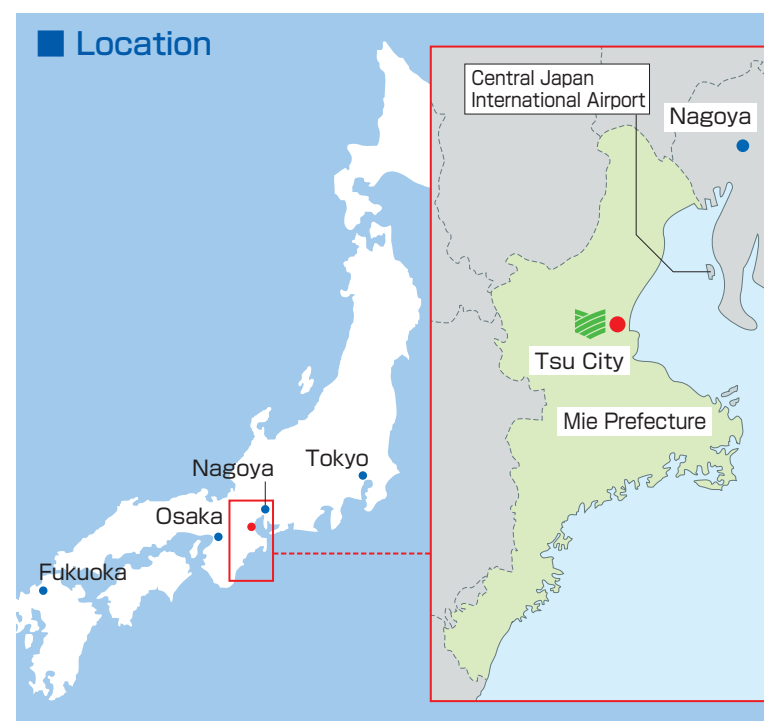
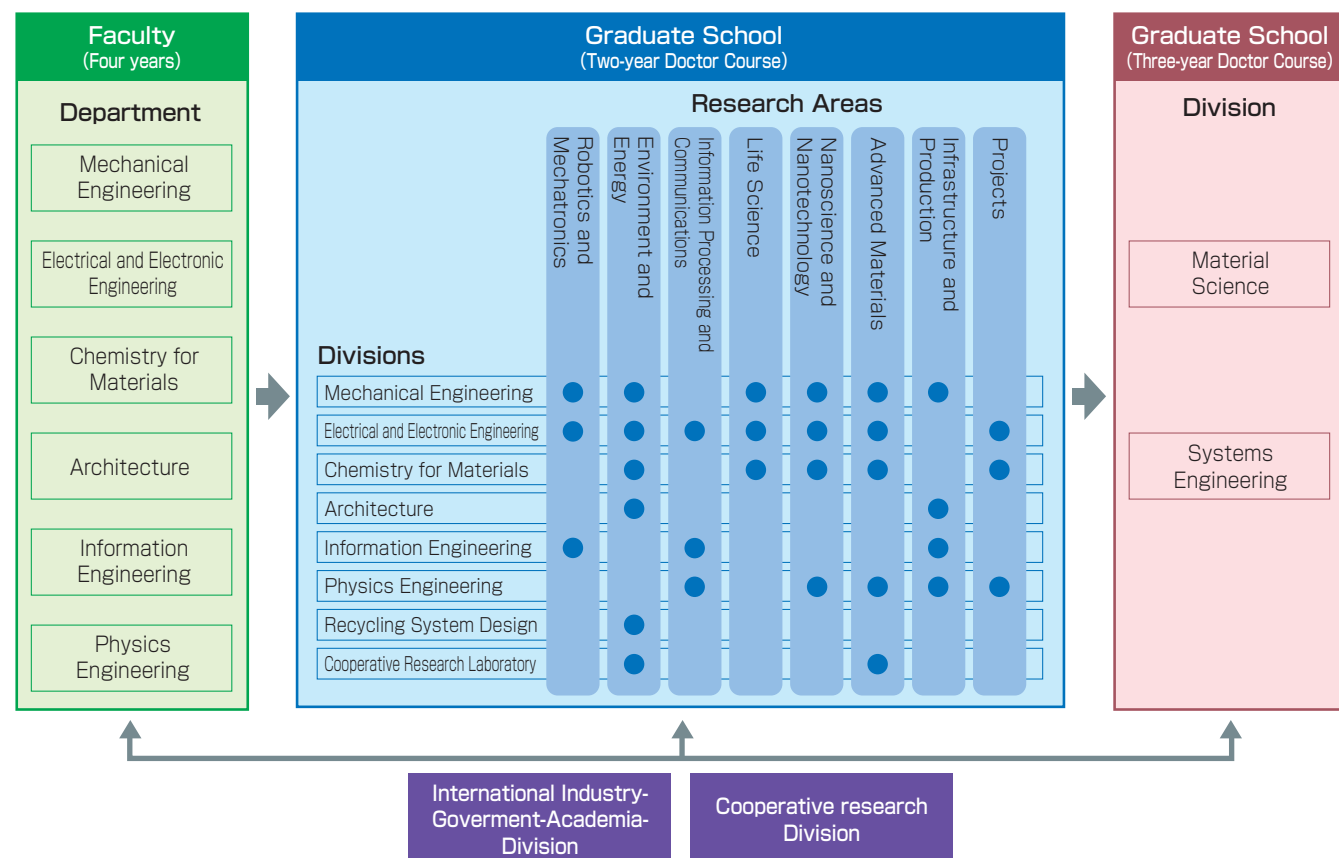


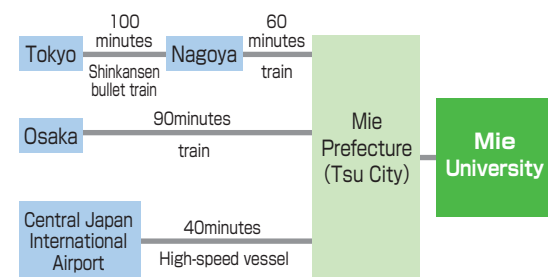
Flow of Engineering Education

Currently, the ratio of engineering students who go on to the graduate school has been increasing. Thus, university entrance examination with a view of the graduate school education has become more and more important. The special feature of education and research in the Faculty and Graduate School of Engineering of Mie University is to have established seven research areas in master course of graduate school. These research areas cover most of industrial fields to meet the request and demand from society, enabling the development of advanced professional engineers acquiring systematic knowledge and skills and capable of rapid and flexible response to each problem. Also, as a distinct attempt by the Division and Department of Engineering, the International Industry-Government-Academia Division and the Public Collaboration Research Division have been established for the advancement of internationalization and cooperation with society.



