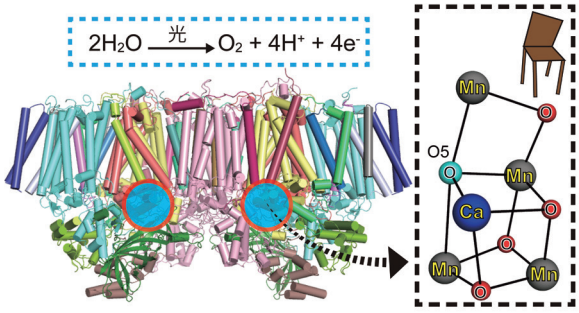
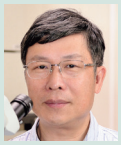
Earth, Environmental and Life Sciences

Course of Biological Sciences

Structural Biology



Proteins are responsible for all life phenomena. We study protein structures using cryo-electron microscopy and synchrotron radiation X-rays to understand protein function better. The knowledge gained will help us to understand protein functions profoundly and to create new catalysts and technologies.



Prof. SHEN Jian-Ren

■Research Themes

Photosynthesis/Membrane proteins/Plant mineral transporter/Structural biology

Prof. SUGA Michihiro

■Research Themes

Photosynthesis/Membrane proteins/Plant mineral transporter/Structural biology

Assoc. Prof. AKITA Fusamichi

■Research Themes

Photosynthesis/Membrane proteins/Plant mineral transporter/Structural biology

Asst. Prof. NAKAJIMA Yoshiki

■Research Themes

Photosynthesis/Membrane proteins/Plant mineral transporter/Structural biology

Asst. Prof. SAITOH Yasunori

■Research Themes

Photosynthesis/Membrane proteins/Plant mineral transporter/Structural biology

Chemical Correlation and Control

In our laboratory, we are conducting research on a wide range of contents from physiological actions of hormones to transcriptional regulatory mechanisms of genes, using mice, rats, chickens, frog, medaka and mudskipper.

Prof. SAKAMOTO Tatsuya

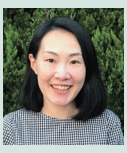
■Research Themes

Hormones/Hormone receptors/Hormone systems/Endocrinology/Comparative endocrinology/Evolution

Prof. TAKEUCHI Sakae

■Research Themes

Hormones/Hormone receptors/Hormone systems/Endocrinology/Comparative endocrinology/Evolution



Assoc. Prof. AIZAWA Sayaka

■Research Themes

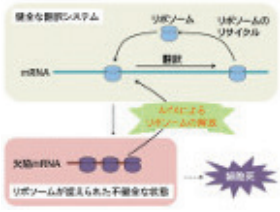
Hormones/Hormone receptors/Hormone systems/Endocrinology/Comparative endocrinology/Evolution

Asst. Prof. AKIYAMA Tadashi

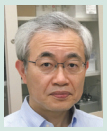
■Research Themes

Hormones/Hormone receptors/Hormone systems/Endocrinology/Comparative endocrinology/Evolution

Molecular Genetics



1. Transcriptional Regulation
2. Reproductive and Behavioral Biology
3. Nutritional and Metabolic Genetics



Prof. NAKAGOSHI Hideki
■Research Themes
Drosophila/Homeostasis/Stress response/Metabolism/Fertility/Sexual behavior

Prof. ABO Tatsuhiko
■Research Themes
Life Science/Genetics/Molecular biology

Assoc. Prof. CHADANI Yuhei
■Research Themes
Life Science/Molecular biology/Ribosome, translation, nascent polypeptide

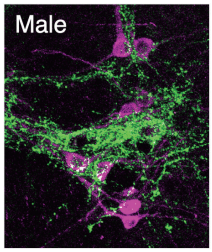
Plant Ecology and Evolution

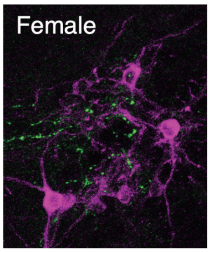
Why are some species able to cope with environmental changes? How have organisms responded to environmental change in the past? We are interested in how plant species cope with and even adapt to environmental changes such as climate change and land use.
We conduct research using field surveys, common garden experiments, diversity manipulation experiments, ecological genomics, and ecological niche modeling, with a particular focus on sources of genetic diversity that enable rapid evolutionary responses and mechanisms of population maintenance through interactions among organisms.

Prof. MIMURA Makiko
■Research Themes
Evolutionary ecology/Ecological genetics/Environmental changes

Asst. Prof. NAKAHORI Kiyoshi
■Research Themes
Conservation ecology of Oriental dollarbird (Eurystomus orientalis)

Neural Control of Behavior





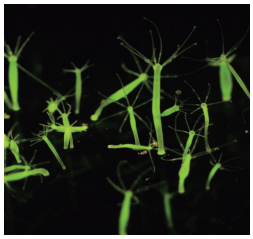
I am studying the behavioral control mechanisms in vertebrates, particularly focusing on the neuroendocrine regulatory mechanisms and the mechanisms involved in sexual differentiation.

Prof. SAKAMOTO Hirotaka
■Research Themes
Neuroendocrinology

Assoc. Prof. OTI Takumi
■Research Themes
Neuroendocrinology

Assoc. Prof. OGOSHI Maho
■Research Themes
Hormones/Hormone receptors/Hormone systems/Endocrinology/Comparative Endocrinology/Evolution

Environmental Biology and Chronobiology



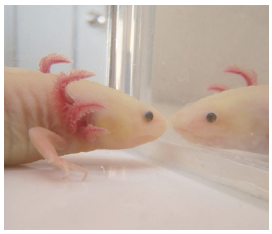
To reveal the principles of animal evolution, we conduct genome-wide studies using basal animals. In particular, we focus on unique ecology related to environmental adaptation and interactions between organisms, and aim to elucidate its molecular mechanism.

Prof.
YOSHII Taishi
■Research Themes
Chronobiology/
Circadian clock/
Drosophila melanogaster

Prof.
ANSAI Satoshi
■Research Themes
Evolutionary biology/
Genetics/Genomics/
Genome editing

Prof.
HAMADA Mayuko
■Research Themes
Animal evolution/
Genome/Symbiosis/
Environmental adaptation

Developmental Biology



We are interested in unraveling the molecular basis of plant growth and development. Our current research is focusing on
I. Function of polyamines in growth and development
II. Molecular mechanism of establishment and maintenance of shoot epidermis-specific gene expression
Urodele amphibians, such as newts and axolotls, can regenerate their missing body parts. In contrast, we cannot regenerate "body parts". Our ultimate goal is to understand the tricks of their higher regeneration ability and to apply their tricks onto higher vertebrates.

