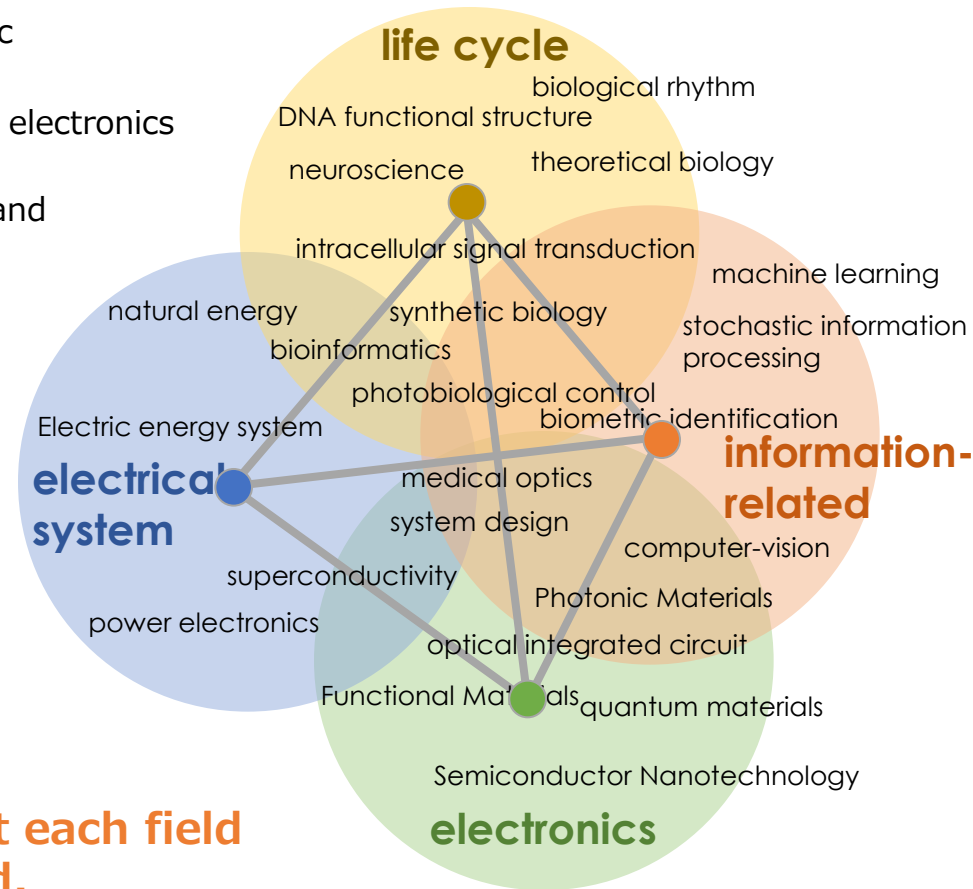
Themes that sharply penetrates each field

- A theme that lies on the line connecting the two vertices
- A theme corresponding to a surface composed of three vertices
- A theme leading to a consolidated research composed of all four vertices



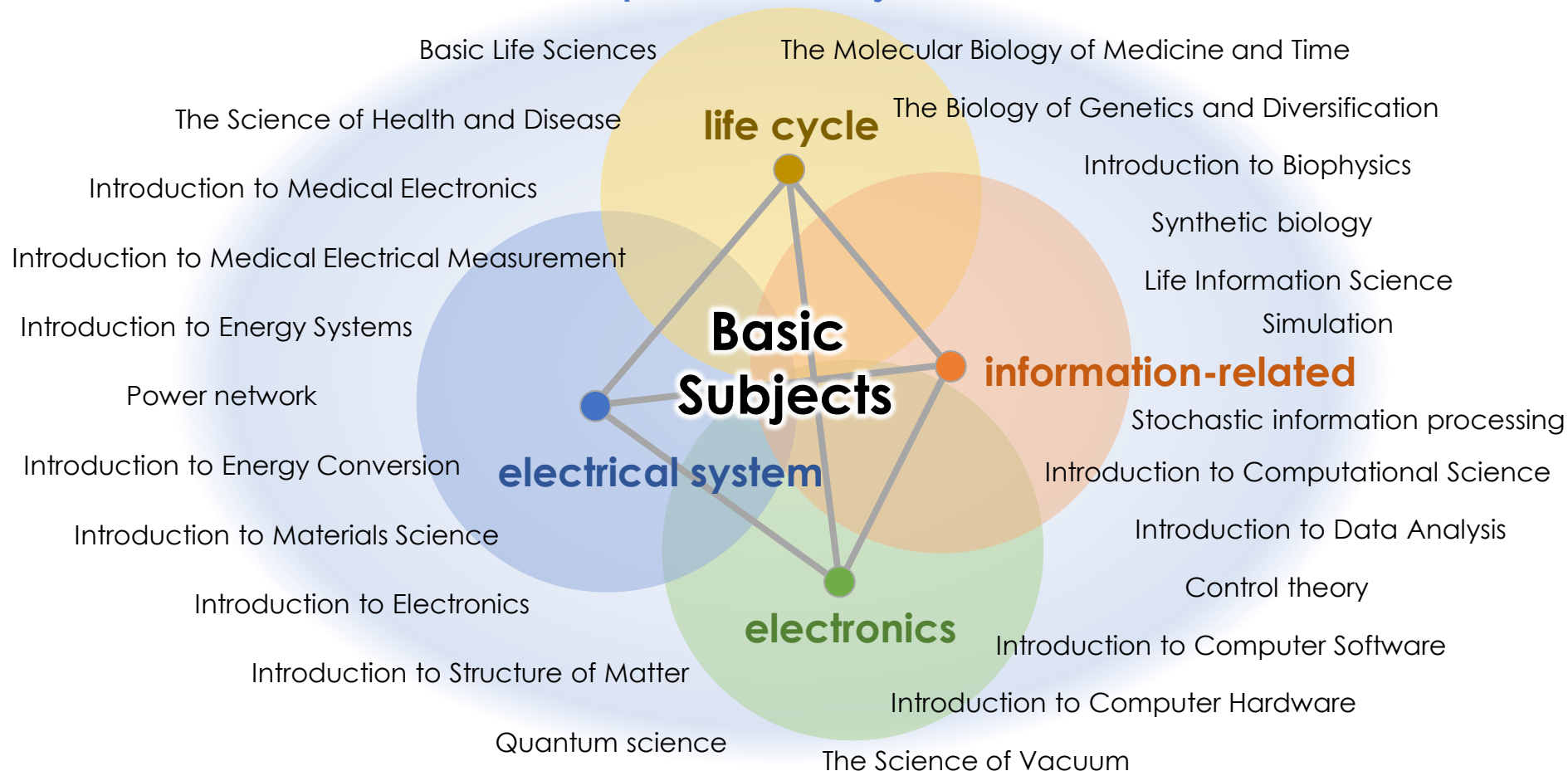
The theory and technology gained at each field expand into the fusion field.