Access

Shortest required time from major cities



National University Corporation
Mie University
Graduate School of Engineering Team

1577 Kurimamachiyacho, Tsu-city, Mie Prefecture
514-8507
TEL 059 - 231 - 9469 FAX 059 - 231 - 9471
<http://www.eng.mie-u.ac.jp>

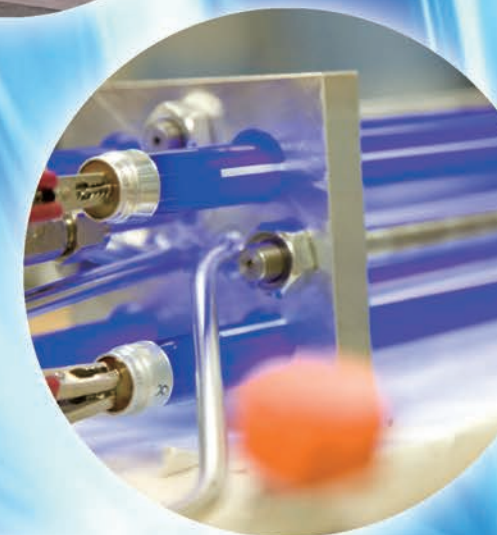
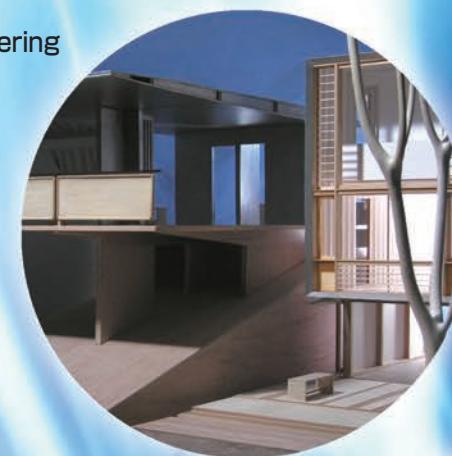
National University Corporation Mie University

Guide Book to Faculty of Engineering and Graduate School of Engineering

- Division and Department of Mechanical Engineering
- Division and Department of Electrical and Electronic Engineering
- Division and Department of Chemistry for Materials
- Division and Department of Architecture
- Division and Department of Information Engineering
- Division and Department of Physics Engineering
- Course of Graduate School/Project Laboratories

Annual Events

- 4 April**
 - Entrance Ceremony
 - Orientation for Incoming Freshman
 - Start of First Semester
- 5 May**
 - Anniversary of the Founding of the University
- 6 June**
 - Distribution of Admissions Office Guidelines
- 7 July**
 - National University of Tokai Regional Athletic Meet
 - First Semester Examination
- 8 August**
 - Open Campus
 - Schooling for Admissions Office
 - Summer Vacation
- 9 September**
 - Entrance Examination by Admissions Office (September)
- 10 October**
 - Start of Second Semester
 - Distribution of Entrance Examination Guidelines of Foreign International Student on Private Expense
- 11 November**
 - Distribution of Individual Achievement Test Guidelines
 - University Festival
- 12 December**
 - Schooling for Admissions Office
 - Acceptance for Application of Entrance Examination of Foreign International Student on Private Expense
 - National University of Tokai Regional Cultural Festival
 - Winter vacation
- 1 January**
 - National Center Test for University Admissions
 - Acceptance for Application of Individual Achievement Test
- 2 February**
 - Entrance Examination by Admissions Office (February)
 - Entrance Examination I
 - Second Semester Examination
- 3 March**
 - Entrance Examination II
 - Commencement Ceremony
 - Spring Vacation



Division and Department of Mechanical Engineering

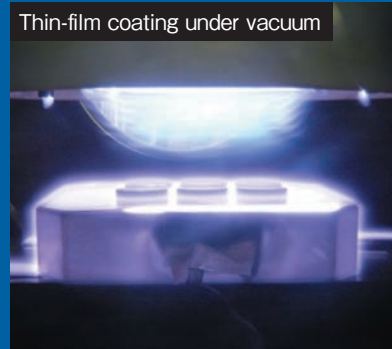
<http://www.mach.mie-u.ac.jp/>

Personal computer, mobile phone, automobile, and aircraft - various kinds of machines are contributing to convenient and rich modern human life. The Department of Mechanical Engineering is for creating these machines necessary for the development of industry, human livelihood, and science. It deals with a wide range of machinery and recently the development of intelligent robot and the mechanical approach to global environment issue have been drawing attentions. In this Department, we aim to teach a broad range of knowledge and technology from basics to students, and to foster creative human resources who can contribute to the harmonious development of human, environment and machinery.

Course of Quantum Engineering and Electro mechanics

Quantum Material Engineering

We study surface and interface properties of materials and nano processing, synthesis of DLC and c-BN thin films, non-equilibrium phenomena of fracture mechanics and solidification application of magnetic properties, non-equilibrium phase synthesis by ion implantation, theoretical calculation of material strength, design of wave algorithm for the application of optics and vibration, and crystal growth simulation by molecular dynamics.



Thin-film coating under vacuum

Mechatronics

We aim to develop robot control technology to realize human-machine coexistence, and create intelligent robot to contribute to the society. Particularly we focus on development of the human support robot in the field of life, medical service and welfare and the product-making robot available for precision work.



Upper limb motion-assist robot

System Design

We are doing a design of individually-customized device and a development of control method based on human property. Examples are the industrial power assist device to carry heavy loads in factory and the autonomous robot vehicle.



Robot vehicle



Industrial power assist device

Biological System Engineering

We are studying deformation and dynamic of materials (material mechanics). Deformation caused by force is a basis for creating a safe and new machine. And we are also drawing much attention from medical field as a study capable of dealing with the motion of human body and organ.



Testing machine for environmental-controlling composite load dynamics

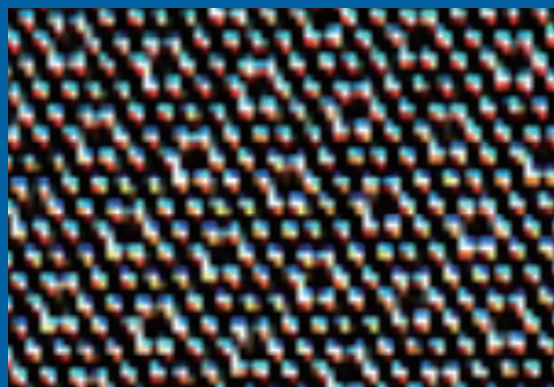
Course of Advanced Materials and Processing

Materials and Processing Engineering

We are making research on joining and cutting for machinery manufacturing by using the devices, such as high-frequency induction heating apparatus which can simulate weld thermal cycles, high-power CO₂ laser and resistance welder which are applied to the assembly of automobile body.



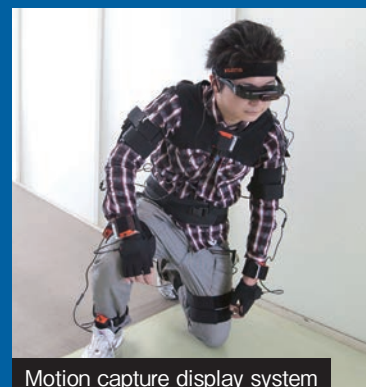
Precision cut of steel plate by laser



High-resolution TEM image of a fullerene-based compound

Integrated Processing System

We study high functional processing system in the fields of manufacturing and material development. It is aimed that environmental-friendly methods are improved and established in metal machining process. New carbon materials are paid attention because of their small environment burden.



Motion capture display system

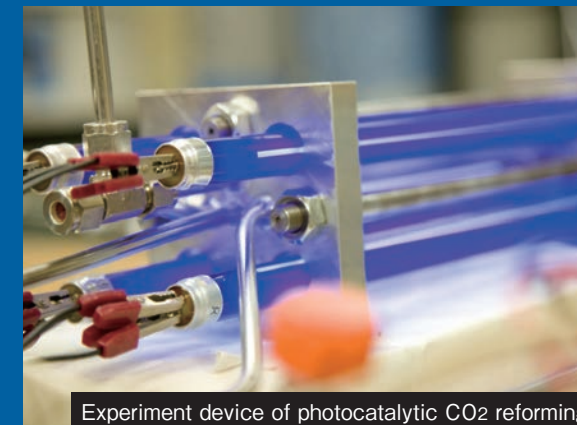
Process Analysis

We are studying intelligent systems such as the sensing, the pattern recognition, the human interface device, and the human function alternative device. The photographs show the goggle-style stereoscopic display and a man wearing the motion capture suit.

