

SCIENCE AND ENGINEERING

ACADEMIC STAFFS AND THEIR RESEARCH INTERESTS AND MAJOR FIELDS

Academic Staffs	Major Teaching and Research Fields
<i>Course in Electronics and Information Systems</i>	
Chair of Mathematical Science	
Pure and Applied Mathematics	
T. Ichikawa	Advanced Arithmetic Geometry
N. Nakagawa	Complex Geometry
N. Terai	Topic on Combinatorial Algebra
Y. Mashiko	Advanced Global geometry
T. Shoda	Advanced Complex Geometry
Mathematical Analysis	
R. Kajikiya	Advanced Study of Partial Differential Equations
K. Handa	Advanced Probability
Y. Hibino	Advanced Applied Mathematical Analysis
Chair of Information Science	
Information Science	
Y. Okazaki	Advanced Intelligent Educational Systems
H. Okumura	Advanced Information Processing Systems for Human and Machine Perception
S. Matsumae	Advanced Parallel and Distributed Systems
K. Nakayama	Advanced Emergent System
M. Otani	Advanced Technology in Ubiquitous Computing
Information Systems	
Y. Yamashita	Code Optimization Techniques
S. Tadaki	Complex Systems
E. Hanada	Medical/Healthcare Information Systems
O. Fukuda	Biological information Engineering
T. Kakeshita	Information Engineering
T. Minamoto	Numerical Functional Analysis
Y. Hieida	Physics of Stochastic Models
M. Hiroতোমো	Algebraic Coding Theory and Information Theory

Chair of Electrical and Electronic Engineering

Electronics, Information and Communication

I. Toyoda	Advanced Microwave Engineering
T. Furukawa	Advanced Computational Engineering
Q. Guo	Advanced Optoelectronics
S. Satoh	High Power Laser Engineering
S. Fukai	Integrated Circuit Design
H. Wakuya	Bionic and Cybernetic Engineering
S. Hara	Network Analysis
S. Sasaki	Advanced Electronics Packaging Technology
T. Tanaka	Photoelectronic Materials and Devices

Advanced Power Electronics

M. Kasu	Power Electronic Devices and Materials
T. Oishi	Microwave Electronic Devices and Circuits
Y. Ohtsu and S. Ihara	Plasma Energy Engineering
K. Takahashi	Surface and Interface Dynamics

Course of Mechanical Engineering and Physical Science

Chair of Physics

Particle Physics and Cosmology

H. Aoki	String Theory
M. Tachibana	Quantum Chromodynamics in hadron
H. Kouno	Hadron Physics
K. Funakubo	Baryon Asymmetry in Universe
T. Takahashi	Particle Physics Cosmology
A. Sugiyama	High Energy experimental physics
H. Ohsumi	Particle and Nuclear Physics

Condensed Matter Physics

XG. Zheng	Condensed Matter Physics, in special, Quantum Magnetism and Multiferroics, Nano Science
M. Maki	Strongly correlated electron system
Y. Ishiwata	Physics of nanostructure
T. Endo	Simulation of quantum effect
Y. Okayama	Physics in superpressure
J. Azuma	Optical processes in condensed matter

Chair of Mechanical Engineering

Thermo-Fluid Energy Engineering

A. Miyara

Heat and Mass Transfer

Y. Kinoue and N. Shiomi

Fluid Engineering

T. Sumi

Y. Mitsutake

Thermal Engineering

Material and Design Engineering

N. Hattori, S. Hagihara, S. Morita

Mechanics of Materials, Solids and Structures

Y. Tadano and S. Taketomi

B. Zhang and H. Hasegawa

Design and Production Engineering

T. Tsujimura and K. Izumi

Robotics and Control

K. Sato

Control Engineering

Ocean Energy Engineering

S. Nagata and Y. Imai

Ocean Engineering

Y. Ikegami

Thermal Energy Conversion Systems

H. Arima

Thermal Engineering

Course of Environmental Science and Engineering

Chair of Chemistry and Applied Chemistry

Inorganic Materials Chemistry

M. Koikawa and Y. Yamada

Coordination Chemistry

Organic Materials Chemistry

T. Kitamura

Organic Synthesis

Y. Oishi and T. Narita

Advanced Organic Materials

T. Hanamoto

Synthetic Organic Chemistry

H. Kodama

Biochemistry

T. Okajima

Organic Chemistry

S. Osada

Bioorganic Chemistry

Environmental Physical Chemistry

M. Era

Physical Chemistry of Organic Materials for Electronics and Photonics

M. Unno

Molecular Spectroscopy and Biophysics

M. Tominaga

Bioelectrochemistry, electrochemistry in nanocarbon interface and mud battery

Environmental Chemistry and Engineering

K. Ohto

Environmental Chemical Engineering

T. Takamuku

Ultra-micro Analysis

S. Morisada

Colloidal Chemical Engineering

Chair of Civil Engineering and Architecture

Civil Engineering

J. Chai, A. Sakai, T. Hino and D. Suetsugu
K. Ijima and H. Obiya
Y. Ito

Geotechnical Engineering
Structural Engineering
Construction Materials and Infrastructure
Management System