Consolidate lots of research examples in the fusion field and develop them into higher level research



Educational Programmes: Subject Group System

Advanced Subjects and Graduate School Courses Specialized Subjects



Advanced Top Runner



電気・情報生命工学科／電気・情報生命専攻

浜田 道昭 教授

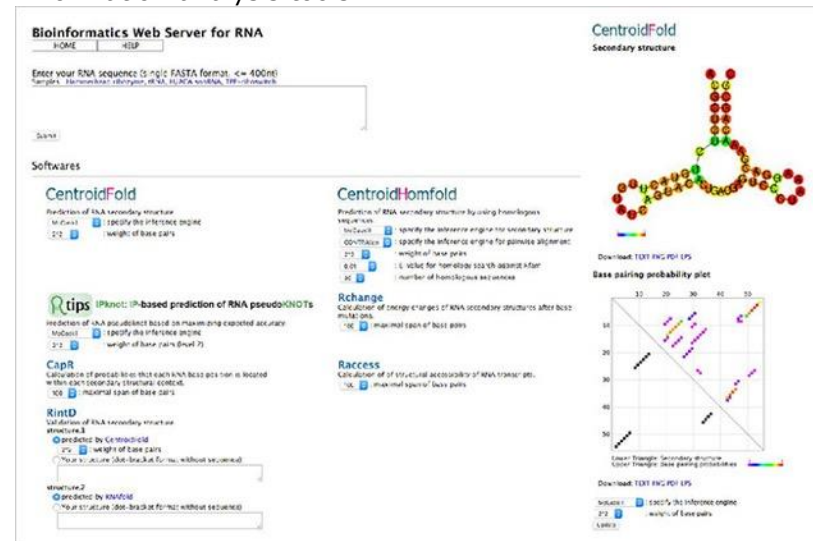
Hamada Michiaki

純粋数学でつなく、情報科学と生命科学：
バイオインフォマティクス

解析装置等の性能向上に従って大量に蓄積されてきたゲノムやRNA等の配列データを、様々な情報科学的手法により分析処理し、新たな発見を目指すバイオインフォマティクスの研究を進めていच्छいます。

Since the discovery of DNA, the source of life, in 1869, many scientists have been studying it, and the Human Genome Project, completed in 2003, has revealed the entire DNA sequence of humans. At present, research is being conducted based on this information to elucidate the sequence, structure and roles of substances expressed from DNA, such as RNA and proteins, in order to better understand the mechanisms of biological activities. This has led to the development of instruments that can amplify and analyze DNA faster and in greater quantities, resulting in the accumulation of too much sequence data to handle. In the field of bioinformatics, we aim to make new discoveries by reviewing these data, which must contain a great deal of useful information, from various perspectives using information science technology, and developing highly efficient and accurate analysis and prediction tools that incorporate knowledge from various fields such as mathematics, physics and chemistry. is Associate Professor Michiaki Hamada of the Department of Electrical, Computer and Biological Engineering.

Rtools, a web server that integrates a number of RNA information analysis tools



The screenshot displays the 'Bioinformatics Web Server for RNA' interface. At the top, there's a header with 'HOME' and 'HELP' links. Below this is a text input field for 'Enter your RNA sequence (single FASTA format, <= 400nt)' with a 'Submit' button. The main content area is divided into two columns of software tools. The left column includes 'CentroidFold' (Prediction of RNA secondary structure), 'Rtips' (IP-based prediction of RNA pseudoknots), 'CapR' (Calculation of pseudoknots), and 'RintD' (Validation of RNA secondary structure). The right column includes 'CentroidHomfold' (Prediction of RNA secondary structure by using homologous sequences), 'Rchange' (Calculation of energy changes), and 'Raccess' (Calculation of structural accessibility). On the far right, there's a 'CentroidFold Secondary structure' section showing a 3D visualization of an RNA structure and a 'Base pairing probability plot' which is a line graph showing the probability of base pairing across the sequence. At the bottom right, there's a 'Download TEXT PNG PDF EPS' link.