Course of Environmental Energetics

Fluid Engineering Laboratory for Energy and Environment

We are studying the flow of various materials including air and water. We are also doing research and development of the fluid machinery relating renewable energy such as eco-friendly wind-power generation and micro-hydropower generation.



Experiment device of photocatalytic CO₂ reforming



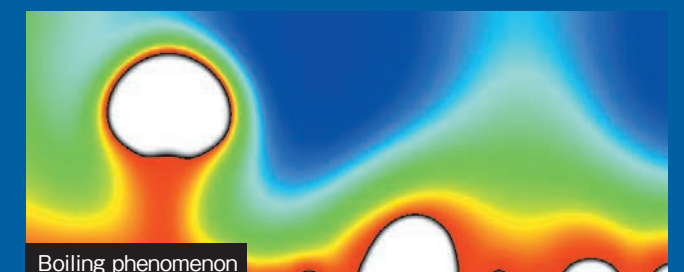
100kW Wind Turbine

Design of Energy System

Photograph on the left shows the experiment device of photocatalytic CO₂ reforming for generating the fuel (CO, CH₄, etc.) from CO₂, the main cause of global warming. The progress of this research may lead to the formulation of carbon cycle which could be one of the solutions for global warming.

Fluid and Thermo Engineering

To improve the performance of energy and environmental applications, we are conducting the analysis of complex flow phenomena, such as turbulence, multiphase flow, phase change, and fluid-structure interaction, while we are developing both numerical simulation methods and flow-control scheme.



Boiling phenomenon

Division and Department of Electrical and Electronic Engineering

<http://www.elec.mie-u.ac.jp/>

Electrical and electronic engineering is an academic field to pursue how to utilize electricity both as electric energy and as medium of communication and information processing. It covers a wide range of technologies such as effective generation, conveyance and transformation of electric energy, advanced communication and information processing, and the electronic material including semiconductor and superconductor for supporting the above-mentioned technologies. This academic field is a basis of various intellectual activities. Students in this division can also learn advanced IT technologies and communication skill required from the information and internationalized society. We aim to develop such human resources that master practical science to apply to various industries and can contribute to the society.

Course of Electrical System Engineering

Electrical System

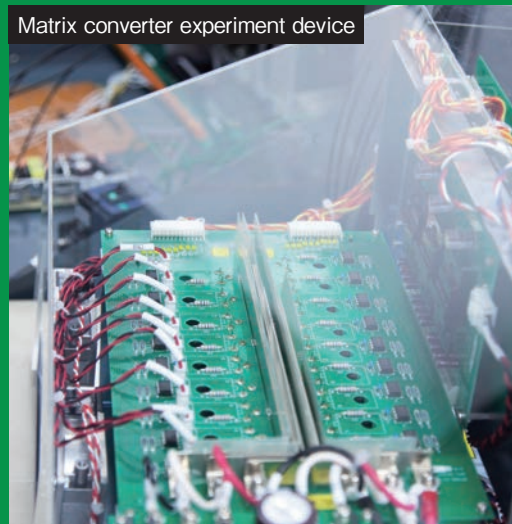
Research and development for realization of high-performance motion control and next-generation robot by applying power electronics and actuator technologies is conducted. Photograph shows the device to demonstrate the research outcome on how robot hand manipulates its fingers to hold a thing (to determine the finger position for a stable grip and maneuverable operation).



Robot hand

Control System

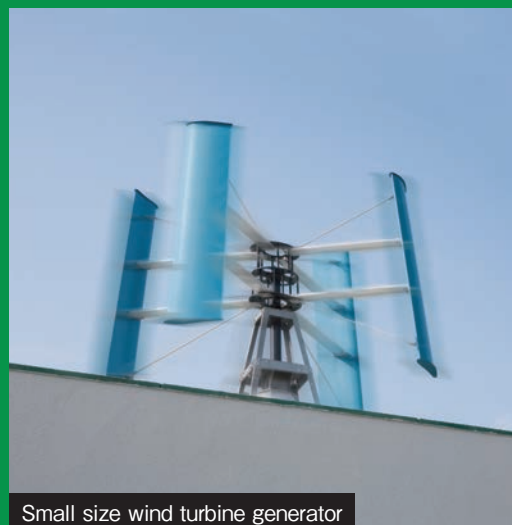
We are doing research and development on application of the latest control theory to power conversion and motor control technology. These are the basic technology for electric vehicle and power generation by natural energy. Photograph shows the circuit of verification test on the frequency conversion device (matrix converter) which can put out fixed voltage and fixed frequency from alternating current of variable voltage and variable frequency.



Matrix converter experiment device

Energy System

In this research field, the study to prevent global warming and to reduce greenhouse gas is being made through the high output and high-efficiency of power generation system utilizing the natural energy generated from wind turbine (shown in the photo) and solar battery, and the development of electric power conversion system for a stable power supply to the power line.



Small size wind turbine generator

Course of Electrical Material Science and Technology

Opto-electronics

Aiming at the next-generation high-tech semiconductor device enabling energy-efficient, environmentally-resistant, high-speed processing, and highly-efficient light generation, we are putting a focus on the leading-edge material of nitride semiconductor, and making research on its crystal growth, characterization, and device application. Also, research on light control technology and application to LED lighting is being conducted.



Clean room

Organic Electronics

Various plastic materials are used in machines such as electric generator or electric vehicle depending on their functions. Organic Electronics laboratory is developing the high-temperature and high-voltage resistant material, the thermally-conducting material allowing no current to pass, and the vibration-resistant material.



Lightning in a polymer

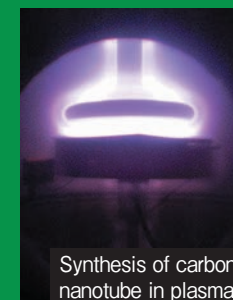
Quantum Electronics

We are doing the local analysis of high resolution, the development of high-intensity charged particle (electron, ion) radiation resource for the probe of microfabrication technology, and the research on related physical phenomenon. In addition, we are

developing novel processes for synthesizing nanocarbon materials such as carbon nanotubes and graphene for application in electronics.



1D/3D atom probe

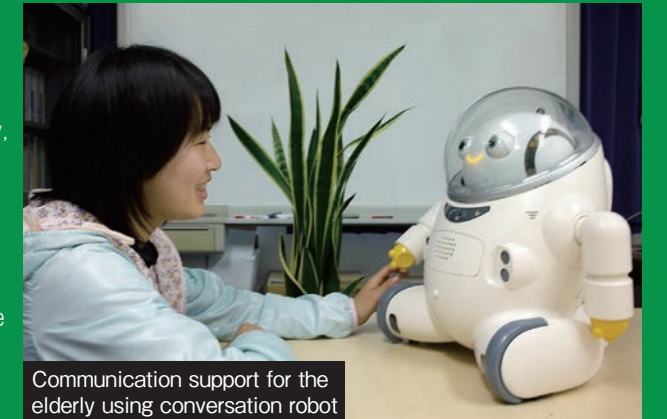


Synthesis of carbon nanotube in plasma

Course of Information and Communication Systems

Information Processing

Understanding and utilization of information media by computer is our research area. For example, we are considering some new algorithms on the image understanding, document analysis, neural network, data-mining strategy, natural language understanding for next-generation e-learning system, medical computer aided system, mobile robot, and electronic medical record system.