Prof. SATOH Akira
■Research Themes
Limb regeneration/Regeneration biology/Organ regeneration/
FGF signaling/Axolotl

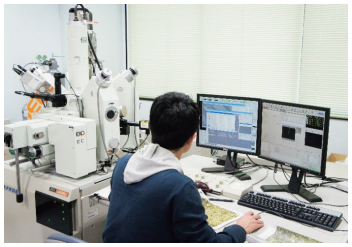
Prof. TAKAHASHI Taku
■Research Themes
Life Science/Plant molecular biology and physiology/Genetics/Morphology and anatomical structure

Assoc. Prof.
MOTOSE Hiroyasu
■Research Themes
Life Science/Cell biology

Earth, Environmental and Life Sciences

Course of Earth Science

Petrology



Rocks record the history from their formation up to the present. Therefore, by observing and analyzing the rock's chemical composition and the types and compositions of the constituent minerals, it is possible to unravel the history of the rock. Deciphering these past geological phenomena can also help us to understand the mechanisms of geological phenomena occurring on the Earth today. We are particularly interested in the formation mechanisms of rocks that make up the ocean floor and plate convergence zones.

Assoc. Prof. NOZAKA Toshio

■Research Themes

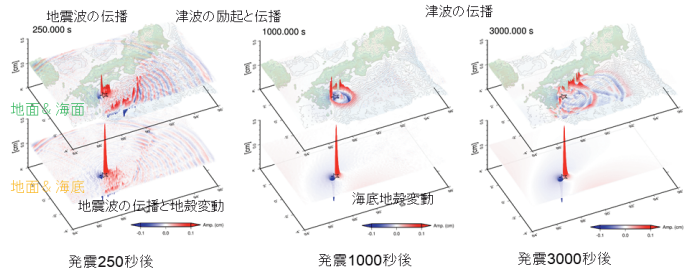
Metamorphic rock/Igneous rock/ Geology/Crust/Mantle

Assoc. Prof. NAKAMURA Daisuke

■Research Themes

Metamorphic rock/Igneous rock/ Geology/Crust/Mantle

Seismology



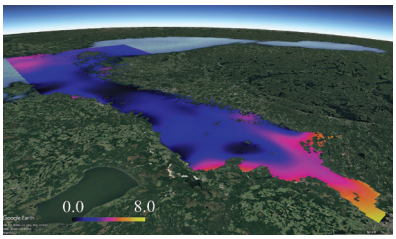
・Modelling of seismic and tsunami waves
・Study on strong motion

Prof. TAKENAKA Hiroshi

■Research Themes

Computational seismology/ Strong motion/Tsunami

Geoinformatics



One of research theme is to develop models that contribute to the evaluation of earthquake resistance and safety by applying data on active faults and seismotectonics to long-term and probabilistic hazard assessment of future earthquakes and simulation of landform evolution in 100,000-year time scale. We also modeling the dynamics of the environmental parameters or environmental substances by using Geoinformatics. For the purpose, AI and Kriging method by Python or R are combined with GIS applications are employed.

Prof. KUMAMOTO Takashi

■Research Themes

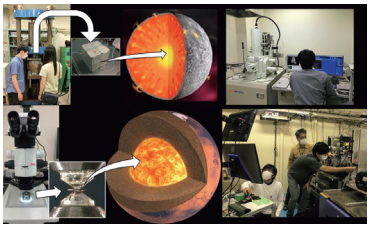
Seismic Hazard assessment/Landform Evolution Simulation

Asst. Prof. YAMAKAWA Junji

■Research Themes

Geostatistics/AI/Kriging/Geographic Information System (GIS)

Physics of the Earth and Planetary Interiors



We investigate structures and properties of materials which consist of Earth and planetary interiors to clarify phenomena occurring in the Earth and planetary interiors. Planetary interior environments are produced in the lab using high-pressure devices, such as large-volume press and diamond anvil cell.

Prof.
URAKAWA Satoru

■Research Themes
Earth and planetary core/Mineral physics/ Amorphous and liquid

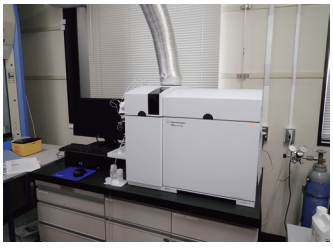
Prof.
TERASAKI Hidenori

■Research Themes
Planetary core/Formation and evolution of the core/Physical properties of liquids

Asst. Prof.
Sakurai Moe

■Research Themes
Earth's mantle/Hydrous mechanism/Experimental mineralogy

Geochemistry



A wide variety of research topics, starting from the origin and evolution of the solar system to modern environmental problems, are being studied by the members of the geochemistry group. Instruments such as the ICP-OES, ICP-MS, TIMS are used in combination with the state-of-the-art clean laboratory to obtain high-precision data from various planetary and environmental materials including meteorites, terrestrial rocks and minerals, calcifying organisms such as corals and sea urchins, and river and groundwater. High quality geochemical data are used to investigate the processes responsible for the evolution of planets, continental crust, modern and ancient ocean, and the impact of human activities on the environment such as the effect of ocean acidification on the calcification of marine organisms.

Prof. INOUE Mayuri

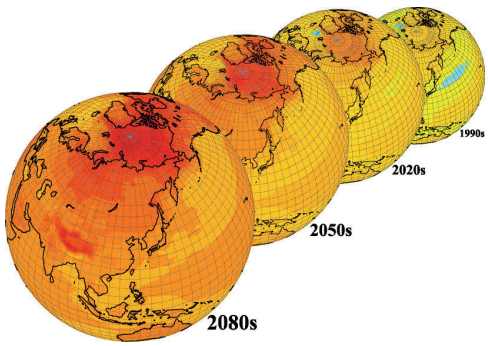
■Research Themes
Paleoenvironments/Coral reefs/ Biomineralization

Assoc. Prof. YAMASHITA Katsuyuki

■Research Themes
Meteorites/Continental crust/River water/ Groundwater/Asian dust

Atmospheric Sciences

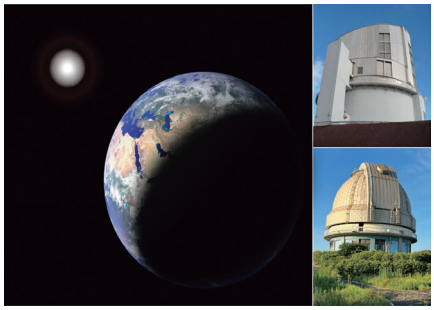
The global circulation of the atmosphere and local atmospheric phenomena occur through various mechanisms. What factors contribute to climate change from the past to the future, as exemplified by global warming? In the atmospheric science section, we study the mechanisms behind extreme weather and climate change by comprehensively utilizing numerical simulations, observation products, and reanalysis datasets. We also develop numerical models to understand physical processes and mechanisms of climate change, for more accurate climate predictions.