In 2010, the Faculty of Science and Engineering at Waseda University became one of the first institutions in Japan to introduce an English-based Program, offering students the opportunity to acquire an undergraduate degree solely taught in English.

This program has been highly acclaimed both in Japan and overseas.

From April 2018, the undergraduate “English-based Program” is reorganized into seven Majors, with education and research programs strengthened through the addition of new disciplines and by boosting the faculty numbers. Based around this world-class program, we aim to create new value through the mutual stimulation of a diverse student body and by building the best possible environment for education in science and engineering.



Major in Physics

Let's acquire a solid basis for flexible thinking!



Major in Chemistry

New chemistry opens a new world

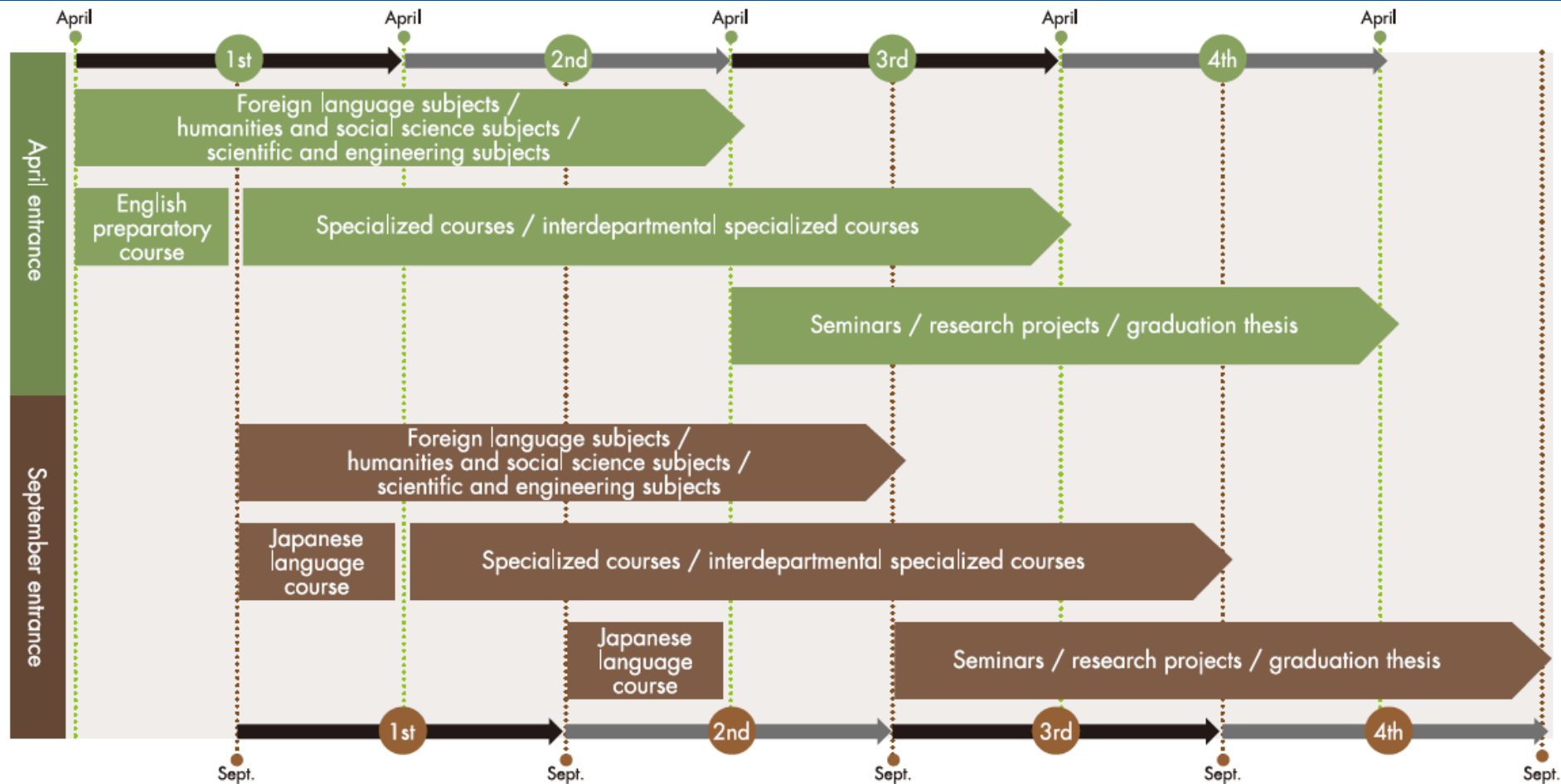


Major in Bioscience

Bioscience unveils the "secrets" of life for its application to advanced medical practice

The English-based program of the Faculty of Science and Engineering covers a wide range of scientific and engineering disciplines. We offer unique specialized courses that cannot be found in the international science programs of other universities in Japan. The School of Advanced Science and Engineering offers our students three program; Physics, Chemistry, and Bioscience.