Communication support for the elderly using conversation robot

Communication Engineering

We are working on a wide range of research all related to wireless communications systems. Our interested research fields include high efficient modulation / demodulation techniques, multiple access techniques and network control techniques for realizing the next generation wireless LAN, terrestrial mobile phone, fixed and mobile satellite communication, television broadcasting and intelligent transport systems (ITS).



Wireless LAN module to be used to prove research outcome

Computer Engineering

We are conducting research and development on the key technologies of ICT (Information and Communication Technology) and their application systems, such as the system design technique for information networks including computer network and the learning and education system to support programming exercise and design exercise of software/hardware.



Programming Practice System

Division and Department of Chemistry for Materials

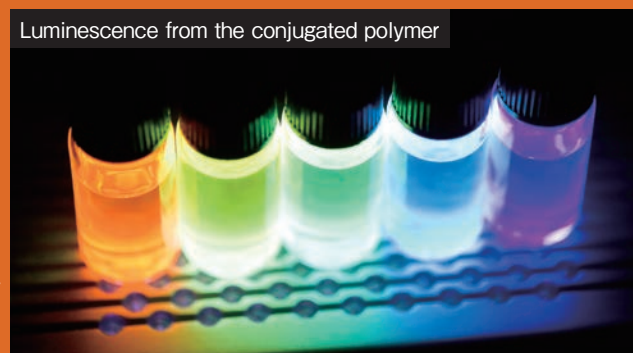
<http://www.chem.mie-u.ac.jp>

Chemistry for Materials is a study field exploring science and technology from the viewpoint of chemistry. Concretely, we develop novel substances or materials with new functions that could help to enrich our social lives. These new substances and materials would lead to construct new functional systems. For example, as for the energy problems, development of new technologies in chemical energy conversion or energy conservation is being required. Also as for global environmental problems, we attempt to develop technologies and measurement methods from the chemical point of view. Moreover, we are also expected to contribute to medical area and others by making the best use of new chemical synthesis methods and biotechnology.

Course of Molecular Design

Polymer Chemistry

Research on the development of high performance organic polymer materials (proton-conducting membranes for fuel cells, ion conductive solid polymer electrolyte materials for lithium cells, soft materials, contact lens materials, Organic-Inorganic Hybrid Optical Materials, etc.) are conducted.



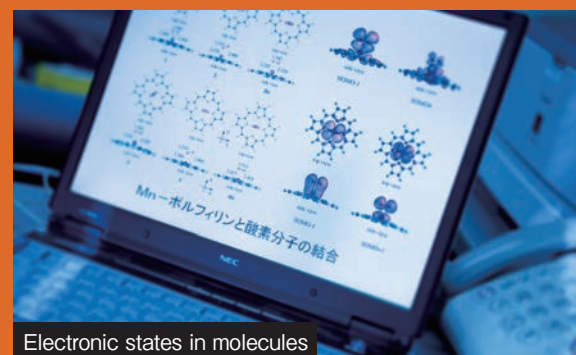
Organic Functional Chemistry for Materials

Our research aims to create organic materials that have electronically, magnetically, and optically useful features. We are working on the syntheses of new organic molecules designed based on the theory and on the evaluation of their physical properties/reactivity by the advanced instrumental analysis.



Fine Organic Synthesis

Modern life is made based on various organic compounds such as functional materials or medicines. We are studying "organic manufacturing," in other words, efficient organic synthesis, aiming the development of environmentally benign organic synthesis process to compound human-friendly fine chemicals, new bioactive compounds, and functional materials.



Theoretical Study on Chemical Reaction

We make a prediction by simulating physical properties and chemical reactions of compounds by the quantum chemical calculation. Mainly focusing on metalloenzymes that have two or more cores, theoretical investigation of their catalytic mechanism (reaction mechanism) and theoretical research of ion selectivity of ion channel are conducted.

Course of Biological and Functional Chemistry



Energy Conversion Chemistry

Energy Conversion Chemistry Laboratory researches into lithium battery and fuel cell development. These researches are based on inorganic solid state chemistry including materials synthesis, structural analysis and physical property measurements. Our major goal is to propose new functional materials to facilitate development of energy storage and conversion systems for automotive applications.



Analytical & Environmental Chemistry

We are researching on the technology for a sustainable society. Technologies for reducing environmental impacts such as the techniques to measure the environmental pollutant, to purify water, to transform carbon dioxide gas (CO₂), to generate hydrogen and so on are mainly being developed.

Laser Photochemistry

We are working on the growth and application of nanocarbon materials and related composites including metals, which are important substances/materials for nanotechnology to support our future society, with the high-tech use of energies such as laser, plasma and heat.



Molecular Bioengineering

Based on molecular bioengineering, cell and gene biotechnology, and biochemistry, we are mainly developing new technologies for the next generation of monoclonal antibody and the construction of artificial cell model. Extensive life science research from basic to application focusing on biotechnology is carried out.



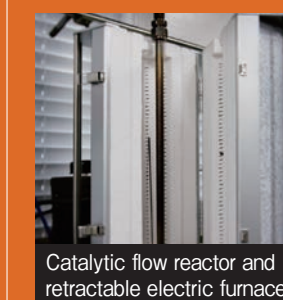
Course of Materials Science

Organic Materials Science

Structure and physical property including design and application as new functional materials are being studied for a complex system composed of different kinds of materials utilizing self-assembled and interfacial properties of soft matters such as polymers, surfactants, and colloids.



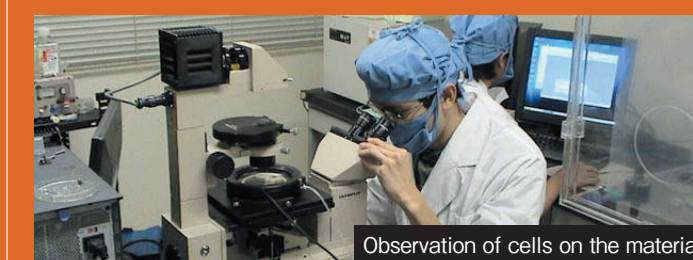
Inorganic Materials Science



We are developing a research on chemistry with good use of inorganic materials. Specifically, research of manufacture and reactivity of each solid catalyst such as petroleum refining catalyst or environmental catalyst, manufacture of new inorganic-organic hybrid materials or eco-glass, elucidation of nonlinear optical effect of glass are conducted.

Biomaterial Science

We are researching on the mechanism of regeneration/restoration of biological tissue by using the analysis of the combination of images of cells or tissues and molecular information. Moreover, based on the knowledge we have obtained, the development of artificial structures imitating biomembrane/blood vessel, the research of inter-organizational material transmission and the development of regenerative medical materials/bio-artificial organs that induce the tissue regeneration are conducted.



Division and Department of Architecture

<http://www.arch.mie-u.ac.jp/>

Architecture is a study exploring design, building, management, and history of architecture. Artistic capabilities are necessary to study it even it is in the field of engineering. Today, holistic perspective is needed for the architecture because buildings should be suitable for today's advanced lifestyle and culture and to meet sophisticated technology to protect lives and properties against natural disasters. This department is aiming to bring up creative human resources who can capture the change of society dynamically and act from wide and comprehensive viewpoint.