Prof. NOZAWA Toru

■Research Themes
Atmospheric physics/Climate change/Global warming/Numerical simulation

Planetary Sciences



How do planets form? The formation and evolution of planets involve a complex interplay between planetary accretion, atmospheric chemistry, and mineralogical processes that occur deep within the planetary interiors. Thanks to the discovery of exoplanets, our understanding of planet formation and atmospheric evolution has been advancing by leaps and bounds. In the Planetary Science course, we collaborate with observation teams that explore the population of exoplanets and study their atmospheres, aiming to uncover the origins of both the solar system and exoplanets.

Assoc. Prof. HORI Yasunori

■Research Themes

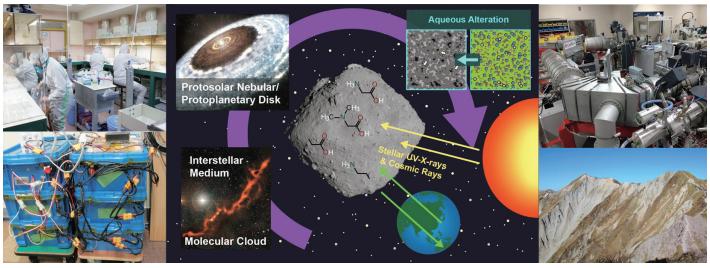
Planet formation/Exoplanets/Planetary atmospheres/Astrobiology

Earth, Environmental and Life Sciences

Course of Planetary Materials Science

Planetary Materials Analytical Chemistry

We are exploring the pathway of material evolution over 13.8 billion years from the birth of the universe to the present through comprehensive materials science with analytical chemistry. Through the analysis of meteorites and extraterrestrial materials by sample returns, in addition to terrestrial volcanic and metamorphic rocks, we are exploring to understand the origin, evolution, and dynamics of materials in space and time, in an attempt to understand the roots of humankind. The exploration of the origin of life using methods that integrate inorganic and organic chemistry will continue to grow in the future.



Prof. MAKISHIMA Akio

■ Research Themes

Silicate planets/Origin of elements origin of life and life-forming materials/Energy storage

Prof. KOBAYASHI Katsura

■ Research Themes

Geochemistry/Petrology/Materials science

Prof. TANAKA Ryoji

■ Research Themes

Geochemistry/Cosmochemistry/Isotope geochemistry/Petrology/Astrobiology

Assoc. Prof. KUNIHIRO Tak

■ Research Themes

Asteroid/The solar nebula

Assoc. Prof. POTISZIL Christian

■ Research Themes

Prebiotic Chemistry/Origin of Life/Organic Matter/Asteroids/Meteorites

Asst. Prof. KITAGAWA Hiroshi

■ Research Themes

Petrology/Geochemistry/Geochronology/Analytical chemistry

Planetary Materials Experimental Physics

Phase relations and melting relations of Earth and planetary materials. Structure, rheology, elastic and electrical properties of Earth's mantle and core materials. Element partitioning between mantle minerals and mantle/core materials. Combine studies of extraterrestrial and terrestrial materials in terms of mineralogy, texture, composition, and spectroscopic properties to interpret the current nature and geological history of other solar system bodies, especially Mars and carbonaceous asteroids.

Prof. YOSHINO Takashi
■Research Themes
Earth and Planetary Material Sciences/ Mineral physics

Prof. YAMAZAKI Daisuke
■Research Themes
High Pressure Earth Science/Mineral Physics

Assoc. Prof. ISHII Takayuki
■Research Themes
Earth and Planetary Material Sciences/ Mineral physics

Assoc. Prof. MORIGUTI Takuya
■Research Themes
Earth and Planetary Material Sciences/ Mineral physics/Magmalogy

Asst. Prof. MASHINO Izumi
■Research Themes
Earth and Planetary Material Sciences/ Mineral physics

Prof. XUE Xianyu
■Research Themes
Mineral physics/Magmalogy/Spectroscopy

Assoc. Prof. YAMASHITA Shigeru
■Research Themes
Petrology/Magmalogy

Planetary Surface Environmental Science

Our research target is planetary surface/near-surface environments to understand the past geological processes and present status in anticipation of future manned missions especially on the Moon and Mars. To achieve this, our division is conducting a wide range of research with various approaches, such as remote sensing data analysis, in-situ geophysical data analysis, numerical simulations, laboratory experiments, and extraterrestrial sample analysis.

Prof. KAMEDA Jun
■Research Themes
Structural geology

Assoc. Prof. RUJ Trishit

Assoc. Prof. IZAWA Matthew Richar
■Research Themes
Astrobiology/Meteorites/ Mars/Asteroids/Remote sensing/Spectroscopy

Earth, Environmental and Life Sciences

Course of
Rural and Environmental Sciences

Applied Ecology

In the last few decades, biodiversity loss has been a big issue all over the world. As you know, human activities are one of the most primary factors, which modify the natural habitats of animal and plant species, cause the decline of their population, and sometimes completely make them extinct. To live as a well-behaved passenger on the future earth, we first need to understand the relationship between biodiversity and human activities. In our laboratory, we study for and actually perform for conservation and appropriate management of biodiversity. And, we believe these should be done based on accurate knowledge about biology, ecology, and environmental science. We are targeting various taxa, such as endangered fishes, invasive crustaceans, and native herbaceous plants.

Prof. NAKATA Kazuyoshi

■Research Themes
Conservation ecology/Ecology and civil engineering/Biological invasion/ Aquatic animals/Crustaceans.

Asst. Prof. KATSUHARA Koki

■Research Themes
Plant ecology/Plant-animal interaction/ Species coexistence/Asian dayflower/ Semi-natural grassland.

Environmental Biogeochemistry

Agriculture is responsible for emissions of greenhouse gases (GHGs) such as carbon dioxide (CO_2), nitrous oxide (N_2O), and methane (CH_4). Production of these gases in farmland soil results from biological processes like organic matter decomposition, nitrification and denitrification, and highly depends on organic matter inputs. We aim at analyzing the effects of organic matter amendment on GHGs emissions. In particular, we are interested in agricultural soil amended with livestock compost.