Curriculum Outline of Physics, Chemistry, and Bioscience Majors



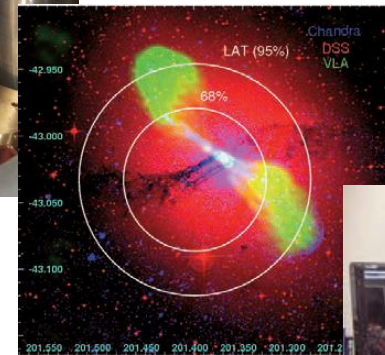
- **Students can obtain a degree by taking courses in English only**
- **No Japanese Language proficiency is required** in prior to enter the program
- **Japanese language course is compulsory** for admitted in both Apr/Sept application

INTRODUCTION TO PHYSICS MAJOR

<https://www.ase.sci.waseda.ac.jp/english/departments/physics.php>

Let's acquire a solid basis for flexible thinking!

The Major in Physics will provide you with a solid basis in physics, which strengthens your way of logical and scientific thinking and enables you to pursue cutting-edge researches on pure and applied physics. You can systematically learn the fundamentals in classical and modern physics and the basics in the physics-based engineering. In the graduation thesis, you may discover as-yet-unknown phenomena in physics, break new ground in the discipline, and develop epoch-making technologies. The faculty members who are well-versed in a wide area of physics are looking forward to enjoying physics with you!



Message from student and graduate/Faculty Member



Living in Malaysia for almost my whole life, I was brought up in a multicultural community. Coming to Waseda felt just like home, welcoming me with a student-friendly atmosphere and an international environment. I enjoy studying physics because it unravels various mysteries of the universe in such a logical and concise manner. Since young, I loved playing sport and I'm glad to have joined the windsurfing club, where I can meet students from various departments and create everlasting bonds with my teammates. I'm confident to say, I'm having the best time of my life!



Learning physics in English was a privilege especially in Japan where the leading edge research was happening. The best thing about the IPSE Applied Physics program was that it provided me with the strong foundation. Not only on the core skills, but emerging skills such as programming, academic writing and presenting gave me the confidence as a Physics graduate. I most enjoyed my time with the experienced and passionate professors from freshmen where they were always willing to help whenever I needed them. A great course for a challenging and exciting experience!

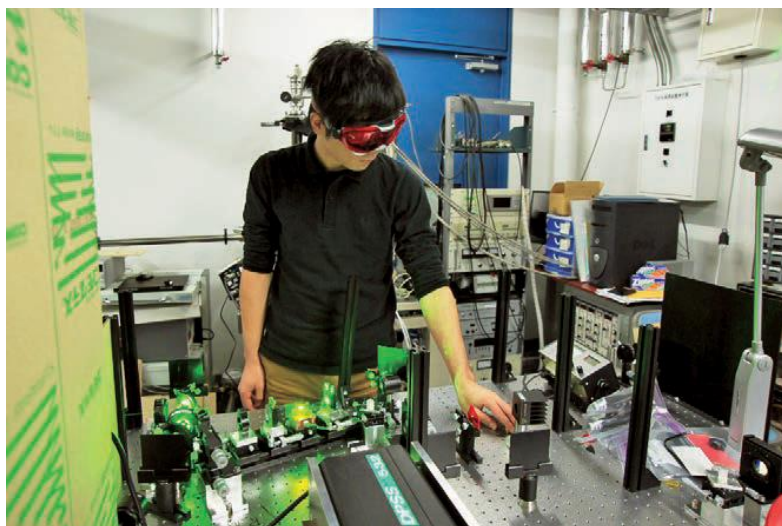
ABE, Hiroyuki	Theoretical Particle Physics
AOKI, Takao	Quantum Optics Research
HARAYAMA, Takahisa	Nonlinear Physics
HASEGAWA, Tsuyoshi	Surface and Interface Physics
INOUE, Akio	Experimental Astrophysics
KATSUFUJI, Takuro	Complex Quantum Physics
KATAOKA, Jun	Applied Radiation Physics
KITA, Tomohiro	Integrated Optical Devices
KOIKE, Shigeaki	Mathematical Physics
KOMATSU, Shinichi	Optical Science and Engineering
MAEDA, Kei-ichi	Relativistic Astrophysics and Cosmology
MATSUDA, Azusa	Experimental Low Temperature Condensed Matter Physics
MIKHAILENKO Sergey	Experimental Biophysics
MIZOKAWA, Takashi	Electronic Correlation Physics
MOCHIZUKI, Masahito	Emergent Materials Physics
MORISHIMA, Shigeo	Image Information Processing
MOTZ, Holger Martin	Cosmic Ray Physics
NAKAZATO, Hiromichi	Fundamental Theory of Quantum Mechanics
NIIKURA, Hiromichi	Atomic, Molecular and Optical Physics
OTANI, Mitsuharu	Mathematical Physics
OZAWA, Tohru	Mathematical Physics
SAWADA, Hideyuki	Fundamentals and Applications of Pattern Information Process
TABE, Yuka	Soft Matter Physics
TAKANO, Masatoshi	Theoretical Nuclear Physics
TAKANO, Mitsunori	Theoretical Biophysics
TAKAYAMA, Akari	Surface Science
TAKEUCHI, Atsushi	Semiconductor Device Engineering
TANAKA, Masashi	Experimental Particle Physics
UYEDA, Taro	Molecular Biophysics
WASHIO, Masakazu	High Quality Beam Science
YAMADA, Shoichi	Theoretical Astrophysics
YAMAZAKI, Yoshihiro	Physics of Non-equilibrium System
YASUDA, Kenji	Experimental Biophysics
YORITA, Kohei	High Energy Experimental Particle Physics
YUASA, Kazuya	Theoretical Quantum Physics

INTRODUCTION TO CHEMISTRY MAJOR

<https://www.ase.sci.waseda.ac.jp/english/departments/chemistry.php>

New Chemistry opens a new world!