Course of Architectural Design

(Architectural Design and Regional Design / Architectural Environment and Equipment Design / Structural Design)

●Field of Architectural Planning

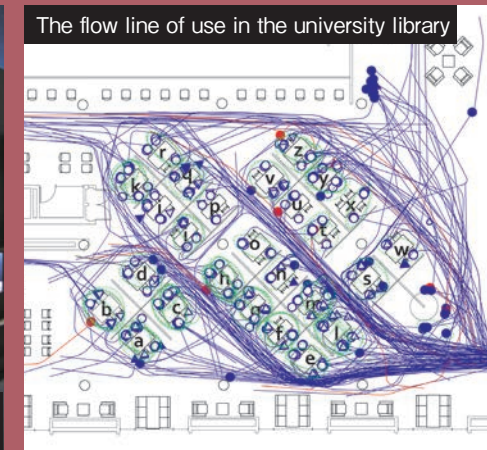
Various researches on architectural planning and design are conducted, such as the researches on functions and management methods of a large variety of buildings, planning of cities or regions and their landscape preservation, history and culture of buildings we have inherited, and the method of consideration when plotting architectural form.



Design review for the student's work



Development of new architectural modeling using thin steel sheets



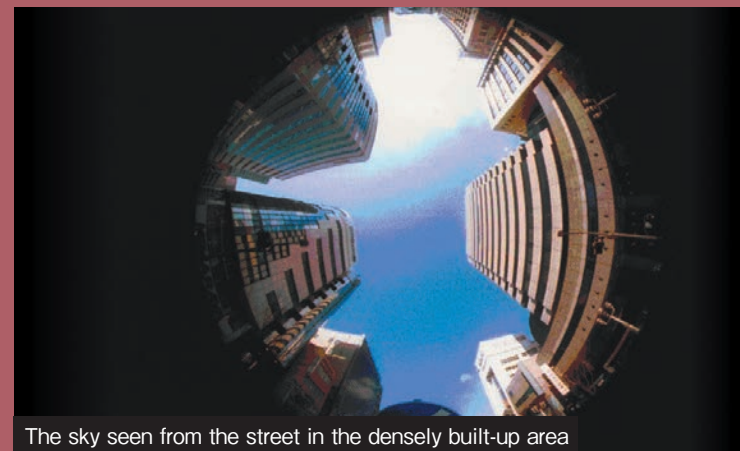
The flow line of use in the university library



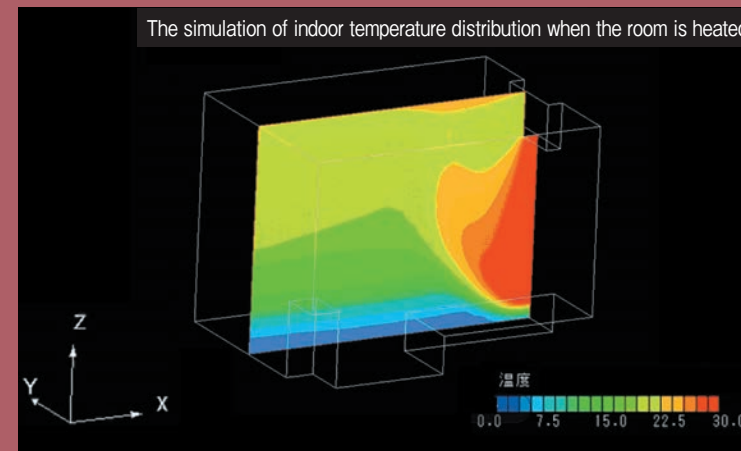
Workshop to elaborate an idea of town development

●Field of Architectural Environment and Equipment

In the Course of Architectural Environment and Equipment Design, researches on the optimum control of the heat / air / sound / light environment of not only inside the architectural structure but also surrounding of the structure to materialize more desirable environment for human and architectural space, and global environment are conducted.



The sky seen from the street in the densely built-up area



The simulation of indoor temperature distribution when the room is heated



Thermal conduction measurement of the porous building material

●Field of Architectural Structure

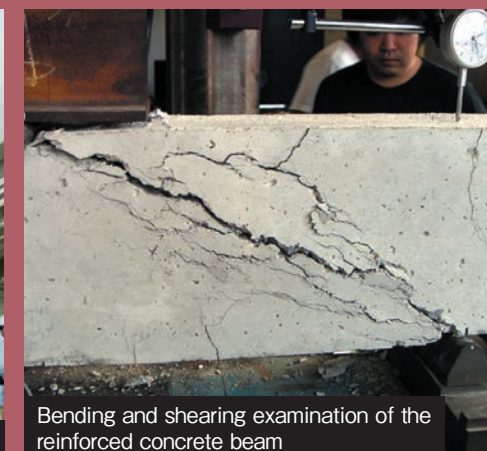
We take charge of the education about the structural design method of buildings, evaluation of quality and durability of building materials, and construction technology. Our research themes are about the seismic performances and the material properties of the structure of steel, reinforced concrete and wood, or about the regional disaster prevention against natural disasters such as earthquake and so on.



A workshop to improve the disaster prevention ability



The equipment for 1MN-large-scale structure tests



Bending and shearing examination of the reinforced concrete beam



Investigation for earthquake resistance of the world heritage: the Parthenon

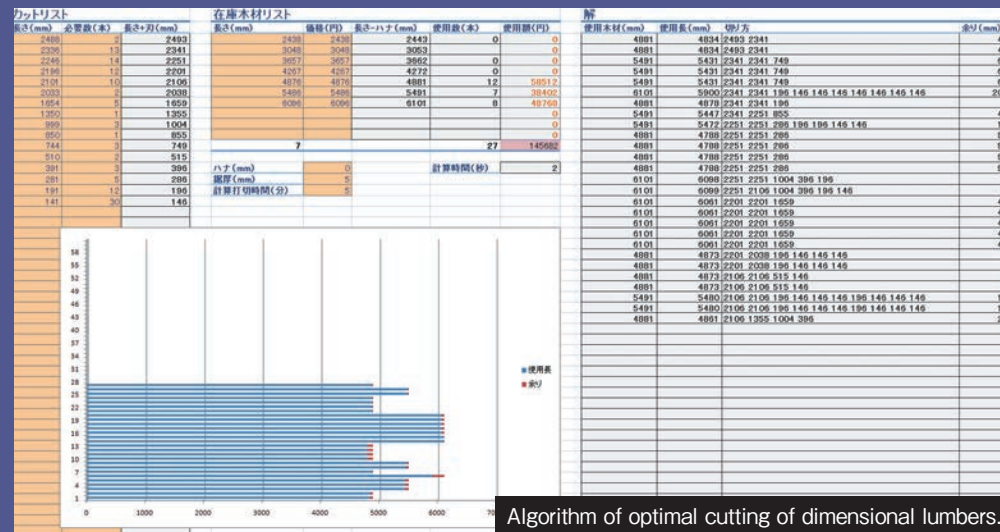
Division and Department of Information Engineering