Prof. MAEDA Morihiro

■Research Themes
Greenhouse gases/Nitrogen/Phosphorus/ Sediment/Soil/Organic waste/Water

Environmental Conservation

In today's global society, where the effects of climate change are becoming increasingly severe, agricultural land, as a production base, is expected to contribute to mitigation and adaptation for climate change through rainwater recharge, organic matter conservation, and greenhouse gas reduction, while producing food in a sustainable and stable manner. Therefore, we are conducting research on management methods of agricultural land through investigation, experimentation, monitoring, and prediction of soil, water, chemicals, and atmospheric environments at multi-layered spatial scales from the earth to the arable land.

Prof. MORI Yasushi

■Research Themes
Soil organic matter/Macropore/ Greenhouse gas emission/Infiltration

Water Resources Management

We attempt to solve problems related to water quantity and quality from a plot to watershed scale. Our research focuses on the harmony between the environment and human activities, such as the optimal allocation of water quantity (stabilization of food production) in response to global warming and population growth, and the solution of water environment problems caused by human activities.

Prof. SOMURA Hiroaki

■Research Themes

Irrigation and Drainage/Environmental Meteorology/Soil Hydrology/Watershed Management

Environmental Hydrology

Hydrology is the science which deals with water cycle on global or regional scales through observation of hydrological processes and numerical simulations. To enhance reliability of flood control in river basins, we need hydrological models that can represent the regional hydrological cycle and predict flood discharges accurately. Our laboratory works on developing mathematical models that quantitatively accounts for the water cycle and probability statistical models that express the scale and frequency of hydrological and meteorological phenomena for appropriate water management, disaster prevention and mitigation against floods and impact assessment of climate change on flood/drought damages.

Prof. CHIKAMORI Hidetaka

■Research Themes

Hydrological cycle/Flood/Drought/Disaster Risk Reduction

Assoc. Prof. KUDO Ryoji

■Research Themes

Hydrological cycle/Flood/Drought/Disaster Risk Reduction

Design and Management of Environmental Infrastructures

This laboratory conducts research on the design and maintenance of agricultural irrigation facilities and social infrastructure facilities—such as dams, reservoirs, and irrigation tunnels—through numerical simulations, experiments, and field investigations. For example, efforts are being made to assess the condition of these facilities by understanding their density distribution using "muography," a technique that estimates soil density based on cosmic-ray muons arriving on Earth from space.

Prof. NISHIMURA Shinichi

■Research Themes

Geotechnical engineering/Irrigation and rural engineering

Assoc. Prof. SHIBATA Toshifumi

■Research Themes

Geotechnical engineering/Numerical analysis

Material Cycles and Waste Management

To achieve Sustainable Development Goals, it is indispensable to promote citizens behavior modification and drive social transformation along the lines with 3R hierarchy which means Reduce as the 1st priority followed by Reuse and Recycle. Our laboratory aims to support science-based/data-driven decision making in MSW management planning, establish good practices on 3Rs, and expand their actual practices.

Prof. FUJIWARA Takeshi

■ Research Themes
Environmental System Engineering/ Waste managment

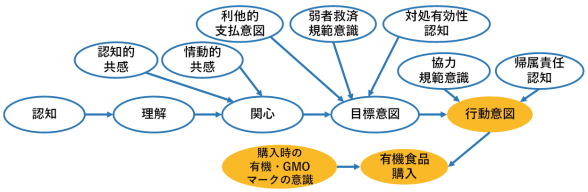
Asst. Prof. HABUER

■ Research Themes
Waste managment/LCA/Material flow analysis/Environmental impact assesment

Science for Sound Material-Cycle

To support rational and effective decision making on municipal solid waste management toward sustainable society, our laboratory aims to accumulate the scientific base by the following research activities:
・Detail survey on municipal solid waste generation, demographics, 3R behavior, pro-environmental attitudes, lifestyle, and household expenditure in Japan and Vietnam
・Exploring influence factors and Bayesian modeling of waste generation and 3R behavior
・Political effect prediction on 3Rs and reliability verification
・Accuracy improvement on sales prediction of food items by Deep Learning toward food loss reduction

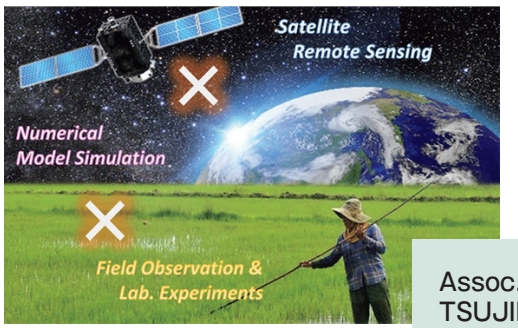
有機食品の購買行動の規定因モデル



Assoc. Prof. MATSUI Yasuhiro

■ Research Themes
Municipal Solid Waste/Food loss from business sectors/Combustion ash from wood biomass/3Rs/Behavior modification/Behavior modeling/Bayesian network/Life Cycle Assessment (LCA)/GIS/Collection and transport

Environmental Data Science



The aim is to contribute to the planning of future predictions and adaptation strategies related to the environment, disaster prevention, climate change, and food production. The research will focus on methods for integrating and socially implementing field surveys and measurements related to soil, water, vegetation, and the atmosphere, as well as remote sensing using artificial satellite observations and numerical simulations.

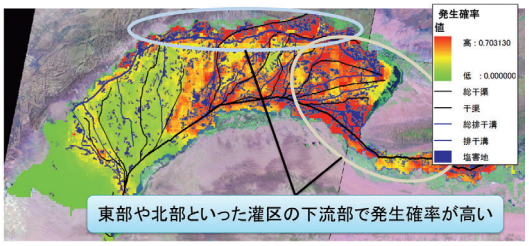
Assoc. Prof. TSUJIMOTO Kumiko

■ Research Themes
Land-atmosphere interaction/Soil moisture/ Micro-wave remote sensing/Climate change impact assessment

Assoc. Prof. FUKUMOTO Yutaka

■ Research Themes
Regional Environmental Engineering / Geotechnical Engineering

Field Data Analysis



We obtain a diverse range of data from fieldwork. For example, they are quantitative data from observations using infrared sensor cameras and qualitative data from interviews to the local residents. In our laboratory, we use geographical information databases to analyse the impact of the environmental issues such as abandonment of farmland and agricultural damage by wildlife. Our laboratory also contributes to build a sustainable society by developing planning methods that include a vision for the future of the local communities based on both quantitative and qualitative data, and by putting these plans into practice.

Prof.
KUKI Yasuaki

■Research Themes

Rural planning/Community planning/Damage by wildlife/Abandoned farmland/Ordinance/Land use

Prof.
MORITA Hidenori

■Research Themes

geospatial Informatics/geoinformatics/ rural planning

Earth, Environmental and Life Sciences

Course of Environmental Ecology

Plant Ecology

The stand structure and dynamics of forests are researched to demonstrate the mechanism of regeneration in forests. The eco-physiological characteristics of invasion, establishment, survival, and growth in relationship to whole-plant water use and matter production of tree species are analyzed to determine the strategies of different species. Based on these research results, an optimal model in the management of forests is constructed for the sustainable conservation of the forests.