Chemistry is a field of science that studies chemical syntheses and reactions, as well as the functions of substances and materials, at the atomic and molecular levels. Our undergraduate curriculum covers the major areas of chemistry and chemical engineering and is designed to provide students with broad knowledge and understanding. It also offers opportunities for more in-depth study in their specific area of interest in Japanese. Upon completion of our program, students have the choice of continuing their research in graduate programs or starting a professional career in a range of fields, such as environmental science, biotechnology, nanotechnology, and chemical engineering.



Message from student and graduate/Faculty Member



Waseda for me is the place that showed me challenge and enormous amount of opportunities. Majoring chemistry here meant access to various laboratories and learning from the best professors in the field. People here have different backgrounds which allows me to learn so much from others. Classes are also different as they are usually small but can be big and each professor has his/her own teaching technique and they always welcome and encourage questions. We have plenty of circles and activities which allow close interactions with the Japanese culture.

Studying at Waseda was an extraordinary experience. As a chemistry major, I was exposed to aspects of chemistry both theoretically and practically. I especially enjoyed the biomedical laboratory conducted at Tokyo Women's Medical University. This course was what ultimately motivated me to study biochemistry further. I recently started working as a research technician in a biology laboratory at ETH Zürich. It is a laboratory that focuses on studying the molecular and cellular mechanisms behind wound healing and skin cancer. The G30 programme is a perfect fit for any international students like myself.

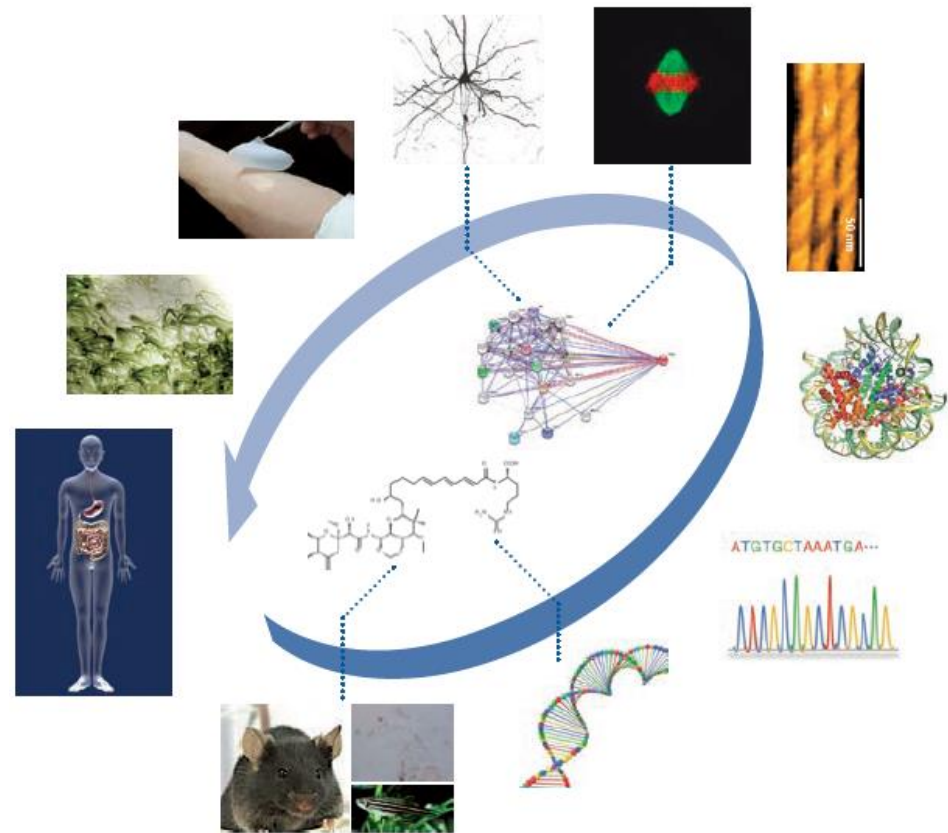
EGUCHI, Mihar	Photo Chemistry, Nano-structure Control
FUKUNAGA, Akihiko	Energy Materials
HANADA, Nobuko	Materials Science, Chemical Engineering
HIRAI, Yusuke	Polymer Physical Chemistry
HOMMA, Takayuki	Functional Surface Chemistry, Interfacial Electrochemistry
HOSOKAWA, Seijiro	Synthetic Organic Chemistry
IMURA, Kohei	Photo-Physical Chemistry
ISHII, Ayumi	Inorganic Materials Chemistry
KANOMATA, Nobuhiro	Functional Organic Chemistry, Organic Stereochemistry, Heterocyclic Chemistry
KIRIMURA, Kohtaro	Applied Biochemistry, Microbial Functions Development
KOHORI, Fukashi	Chemical Engineering, Interface Engineering
KOIDE, Takaki	Biomolecular Chemistry
KUNIMOTO, Masahiro	Functional Surface Chemistry, Electroanalytical Chemistry
MATSUKATA, Masahiko	Catalytic Chemistry, Membrane Separation
MOMMA, Toshiyuki	Applied Electrochemistry, Chemistry of Energy Materials
NAKADA, Masahisa	Synthetic Organic Chemistry, Total Synthesis of Bioactive Compounds, Asymmetric Catalysis
NAKAI, Hiromi	Electronic State Theory
NAKAO, Yoichi	Chemical Biology
NODA, Suguru	Reaction Engineering, Materials Process Engineering
OYAIZU, Kenichi	Polymer Chemistry
SAKTI, Aditya Wibawa	Molecular Simulation
SEINO, Junji	Cheminformatics
SEKINE, Yasushi	Catalysis, Surface Ionics
SHIBATA, Takanori	Reaction Organic Chemistry
SHIMOJIMA, Atsushi	Inorganic Solid State Chemistry, Synthetic Inorganic Chemistry
SUGA, Takeo	Polymer Chemistry, Functional Polymers
SUGAHARA, Yoshiyuki	Inorganic Materials Chemistry
TERADA, Yasuhiko	Molecular Biology & Cellular Biology
UMENO Daisuke	Umeno: Synthetic Biology
YAMAGUCHI, Junichiro	Organic Chemistry
YAMAGUCHI, Tadashi	Coordination Chemistry
YAMAMOTO, Kana	Bioorganic Chemistry, Medicinal Chemistry, Asymmetric Synthesis