<http://www.info.mie-u.ac.jp/>

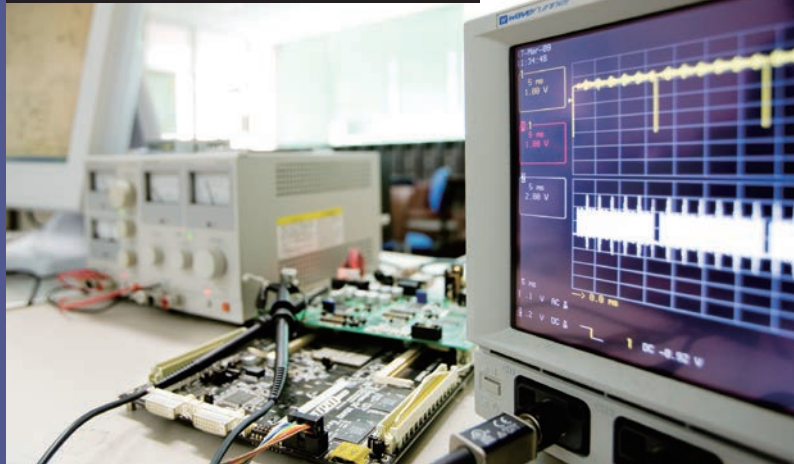
Computer Science Course

Computer Software

In this field, the research of computer software is carried out from the both aspects of its theory and practice. With the theoretical aspect, researches on verification of correctness of software and computation model are carried out. With the practical aspect, researches on design and implementation of parallel programming languages for high-performance computing are carried out.



FPGA parallel processing board equipped with a noise restoration circuit



Computer Architecture

For design and implementation of a large scale distributed parallel processing system, ultra low power processors for mobile devices, UHDTV Codec LSI, such researches as parallel programming environment, low power VLSI architecture, and high efficiency coding hardware are carried out in this field.

Prototype VLSI chip of a low power CPU



Computer Network

In this field, based on network technology and image processing technology, researches on their application are carried out. Especially, researches on overlay/ad hoc networks, security, medical image diagnosis support, and robotic vision image processing take a leading part.

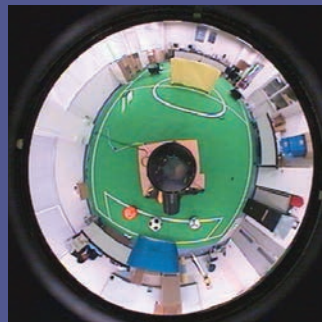
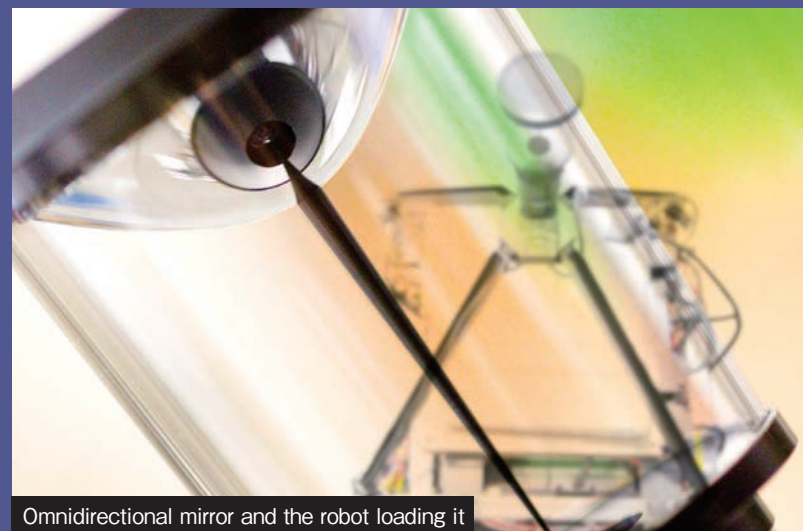


Image of omnidirectional camera



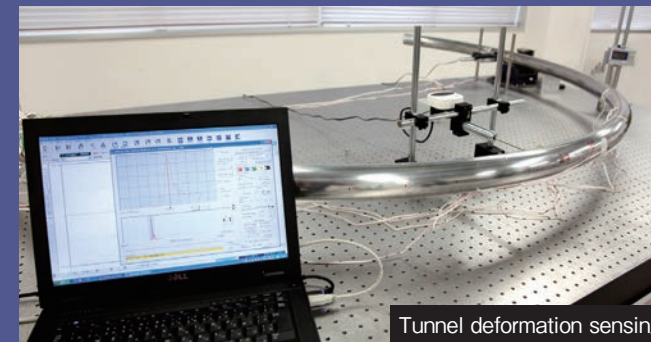
Omnidirectional mirror and the robot loading it

Information is essential to modern life and key of success for almost all companies. Information engineering is the study of engineering techniques and systems to deal with information, and is expected for further development. Specifically, it includes information process such as occurrence/transmission/conversion/output of information, and diverse fields of computer architecture and software for their actual use. In this department, it enables student to comprehend Information Engineering fully and to view it with a wider perspective, from basic information technologies for studying computer to advanced information technologies, even to application to various problems. Advanced and attractive researches are being conducted.

Intelligent Computing Course

Pattern Analysis

As a contribution to a safer living environment, we have been researching sensing systems that employ optical fibers as a sensor, and developing monitoring systems in which they are applied. Analysis of the light spectrum from the optical fiber sensor provides information on the strain and deformation of structures. Further, through the researches on audio signal processing such as spatial audio, sound image control, and sound analysis of musical instrument, we aim to realize highly realistic communication system.



Tunnel deformation sensing



Analysis of instrument signal



Virtual reality system

Human Informatics

Human Information Science concerning visual/vestibular sensation and perception is studied mainly focusing on motion/ cyber sickness. Sickness-free 3D driving simulator and movie-showing methods at sea are being developed. Moreover, research on natural language processing such as computer aided language learning system for ESL is carried out.



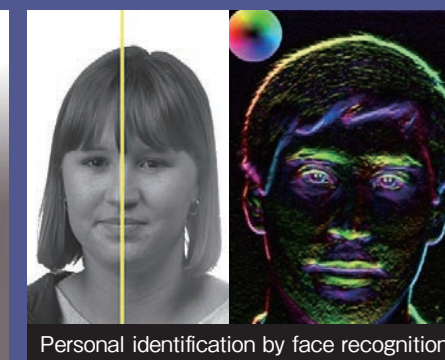
Device for Coriolis Stimulus

Human Interface

Human-interface laboratory involves pattern recognition and its application. Examples of our research contributions are on an address and place name recognition for mail sorting machine and license plate recognition for a vehicle, and the research on personal identification based on a signature and face recognition. The researches on quantitative evaluation of the performance of human heart by computer processing using ultrasonic imaging device and MRI are also involved. These are applicable for early detection of a heart disease.



Mail sorting machine which recognizes an address



Personal identification by face recognition



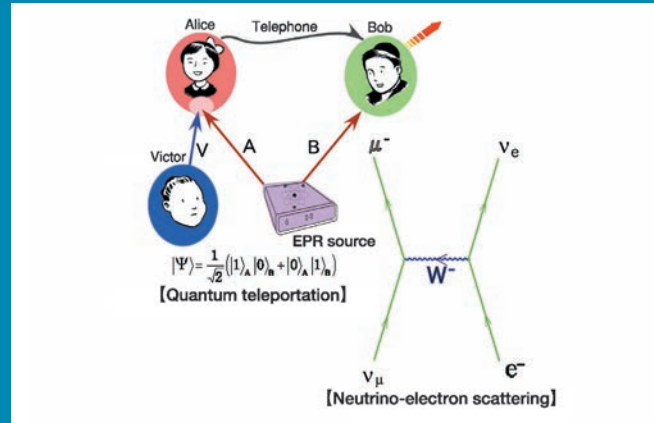
Ultrasonic diagnostic equipment and the human heart

Nanotechnology which is the technology to produce the nanometer-sized materials and parts has been attracting attentions as a key technology for the 21st century. Nanotechnology has been expected to contribute to advancement of science and technology, and to solve the various problems such as global environment, energy and medical care. Our department has an education and research system which combines physics, mechanical engineering and electric engineering tightly connected with nanotechnology. Thus our students are educated to become competent engineers and research workers having comprehension of physics and mastering mechanical and electric engineering at the same time.