Prof. MIKI Naoko

■Research Themes

Plant physiological ecology/ Water use characteristics/ Drought stress

Assoc. Prof. MIYAZAKI Yuko

■Research Themes

Plant reproductive ecology/ Environmental responses/ Forest dynamics

Forest Ecology

We conduct research at various scales, from genes to entire ecosystems, with the aim of understanding the structure, function, and dynamics of forest ecosystems that provide a variety of ecosystem services to human society. Special attention is paid to the mechanisms of elemental cycles and the role of organisms in elemental cycles.

Prof. HIROBE Muneto

■Research Themes

Elemental cycles/Structure, function, and dynamics of forest ecosystems

Prof. HYODO Fujio

■Research Themes

Food web/Isotopes/Feeding habit/Soil ecology

Environmental Soil Science

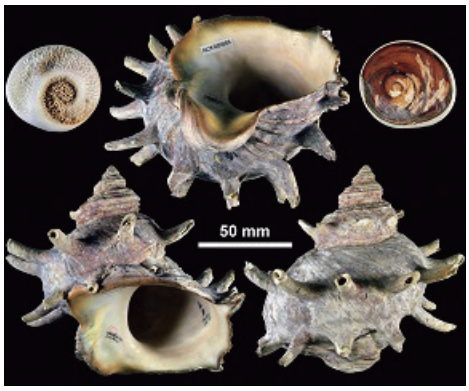
In order to develop re-vegetation techniques for forests after disturbances such as fires or clear-cutting, we study the change factors that regulate the dynamics of nutrient mineralization, immobilization, and turnover in the soil-plant ecosystems. We also study techniques of utilization and recycling of organic waste as a re-vegetation material.

Prof. SHIMA Kazuto

■Research Themes

Nutrient dynamics in soil-plant ecosystems

Conservation of Aquatic Biodiversity



Molluscs including shellfish, snails, slugs and so on are a very diversified animal group and consist of more than 80,000 Recent species in the world, but their taxonomy and recognition of species are still poorly understood. For example, Turbo sazae is one of the most well-known marine snails in Japan since ancient age, but nevertheless the species has long been misidentified with Turbo cornutus, a species endemic to China, until recently and documented to be unnamed in 2017. Another edible species Tegula kusairo exhibited the similar case and it was described as a new species in 2020. Furthermore, many species become extinct or critically endangered by artificial environmental changes before recognizing their presences by human beings. The alpha-taxonomy of this group is thus highly important and an urgent matter in terms of biodiversity conservation.

Assoc. Prof.
FUKUDA Hiroshi

■Research Themes
Taxonomy/Systematics/
Malacology/Biodiversity/
Conservation biology

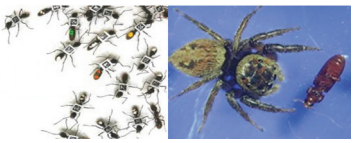
Evolutionary Ecology

Using several insects, we are conducting researches for evolution and ecology. Specifically, we focus on reproductive behavior, learning behavior and life history, and analyze them to clarify their adaptive significance. We are also analyzing the physiological mechanisms gene expression that control these behavioral traits for understanding their proximate factors. In addition, we will apply the experimental results as above to the development of technology for pest control methods and are attempting to expand our research into applied researches.

Assoc. Prof. OKADA Kensuke

■Research Themes
Ecology

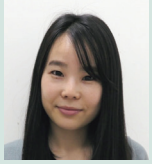
Insect Ecology



We research behavior, ecology and evolution mainly using insects. Research topics are the evolutionary process from the view point of natural selection and/or sexual selection, environmental effects on traits in animals, life-history evolution, and applied entomology in evolutionary biology.

Prof. MIYATAKE Takahisa

■Research Themes
Evolutionary biology/Animal behavior/
Entomology/Ethology/Chronobiology/
Beetle/Fly/Ant



Asst. Prof. FUJIOKA Haruna

■Research Themes
Evolutionary biology/Animal behavior/
Entomology/Ethology/Chronobiology/
Beetle/Fly/Ant

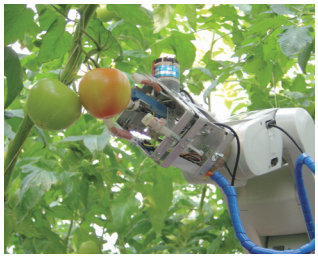
Resources Management

The effective and sustainable management method of local resources is studied in a viewpoint of social science.

Assoc. Prof. DATAI Hisashi

■Research Themes
Resource Managements/Agricultural Economics

Bioproduction Systems Engineering



In our laboratory, we are conducting research on agricultural robots that contribute to automation and labor saving in biological production, plant factories that propose new farming methods in an optimal environment based on biological measurements, and smart agriculture that navigates agriculture based on big data such as farm environment and yields, all based on a systems engineering approach, in preparation for the serious labor shortage and other agricultural problems our country will face in the near future. We are also conducting research on smart agriculture, which navigates agriculture based on big data such as the farm environment and yields.

Prof. MONTA Mitsuji

■Research Themes
Agricultural Engineering/Agricultural Machinery

Assoc. Prof. NAMBA Kazuhiko

■Research Themes
Agricultural Engineering/Agricultural Machinery

Food and Environmental Policy

Toward the "Asian Ways" of Sustainable Development: Viewing Our Food and Environment from Social, Political, and Economic Perspectives

Social sciences and humanities (SSH) can contribute to solving food and environmental problems. We are especially employing area studies/political and economic perspectives to broadly re-examine these issues in Asia, such as agriculture, resource industries, environmental policies, community-based development, disaster management, etc. The 21st century is believed to be the Asian century. The future of our world thus largely rests on how Asia commits to sustainability. Based on domestic, foreign, and international research from Asia and other regions, we wish to examine changes in human–nature relationships and the balance between development and the environment.

Prof. UBUKATA Fumikazu

■Research Themes
Development studies/Environmental studies/Policy/Asia/Area studies/Social sciences and Humanities (SSH)

Assoc. Prof. OHNAKA Katsutoshi

■Research Themes
Food security/Development and environment/Policy/Asia/Area studies/Social sciences and Humanities (SSH)

International Rural Studies

Based on field surveys in Asia, we examine relationships between rural development and the environment in contemporary globalized societies. We also explore how we can redirect ourselves toward "sustainable development" from the perspective of local communities.