INTRODUCTION TO BIOSCIENCE MAJOR

<https://www.ase.sci.waseda.ac.jp/english/departments/bioscience.php>

Bioscience unveils the “secrets” of life for its application to advanced medical practice

The Bioscience Major fuels discovery in Life Science and innovation for medical practice by providing fundamental and cutting-edge knowledge and techniques to explore the diversity of living systems. In addition to Bioscience major-specific disciplines, students will receive basic training in core scientific fields such as mathematics, physics, chemistry, biology, medicine, engineering, and information science. To gain practical skills, laboratory sessions will be incorporated to cover experimental techniques across the full spectrum of physical, chemical and biological sciences.



Message from student and graduate/Faculty Member



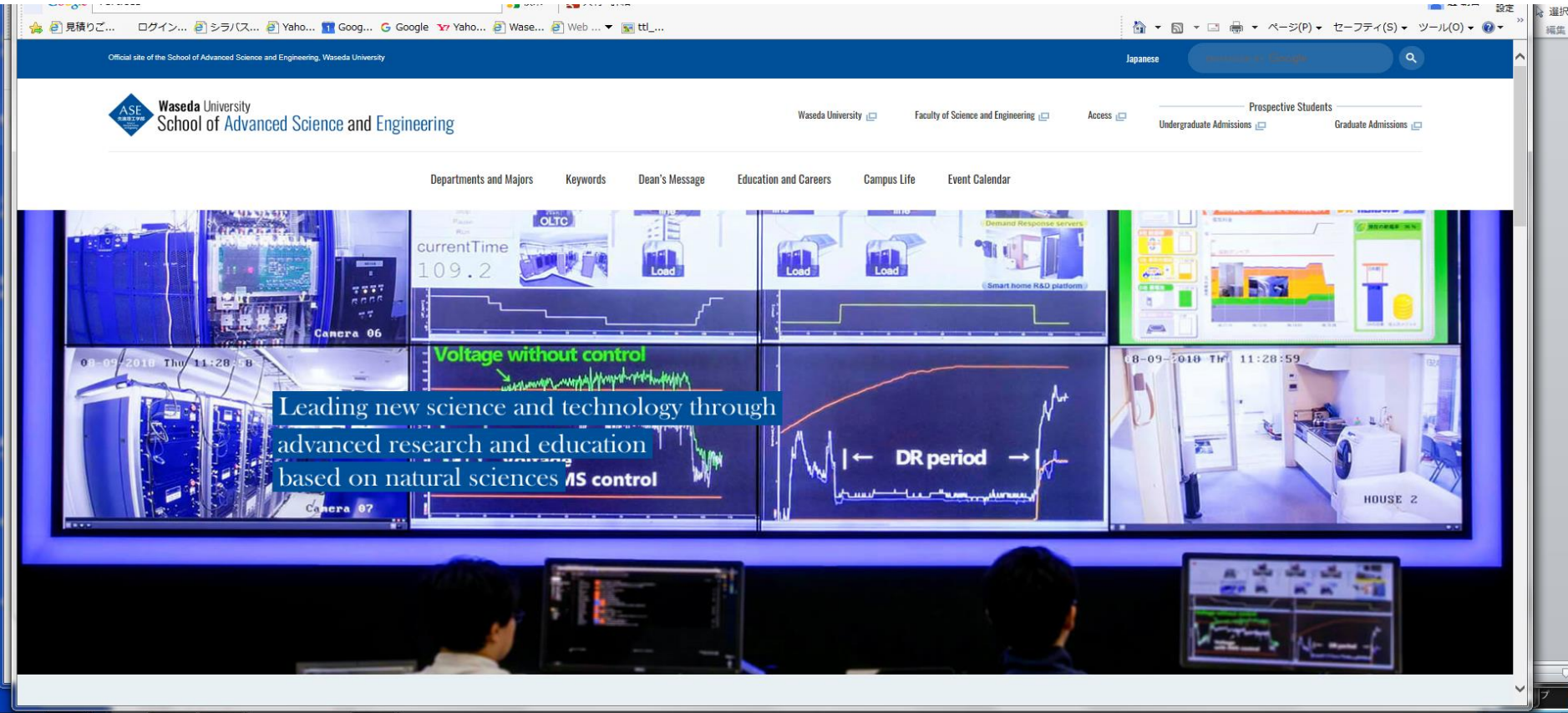
Having lived in many different countries, I was looking for a university where I can receive quality education with people from diverse background. Waseda University is an epitome of such university. As a Medical Bioscience major, I am able to study wide range of science and humanities courses with fellow Japanese and international students. When I am struggling with a certain class, students majoring in that subject helps me get through it. I feel so blessed to be a part of this community and am looking forward to four years in Waseda!