Course of Quantum Mechanical Engineering

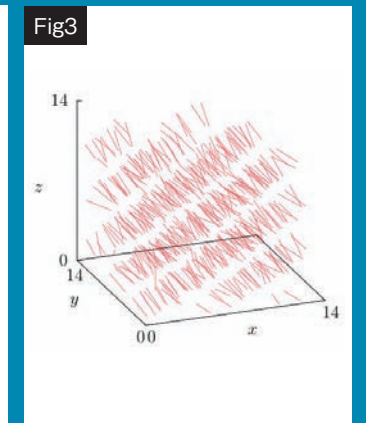
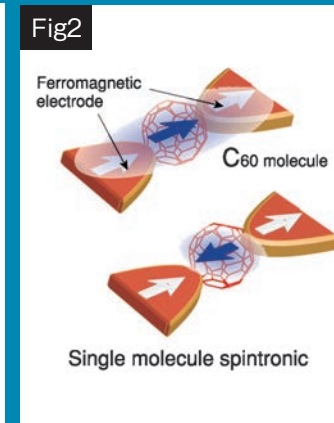
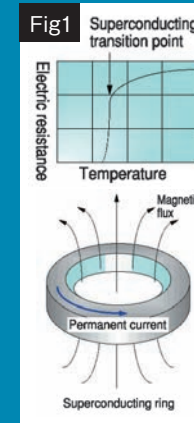
Quantum Physics

The research activities are performed on fundamental problems of quantum theory, high energy physics, nonequilibrium statistical mechanics, and complex systems. Quantum thermodynamics is also one of the main subjects in connection with nanoscience.

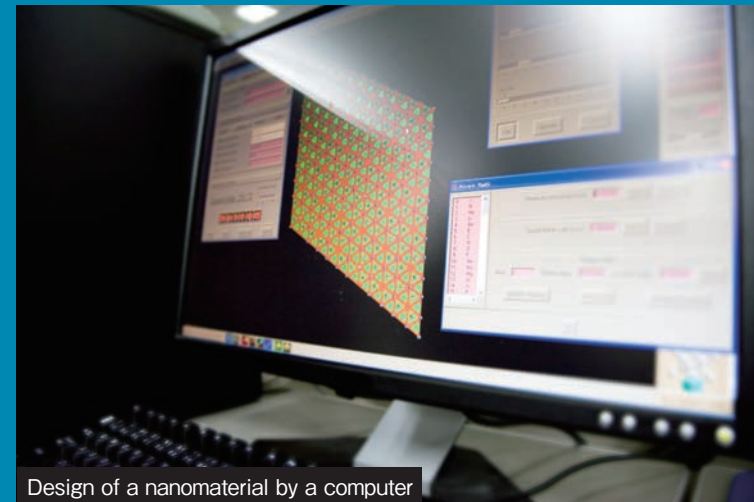


Condensed Matter Physics

In this field, the research on electronic state of metals such as superconductivity, phase transitions of liquid crystals and physics of nanostructures are carried out. Fig1 shows temperature dependence of electrical resistance observed in typical superconductors and persistent current flowing in the superconducting ring. Fig2 is a schematic picture of a single-molecule spintronic device. Fig3 shows the smectic A phase of rod-like liquid crystal molecules obtained by computer simulation.

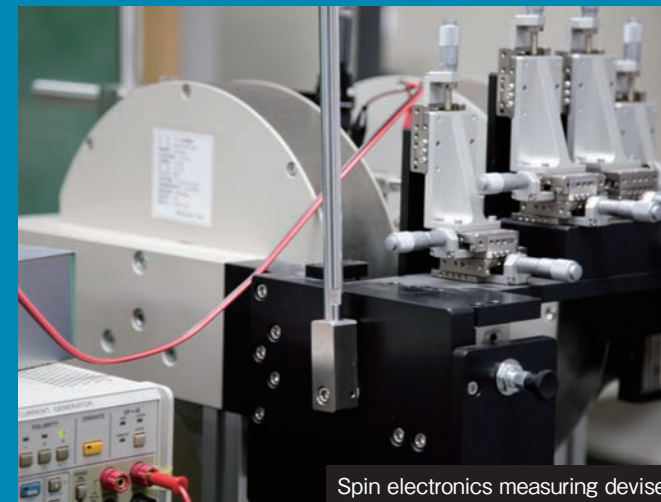


Course of Nanotechnology



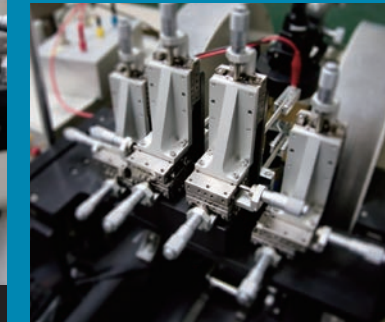
Nano-design

Among science and technology in the 21st century, nanotechnology raises high expectations. Nano-design laboratory develops a leading edge nano-simulation technique in terms of computational materials science, and leads the nanotechnology research in cooperation with domestic and overseas research institutes.



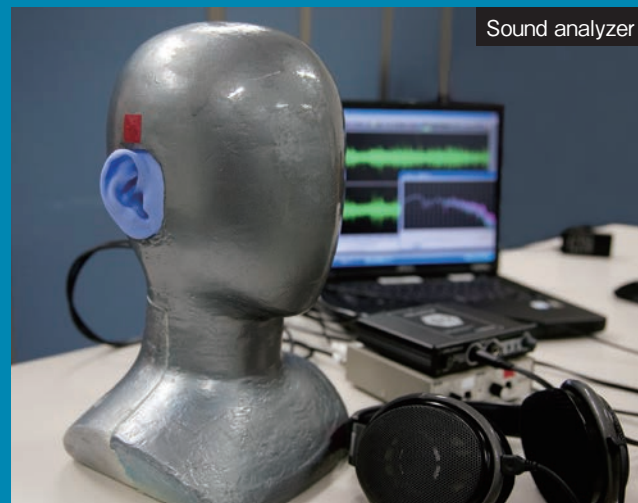
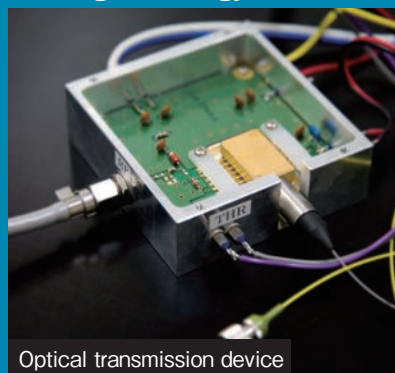
Nano-electronics

The research on the resource-and-energy-efficient information recording is carried out in this field. Main subjects include the magnetic recording which records one bit in the nanometer size and the new electronics using a spin, which is a unique nature of electron.