Prof. KIM Doo-Chul

■Research Themes

Rural Geography/Environmental Geography

Assoc. Prof. HONDA Yasuko

■Research Themes

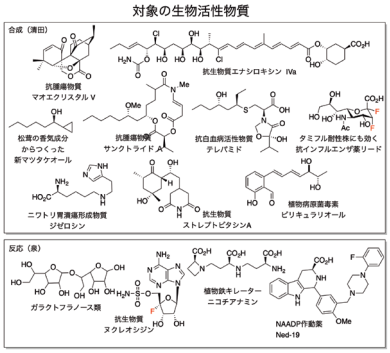
Rural Sociology/Environmental Sociology

Earth, Environmental and Life Sciences

Course of
Agricultural and Biological Chemistry

Applied Natural Product Chemistry

Our research targets are biologically active natural organic compounds. Using synthetic organic chemistry, we aim to elucidate the mechanism of activity expression and structure-activity relationship of physiologically active substances, and to apply them to agricultural chemicals and medicines.

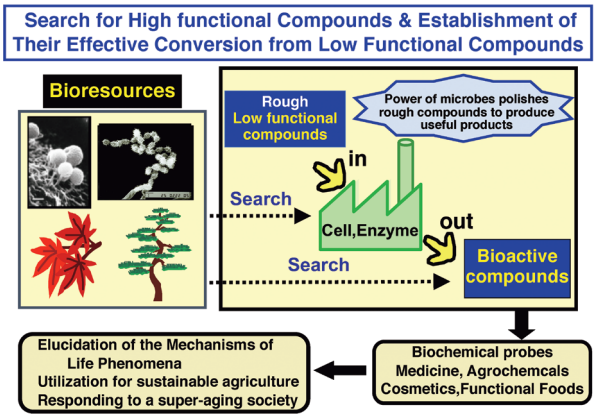


Overview: Synthesis and activity evaluation of natural organic compounds and analogues, Elucidation of biosynthetic pathways of physiologically active substances, Application of biocatalysts (microorganisms and enzymes) to organic synthesis, Development of useful organic reactions
Target: antibiotics, plant pathogenic toxins, plant hormones, anorexia, insect attractants; repellents, aroma substances
Development: anticancer agents, antitumor agents, antiviral agents (influenza, novel coronavirus, HIV), herbicides, antibiotics, insecticides, perfumeries

Prof. KIYOTA Hiromasa
■Research Themes
Organic synthesis/Natural product chemistry/Medicinal chemistry/Pesticide chemistry

Prof. IZUMI Minoru
■Research Themes
Glycotechnology/
Chemical Biology

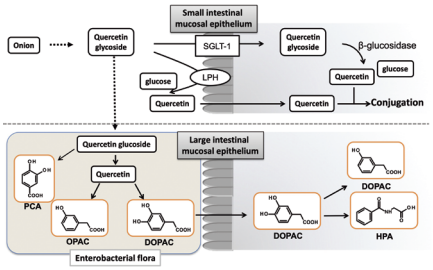
Chemistry of Bioactive Compounds



Search for bioactive organic compounds produced by microorganisms and plants, i.e., highly-functionalized compounds, and study on microbial conversion of these highly-functionalized compounds from low-functional compounds.

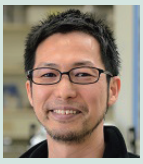
Prof. NITODA Teruhiko
■Research Themes
Applied Microbiology/Natural Products/
Chemistry/Enzyme Chemistry

Food Biochemistry



The values of foods are defined by three categories: nutritional function, sensory function, and health-maintenance function. Our research has been focused on health promotion and disease prevention.

Prof. NAKAMURA Yoshimasa
■Research Themes
Food Chemical Biology (Biological and physiological functions of food phytochemicals)/Functional Mechanism and Bioavailability of Food Factors



Assoc. Prof. NAKAMURA Toshiyuki
■Research Themes
Food Chemical Biology (Biological and physiological functions of food phytochemicals)/Functional Mechanism and Bioavailability of Food Factors

Chemistry of Bio-signalling

In particular, our research focuses on stress signaling regulating stomatal movement. Stomatal pores, which are formed by pairs of guard cells in the epidermis especially of leaves, regulate gas exchange for photosynthesis and transpirational water loss. Guard cells can perceive various stimuli such as light, CO_2, pathogen infection, and various phytohormones such as abscisic acid, then transducing the inputs to a change in stomatal aperture. Using multidisciplinary approaches, we aim to reveal the detailed mechanisms of signaling cascading from stress sensing to stomatal aperture regulation in guard cells. We also study the basic mechanisms of heavy metal and salt stress responses in plants using model plants as well as cultured cells. Our research advance will contribute to develop new technologies that improve crop productivity and safety.

Prof. MURATA Yoshiyuki

■Research Themes

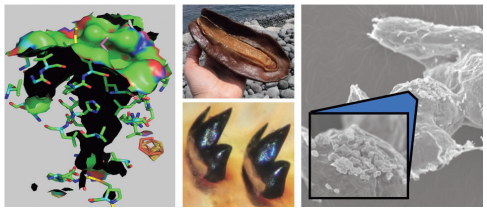
Plant physiology/Molecular biology/ Electrophysiology/Agricultural and biological chemistry

Assoc. Prof. MUNEMASA Shintaro

■Research Themes

Plant physiology/Molecular biology/ Electrophysiology/Agricultural and biological chemistry

Microbiological Chemistry



We are conducting research to elucidate the metabolic functions of microorganisms and others so as to apply them to solving environmental problems and producing useful materials. We are pioneering a new field of bioinorganic chemistry that elucidates the interaction between proteins and minerals at the molecular level, such as microorganisms that breathe iron, marine organisms that produce magnetite, and catalytic mechanisms of metalloenzymes. In our laboratory, we are promoting interdisciplinary education and research that incorporates information systems such as machine learning and computational chemistry into general-purpose experimental methods such as genetic engineering, protein engineering, genome editing, and RNA engineering.

Prof. TAMURA Takashi

■Research Themes

Biofuel hydrogen/ Chemoautotrophic bacteria/Biomineralization

Prof. KANAO Tadayoshi

■Research Themes

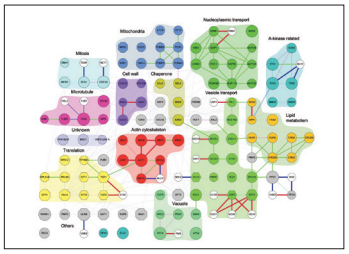
Applied microbiology/ Acidophilic bacteria/ Iron- and sulfur-oxidizing bacteria

Prof. NEMOTO Michiko

■Research Themes

Biomineralization/Omics

Cellular Systems Chemistry



We aim to understand the operating mechanisms of eukaryotic cells by treating them as systems, and to apply this understanding for practical use.