I entered Waseda university in 2012 and am currently studying neuroscience in the graduate school. The reason I decided to come to Waseda is because of its interdisciplinary education system, which allows students to combine different fields to study science. Also, the friendly atmosphere of the faculty members made it easier for us to communicate freely. In addition, the life science department has advanced research facilities and students will have many opportunities to learn different experimental techniques. They can even design their own research! I hope you will enjoy your future in Waseda!

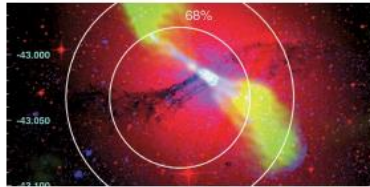
ASAHI, Toru	Bio Solid State Physics
CAMPBELL, Douglas S.	Neuroscience, Neuronal Remodeling, Cell Biology, Developmental Neurobiology
GODA, Nobuhito	Medical Biochemistry and Molecular Biology of Diseases
HAMADA, Michiaki	Bioinformatics, Computational Biology
HATTORI, Masahira	Genome and Metagenome Sciences, Bioinformatics
HOSOKAWA, Masahito	Biotechnology, Bioengineering, Microfluidic Device, Genomics
INOUE, Takafumi	Neurophysiology
INOUE, Masato	Probabilistic Information Processing
IWASAKI, Hideo	Biological Aesthetics/Art, Molecular Microbiology
KIGA, Daisuke	Synthetic Biology, Biochemistry
LI, Tianshu	Biomaterials, Nanomedicine, Cell Biology
OHSIMA, Toshio	Molecular Neuroscience
OKANO, Toshiyuki	Photobiology, Biochemistry
ORIHARA, Kanami	Immunology, Molecular Bioscience
SATO, Masamitsu	Molecular Cell Biology, Cytoskeletal Regulation
SHIBATA, Shigenobu	Pharmacology, Nutrients Science
SEMBA, Kentaro	Molecular Oncology
TAKEDA, Naoya	Biomaterials, Soft Interface, Tissue Engineering
TAKEOKA, Shinji	Science of Biomolecular Assembly, Engineering of Nanomedicine
TAKEYAMA, Haruko	Biomolecular Engineering and Biotechnology
TSUNEDA, Satoshi	Environmental Biotechnology
UYEDA, Taro	Molecular Biophysics
YANAGITANI, Takahiko	Biosensors, Ultrasonics

Web Site



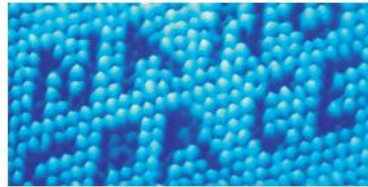
<https://www.ase.sci.waseda.ac.jp/english/>

Departments and Majors



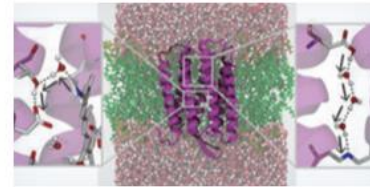
Department of Physics/
Department of Pure and Applied Physics, Graduate
School of Advanced Science and Engineering

"Unraveling natural phenomena ranging from elementary particles to universe to biology"



Department of Applied Physics/
Department of Pure and Applied Physics, Graduate
School of Advanced Science and Engineering

"Producing next-generation technologies and new physics"



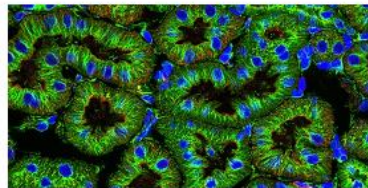
Department of Chemistry and Biochemistry/
Department of Chemistry and Biochemistry,
Graduate School of Advanced Science and
Engineering

"Studies on substances and energy from the view point of atoms and molecules"



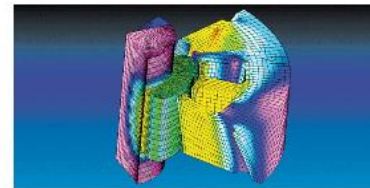
Department of Applied Chemistry/
Department of Applied Chemistry, Graduate School
of Advanced Science and Engineering

"Useful chemistry / Practical chemistry"



Department of Life Science and Medical Bioscience/
Department of Life Science and Medical Bioscience,
Graduate School of Advanced Science and
Engineering

"Turning out fresh talent and advancing the frontier of medicine and life science through collaboration among medicine, science and engineering"



Department of Electrical Engineering and
Bioscience/
Department of Electrical Engineering and
Bioscience, Graduate School of Advanced Science
and Engineering

"Enabling students to discover what they want to be"



Major in Physics →

Let's acquire a solid basis for flexible thinking!