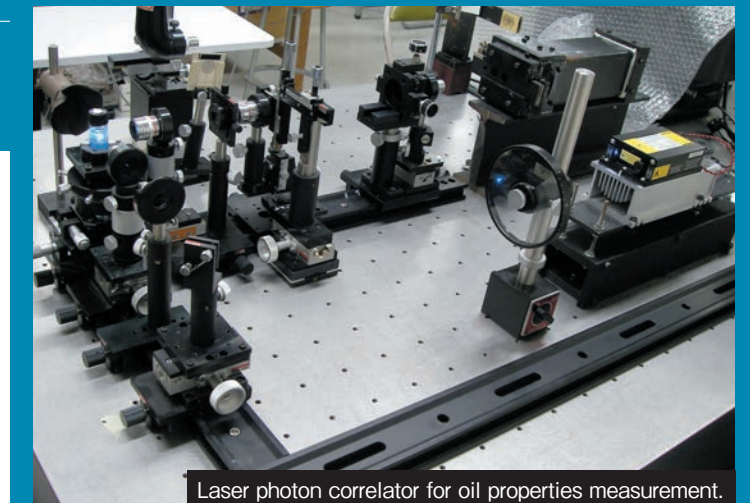
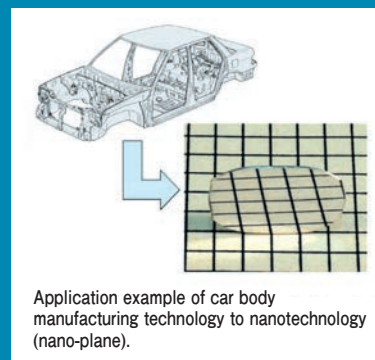
Nano-sensing

In this field, researches on various measurement techniques using a wave motion of sound and light (electromagnetic wave) and relevant signal processing technology are carried out. Examples of concrete subjects of research are measurement/analytic technology of biological weak signal, and fine measurement technology using optical fiber. Not only nano scale, extensive measurement researches are being advanced in cooperation with companies.



Nano-processing

The researches on bio/nano-processing, and high pressure properties of newly developed power transmission oil as a nano-scale molecular machine are carried out in this field. (Research facilities: Atomic force microscope, universal testing machine, electron microscope, photon correlator of oil and ultrahigh-pressure properties measuring device etc.)



Course of Graduate School

Division of Recycling System Design

We human beings have consumed various resources and energy such as fossil fuel since the Industrial Revolution and therefore it has been concerned that they might be depleted. Also, mass production and consumption activities have rapidly expanded environmental pollution and destruction and caused serious human and material damages one after another.

Under such situation, these days, it is urgently needed to research on effective utilization of resources and energy and to construct technologies for saving energy, recycling, and environmental conservation.

This course provides education and research on effective utilization of resources and energy, and on the recycling-oriented system related to saving energy, recycling, and environmental conservation. Specifically, we aim at the education and research on environmental thermal fluid engineering, flow / heat transfer control, and durability / recycle of structures.

Moreover, this course also aims at social contribution as the course of education and research for working adults to brush up their skills (or upgrade their career).

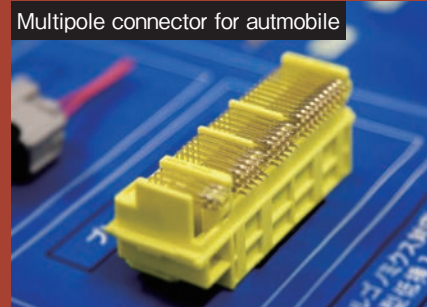
Project Laboratories

Laboratory of Vehicle Network Technology

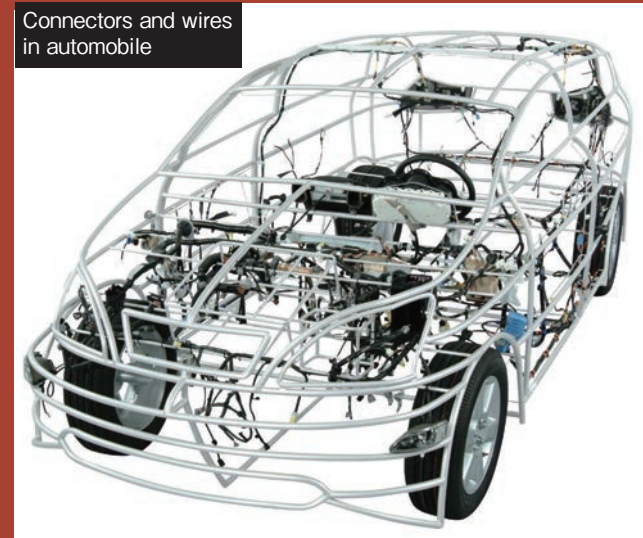
A connector is one of the indispensable parts of electrical and electronic equipments. As the connectors mounted on automobiles are in severe usage

environments, we are attempting to realize the highly reliable connectors by working on the basic research on conduction and insulation.

Multipole connector for automobile



Connectors and wires in automobile



Eco-Products Laboratory

Mie University and Fuji Electric Retail Systems Co., Ltd. are jointly researching on energy-saving, automation, control, function and safety especially for vending machine

development. We are developing the technology for saving energy by measuring energy consumption of vending machines under the field test.



Meteorological observatory equipment



Field test of vending machines

Facilities for Education and Research

Cooperation Research Center

The center is founded in the aim of promoting high-level science and technology and contributing to the development of regional industry. These developments are carried out through cooperative research or delegated research by the university together with enterprises, local governments or public research and development institutes and through technological assistance and technological consultation.



Industrial Technology Innovations Institute

This institute advances innovative and internationally-evaluated research and development, centering on cooperative research with enterprises.

We aim at the creation of new industrial field through the university-industry cooperation along with the human resource development of young and competent researchers.



Creative Research and Development Institute

●Instrumental Analysis Facilities

We have large-sized and newly produced analytical instruments to measure physical properties and chemical properties of substances and materials. All staff and students have useful and adequate access to the facilities.

Life Science Research Center

●Ultrastructural Research Facilities

The facilities are for the most advanced researches or experiments such as experiments of genetic modification. Division of Chemistry for Materials in Faculty of Engineering uses the facilities to conduct their researches related to genetic engineering.

●Electron Microscope Facilities

The facilities contribute to develop the medical, biological, and engineering researches, equipped with transmission electron microscopes, and scanning electron microscopes.

Department of Engineering uses the highly efficient facilities to observe the microstructure of semiconductors, metals and glass.



Center for Information Technologies and Networks

This is a center of the campus network of Mie University. All students can access the mail server operated by the center and also upload their own homepages. It is used for web search and report writing.



Environmental Preservation Center

Appropriate administration of all of the waste matters in the university is conducted in this center. Processing units for waste liquid detoxify the harmful waste liquid and prevent environmental pollutant from flowing out. What is more, we carry out the researches about energy and resource saving and waste recycling, and attempt to make the university a model area for reducing environmental loading.

Auditorium (Sansui Hall)

The auditorium includes the main hall with 1,650 seats, the small hall with 300 seats, and a stage of 20-meter open width. School ceremonies and events, as well as national conferences and lecture meetings are held in it.



University Library

The library supports the study of students living in an advanced information-oriented society. A reference room, a collaborative learning room, an audiovisual room and the most advanced high technological equipments are provided. It can be used as an extension of a classroom since it is opened from 8:45 to as late as 21:45 on weekdays.