The Moriya group focuses on yeast cells, studying both the detrimental effects and the advantageous outcomes caused by protein overexpression.

The Maeda group focuses on plant glycans, investigating their physiological functions and their impact on the immune system.

Prof. MORIYA Hisao

■Research Themes

Eukaryotes/Systems Biology/ Applied Microbiology

Assoc. Prof. MAEDA Megumi

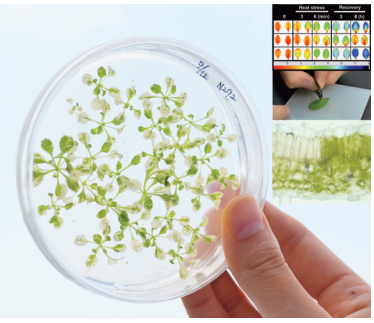
■Research Themes

Eukaryotes/Functional Glycobiochemistry/ Immunology

Earth, Environmental and Life Sciences

Course of Plant Stress Science

Plant Genetics and Physiology



Our life on earth cannot continue without the atmospheric environment, which is maintained by oxygenic photosynthesis. Plants perform photosynthesis in chloroplasts, where light energy is converted into chemical energy by a series of electrochemical reactions. In contrast, land plants are exposed incessantly to excess light energy or harsh atmospheric environments that engender 'photodamage'. How do plants cope with such photosynthetic inactivation? What are the key elements to maintaining or even maximizing chloroplast functions? Our group studies various aspects of chloroplast development and photosynthesis. By understanding the factors involved in photoprotection and chloroplast function, we aim to improve crop productivity against atmospheric stress over the long term.

Prof. SAKAMOTO Wataru

■Research Themes
Chloroplast/Photosynthesis

Assoc. Prof. MATSUSHIMA Ryo

■Research Themes
Amyloplast/Starch biosynthesis

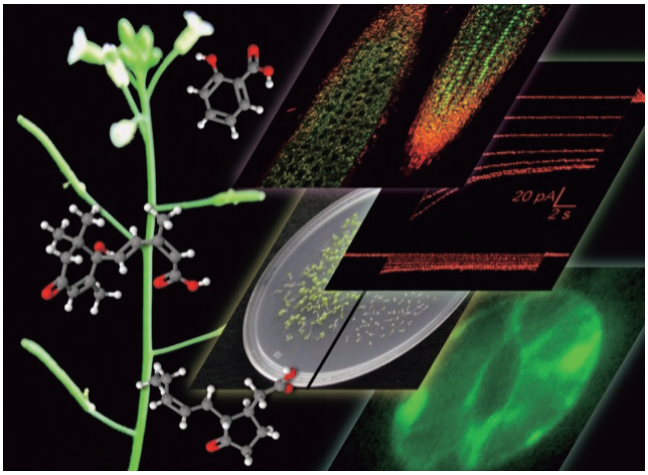
Assoc. Prof. OZAWA Shin-Ichiro

■Research Themes
Light-harvesting complex/Protein structural biology

Assoc. Prof. OKEGAWA Yuki

■Research Themes
Photosynthetic electron transport/Redox regulation

Signaling Mechanisms



Did you know that plants, despite being rooted in one spot, are actually quite adaptable to changes in their environment? It's fascinating to think about how they sense and respond to these changes without having a nervous system or brain like animals do. This is a question that scientists are still trying to answer. Our research group is specifically investigating how plants integrate and analyze environmental information, even at the tissue level, to determine the best response as individuals. We're focusing on plant hormone responses and chromatin regulation, using techniques like physiological and molecular biology, as well as molecular genetics. Our ultimate goal is to apply this knowledge to develop stress-tolerant crops that can thrive even in challenging conditions. By understanding how plants handle environmental stress, we can help create a more sustainable and resilient food supply for the future.

Prof. HIRAYAMA Takashi

■Research Themes
Environmental response mechanism of plants/Plant molecular genetics/Model plants/Epigenetics/Stomatal movement/Integration of environmental stimuli in plants

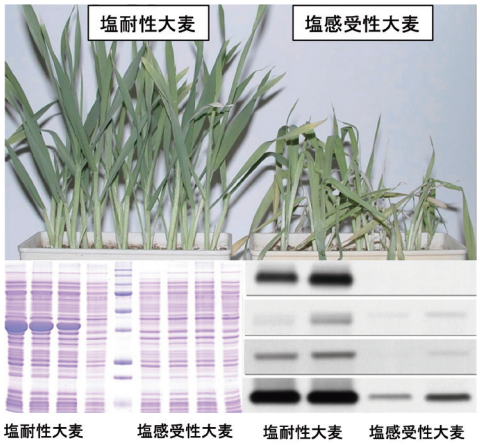
Assoc. Prof. MORI Izumi

■Research Themes
Environmental response mechanism of plants/Plant molecular genetics/Model plants/Epigenetics/Stomatal movement/Integration of environmental stimuli in plants

Assoc. Prof. IKEDA Yoko

■Research Themes
Environmental response mechanism of plants/Plant molecular genetics/Model plants/Epigenetics/Stomatal movement/Integration of environmental stimuli in plants

Plant Cytomolecular Biochemistry



Plants are sensitive to various environmental stimuli. They respond to physical, chemical, and biological stress factors. Consequently, plants can undergo changes in their development, morphology, and physiology during their life cycle. We have used biochemical and molecular biological techniques to elucidate the functions of enzymes, proteins, and gene regulating factors, which are all related to stress tolerance mechanisms of plant cells under environmental stress conditions. Through our research, we aim at developing plants that can adapt well to adverse and extreme environments to resolve difficulties such as food shortages and environmental degradation.

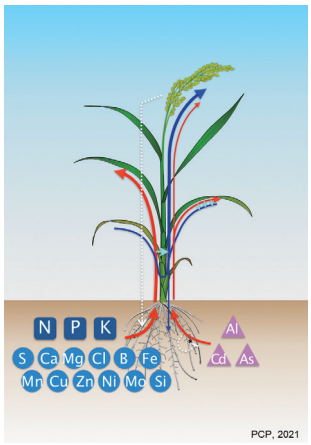
Assoc. Prof.
SUGIMOTO Manabu

■Research Themes
Environental Stress Biochemistry

Asst. Prof.
RIKIISHI Kazuhide

■Research Themes
Plant Molecular Genetics

Plant Stress Responses



Since plants cannot move, they must cope with various environmental stresses. In our group, we are focusing on "mineral stress" including deficiency of essential nutrients or excess of toxic and essential elements. We are working on the identification of transporters involved in the uptake, root-to-shoot translocation, and distribution/redistribution of different mineral elements mainly in rice, and on the regulatory mechanisms of these transporters in response to environmental changes. Our goal is to improve the productivity and safety of crops through the manipulation of transporters.