Environmental System Engineering

K. Ohgushi, H. Yamanishi
and V. Narumol
H. Li and T. Inohae

Water Environmental System
Urban System and Environment

Architecture and Urban Design

N. Mishima, R. Gotoh and Y. Taguchi
S. Kojima and K. Nakaokubo

Urban Design and Architecture
Environmental Design for Architecture

Regional Economic and Industrial Systems

M. Nakanishi
M. Shinagawa
T. Kidota
H. Tsuzuki

Regional policy on Industrial and Employment
Rural Development
Accounting Information System
Social Choice and Mechanism Design

System on Human Society and Culture

J. Hanmo
H. Miyawaki
M. Yamashita

Regional Economics and Sociology
Environmental Ecology and Law
Urban Geography

Course of Advanced Technology Fusion

Chair of Advanced Technology Fusion

Biomedical Engineering

S. Goto
S. Matsuo and T. Hashimoto
K. Teramoto
K. Muramatsu
A. Kimoto
H. Dozono
N. Ueno
Md. T. I. Khan
E. Takahashi
Y. Sugi

Systems Control
Fluid Engineering
Sensing Systems
Computational Electromagnetics
Instrumentation System
Soft Computing
Interface device
Biomedical Motion Sensing
Biomedical Imaging
Biomedical Signal Processing

Advanced Material Chemistry

T. Watari and M. Yada
M. Takeshita
H. Kawakita

Functional Ceramics
Advanced Organic Materials
Environmental Chemical Engineering

DETAILED RESEARCH FIELDS

Chair of Mathematical Science

Research Field: Differential Geometry, Topology, Number Theory, Algebraic Geometry, Combinatorial Algebra

Research Field: Partial Differential Equations, Probability, Complex Analysis

Chair of Information Science

Research Field: Environmental Education System supported by computers as the knowledge communication system and intelligent interface between human and computer
Development of Internet Collaboration System for Supporting International Telemedicine

Code Optimization for RISC Processors

Traffic control in high-speed networks

Research on reliable data transmission

Research Field: Basic theory on mathematical treatment and analysis of information

Construction of algebraic geometry codes having superior properties

Numerical method with guaranteed accuracy of solutions for partial differential equations

Research Field: Fundamental technologies in order to fully utilize and to design computer systems

Development of the user authentication system for the open space network

Research on Personal Data Management System, Research on Systematic Educational System for Software Engineers

Support System for Cooperative Software Development Exercise, TA Robot System for Foreign Language Education Using 3D Virtual Space, Research on Personal Data Management System, Research on Systematic Educational System for Software Engineers

Constructing error-correcting codes for ECOC

Research Field: Interface Science between Computer and Human as well as Nature

Global monitoring from space, Human Computer Interaction

Development of remote sensing image processing technique using high resolution satellite images, Development of high efficient electronic chart system for ophthalmology, Development of a virtual eyeball model

Development of Search System based on identity of feature within satellite image data

Research Field: Fundamental perspectives on intelligence, knowledge and complex behavior of natural systems

An Analysis of Information and Its Exchange between a Teacher and Students for Practical Remote Lessons

Educational system and environment with computers and networks

Chair of Electrical and Electronic Engineering

Research Field: Communication Engineering and Advanced Circuit Technology

- Microwave Circuits
- Planar Antennas
- Electronic Circuits
- High-speed Interconnections
- Communication Systems

Research Field: Power Electronics

- Electronic Devices
- Plasma Energy Engineering
- Surface and Interface Dynamics

Research Field: Optoelectronic Materials and Applications

- Epitaxial growth and characterization of semiconductor materials
- Advanced optoelectronic devices
- Photovoltaics
- Network Analysis
- Pulse power engineering
- Synchrotron light application for materials processing and characterization

Research Field: Advanced Computational Engineering and Artificial Intelligence

- Power Engineering and Smart Power Grid System
- Electromagnetic and Acoustic Analyses
- Virtual Reality (VR) and Augmented Reality (AR)
- Biomedical Signal Processing
- Neural Networks
- Intelligent Robotics
- Natural Language Processing

Chair of Physics

Research Field: Quantum Field Theory

- Phase transition in Quantum Chromodynamics
- Sign problem of Lattice QCD
- Baryon Asymmetry
- Dark Energy of Universe
- Linear Collider experiment
- Particle detector

Research Field: Geometrical Frustration of $M_2(OH)_3X$

- High-temperature superconductivity
- Spin glass
- Quantum size effect
- Quantum Entanglement

Chair of Mechanical Engineering

Research Field: Strength of Materials

- Mechanics of Solids and Structures
- Fatigue strength of metals and advanced materials
- Computational Mechanics
- Numerical Analysis Methods