Major in Chemistry →

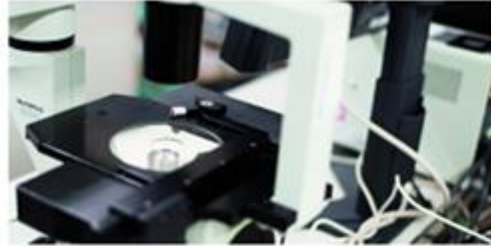
New chemistry opens a new world



Major in Bioscience →

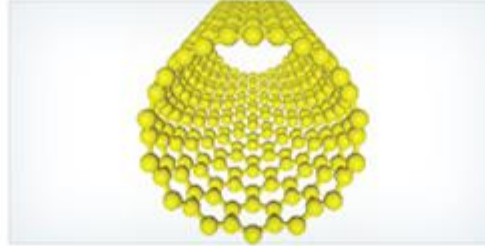
Bioscience unveils the "secrets" of life for its application to advanced medical practice

Interdisciplinary Departments



Department of Integrative Bioscience and Biomedical Engineering, Graduate School of Advanced Science and Engineering

"Moving into the future with cooperation between advanced biotechnology and advanced science and engineering"



Department of Nanoscience and Nanoengineering, Graduate School of Advanced Science and Engineering

"Developing new functions of photons, electrons, atoms and molecules to achieve a good quality of life"

5-Year Doctoral Program



Department of Advanced Science and Engineering

"We welcome Science and Engineering students who wish to become leaders on the international stage and we help them polish the skill set required to resolve global issues, which now involve a complicated web of physics, chemistry, life science, electricity and electronics."

Joint Departments



Cooperative Major in Advanced Biomedical Sciences, Graduate School of Advanced Science and Engineering

Waseda University-Tokyo Women's Medical University

"Achieving rapid clinical implementation of advanced medical equipment, newly developed drugs and regenerative medicine"



Cooperative Major in Advanced Health Science, Graduate School of Advanced Science and Engineering

Waseda University-Tokyo University of Agriculture and Technology

"Promoting education and research on health science in the fields of life science, environmental science and food science and developing human resources to contribute to society"



Cooperative Major in Nuclear Energy, Graduate School of Advanced Science and Engineering

Waseda University-Tokyo City University

"A new world created by advanced nuclear energy and radiation applications"

Nine Key Words



IT/System

Faculty →



Bio/Life Sciences

Faculty →



Environment

Faculty →



Electronics/Electricity/Electric Power

Faculty →



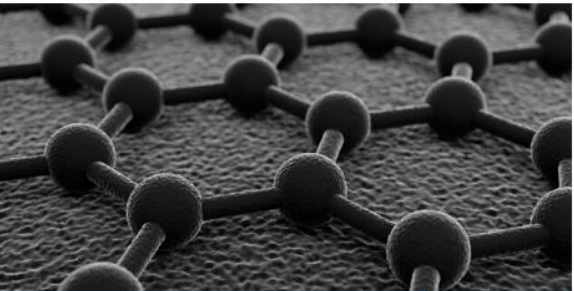
Medical/Biotechnology

Faculty →



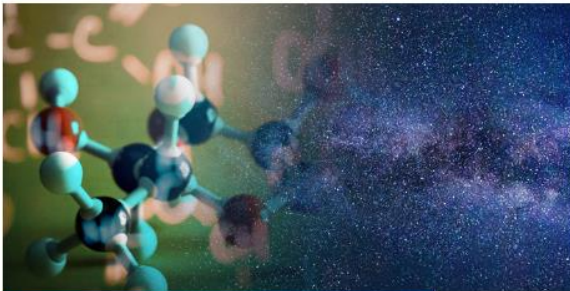
Energy

Faculty →



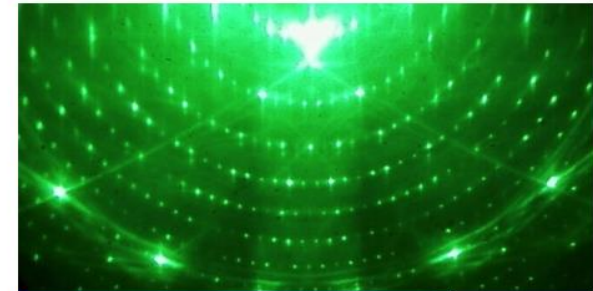
Nano

Faculty →



Basic Sciences

Faculty →



Material

Faculty →



Department of Physics,
4th year undergraduate student

LIAO Keng-Yi (Henry)

Investigating supergravity in a high-energy physics lab
A desire for challenge convinced LIAO Henry to come to Waseda to do cutting-edge research



Department of Chemistry and Biochemistry,
4th year undergraduate student

YAMASAKI Mone

Thriving in an international environment
Waseda offers a chance to do cutting-edge research into cell biology



Department of Life Science and Medical Bioscience,
3rd year undergraduate student

HEERA Matilda

Cutting-edge research in tissue engineering is yielding exciting applications
HEERA Matilda is helping to develop life-saving biomedical technologies



Department of Applied Physics,
4th year undergraduate student

LI Zi yuan

Unraveling the molecular mechanism of muscle contraction
LI Zi yuan engineers proteins to shed light on a basic natural process



Department of Applied Chemistry,
4th year undergraduate student

PATIL Neel

Paving the way for fuel cell cars
Producing hydrogen from ammonia could be the future of driving



Department of Electrical Engineering and Bioscience,
3rd year undergraduate student

HU Yuxin

Can you predict the future with information science?
HU Yuxin, a 3rd year undergraduate student, is doing pioneering research to find out

Map near the Nishi-waseda Campus

Map