Research Field: Design and Production Engineering

- Design of machinery and machine elements
- Tribology of machine elements
- Surface engineering

Research Field: Heat and mass transfer

- Heat exchanger, absorption condensation, evaporation
- Modeling and analysis of geothermal power station
- Plant system control; Modeling and control of Ocean/Spring Thermal Energy

Conversion(OTEC/STEC), Modeling and control of chemical plant

Robotics, Mechatronic system control, Simulator for articulated robot arm, Metaheuristic systems

Research Field: Thermal Energy Conversion Systems

Ocean thermal energy conversion plant, development of thermal energy conversion system

Research Field: Thermal Engineering

High density heat transport, boiling heat transfer, effective utilization of high density thermal energy

Research Field: Fluid Engineering

Turbomachinery, compressible fluid flow, effective utilization of fluid energy, multiphase flow

Chair of Chemistry and Applied Chemistry

Research Field: Coordination Chemistry

Education and studies on synthesis, structure, and physical properties of organic and metal complexes

Structural aspects of metal complexes

Basic coordination chemistry

Bondings in metal complexes

Research Field: Functional Molecular Chemistry

Education and studies on reaction, analysis, separation, and sensing of metal ions and organic molecules in artificial and biological environments

Kinetics and mechanism for environmental analysis

Advanced molecular recognition chemistry

Advanced Bioelectrochemistry

Research Field: Environmental Chemistry

Advanced environmental chemistry

Research Field: Material Engineering for Separation

Comprehensive study on separation science and technology

Separation science and technology of recycling for sustainable society

Research Field: Biomolecular Spectroscopy

Vibrational spectroscopy of biomolecules

Computational chemistry

Chair of Civil Engineering and Architecture

Research Field: Geotechnical Engineering

Theory and practice of geotechnical engineering prediction and prevention of ground disaster

Advanced geotechnical engineering

Advanced geo-environmental engineering

Geomechanics and rock engineering

Advanced soil mechanics

Research Field: Structural Engineering

Advanced earthquake engineering

Theory of basic and application of large scale structure systems

Advanced structural analysis

System analysis of structures

Advanced structural design

Advanced computational mechanics

Research Field: Urban Design

Basic principle and application of urban planning and transportation planning

Advanced urban space design

Advanced transportation planning

Advanced environmental evaluation

Research Field: Architecture

Town space design
Advanced Architectural environmental control
Urban and Building Environment

Research Field: Water Management System

Water resources engineering
Wastewater treatment systems
Computational hydraulics and remote sensing engineering for water environment
Water resources management
Water environmental systems engineering
Environmental systems engineering
Water pollution control systems
Advanced hydraulic network system planning
Planning theory on water environment

Research Field: Construction Materials

Improvement of mechanical properties of construction materials
Utilization of waste materials
Advanced concrete engineering
Maintenance management of concrete structures
Development of inspection technique for concrete structure
Advanced geotechnical materials
Geotechnical materials engineering

Research Field: Accounting Information and Social Choice

Research Field: Regional Policy of Industry and Rural Development

Research Field: Economics for Developing Countries

Research Field: Environmental Ecology

Research Field: Social System and Culture

Chair of Advanced Technology Fusion

Research Field: Interface Function Engineering

Robotic Manipulator Control, Mobile Robots,
Neuro-Fuzzy Control Systems, Evolutionary Control Systems,
Behavior-based Control Systems, Self-organizing Robotic Systems,
Biorobotics, Robotics in Medicine, Human Motion Simulator,
Intelligent Robot, Soft Computing, Robotics in Industry,
Friction Compensation,
Control theory, robust control, adaptive control

Research Field: Intelligent Control Engineering

Compensation of hand movement by additional force
Power system control; Reliability analysis of equipments in power stations,
Mechatronic system control; Simulator for articulated robot arm,
Cooperative control of plural robots, Forcefree control
Non-invasive diagnosis system; Novel measurement techniques without references
are on the trial
Medical and welfare sensor system; All field of sensing system for medical and wel-
fare purpose are developed
Mobile and robotics multi-sensing; Advanced new sensors for mobile and robotics
are studied

Research Field: Biological System Dynamics and Informatics

Fluid Engineering
Advanced electromagnetics
Sensing Systems
Biomedical sensing
Signal processing

Research Field: Functional Ceramics

Education and studies on structural and functional ceramics Advanced
inorganic materials

Ceramics for advanced battery

Advanced ceramics and electronic ceramics Preparation and
properties of ceramics

Research Field: Physical Chemistry for Organic / Inorganic Hybrid Molecular System Optoelectronic
materials

Advanced solid state chemistry Research Field:

Functional protein chemistry

Synthesis and function of biologically active substances and their related artificial
materials

Advanced computational material chemistry Advanced
synthetic organic chemistry Chemistry of cooperative
interaction