Prof.
MA Jian Feng

■Research Themes
Plant stress/Mineral transport/Transporters

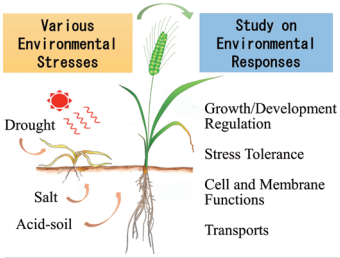
Assoc. Prof.
YAMAJI Naoki

■Research Themes
Plant stress/Mineral transport/Transporters

Assoc. Prof.
MITANI Namiki

■Research Themes
Plant stress/Mineral transport/Transporters

Plant Molecular Physiology



Our research has been focusing on the molecular, cellular, and physiological response and adaptation mechanisms of plants under environmental stresses. We report ion conduction in the plasma membrane and water conducting aquaporins in the tonoplast. We also report the relationship of transport function and structure regarding guard-cell-type ALMT family malate transporters.

Prof.
KATSUHARA Maki

■Research Themes
Ion transport/Water transport/Root/Salt stress

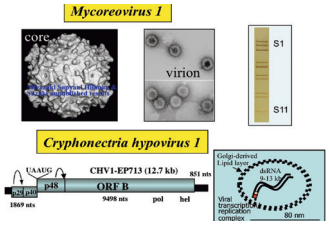
Assoc. Prof.
SASAKI Takayuki

■Research Themes
Acid-soil stress/Aluminum tolerance/Malate transporter/Stomatal closure

Asst. Prof.
UTSUGI Shigeko

■Research Themes
Drought stress/Aquaporin /Water transport/Seed

Molecular Virology



Plant growth is influenced by various microorganisms including both beneficial and harmful ones. Among them are plant-infecting viruses that cause serious damage to crops and mycoviruses infecting phytopathogenic fungi that serve as biocontrol (virocontrol agents). Also, an increasing number of bacteria and fungi mutualistic to plants that enhance plant growth and stress tolerance. This group is mainly engaged in the three projects below.

Assoc. Prof. KONDO Hideki

■Research Themes

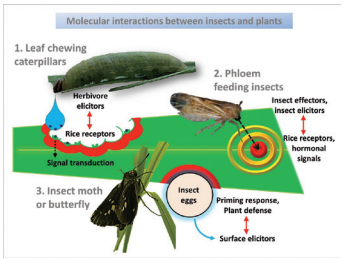
Virus/Phytopathogenic fungi/Plant Disease/Plant-Microbe Interactions/ Plant Pathology/Biological Control

Assoc. Prof. HYODO Kiwamu

■Research Themes

Virus/Phytopathogenic fungi/Plant Disease/Plant-Microbe Interactions/ Plant Pathology/Biological Control

Plant-Insect Interactions



Establishment of effective plant defense systems against herbivores in natural history reflects the existence of extremely variable interactions between plants and insects, also known as co-evolution process. Our group strives to understand, at a molecular level, the mechanisms of activation, signal transduction and metabolic basics of plant defenses triggered after the recognition of insect attack. Furthermore, we target sustainable pest control by the use of natural enemies and their attraction to herbivore-infested plants by the emissions of various volatile organic compounds (VOCs) from plants.

Prof. GALIS Ivan

■Research Themes

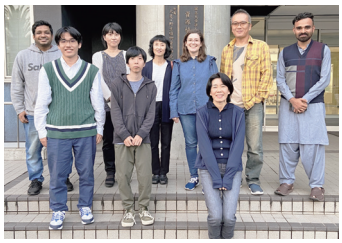
Plant-insect interactions/Plant defense mechanisms/Chemical ecology/Herbivore

Assoc. Prof. SHINYA Tomonori

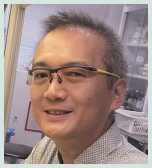
■Research Themes

Plant-insect interactions/Plant immunity/ Biofunctional molecules

Plant-Environmental Microbiology



By understanding the ecology of Methylobacterium species, which utilize methanol released by plants and dominate on leaves, we will apply their function as growth-promoting bacteria to agriculture. We are also analyzing the rhizosphere microbial community structure in crop ecosystems. On the other hand, we are trying to uncover the mechanism of growth and mortality of bloom-forming phytoplankton, which cause damage to fisheries, by focusing on symbiotic bacteria.



Assoc. Prof. TANI Akio

■Research Themes

Plant growth promoting bacteria/ Methylotrophs/Lanthanides

Assoc. Prof. UEKI Shoko

■Research Themes

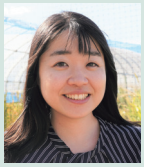
Bloom-forming phytoplankton/Marine bacteria

Plant-Pathogen Interactions

Rice is the world's most important crop, and improving rice is an important research challenge. Our ultimate goal is to design new rice varieties that exhibit resilience against abiotic stresses while augmenting essential agronomic traits. To achieve this ambitious goal, we investigate immunoreceptors and the small G protein OsRac1, both of which play pivotal roles in rice immunity. We firmly believe that we can successfully engineer a robust rice immune system by acquiring a comprehensive understanding of the functions performed by immunoreceptors and OsRac1.

Prof.
KAWANO Youji

■Research Themes
Rice/Immunity/NLR

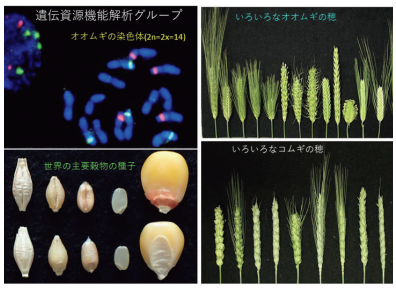


Asst. Prof.
FUKADA Fumi

■Research Themes
Plant pathology, Plant-microbe interaction

Plant Functional Genomics

Barley, the fourth most important cereal crop in the world, typically has seeds with adhered hulls. This hulled seed trait is suitable for breweries. Some naked seed mutants with easily separable hulls were generated through spontaneous mutation. They are suitable for food usage. We have revealed that barley awns and spike hulls are photosynthetically active. Our current research specifically examines molecular identification and characterization of beneficial genes controlling (1) seed morphology and quality, including water soluble healthy dietary fiber, and (2) photosynthetic contribution of awns and hulls by using mutants. We seek application of our basic findings to practical breeding.



Prof. TAKETA Shin

■Research Themes
Barley/Seed/Gene hunting/ Plant molecular genetics/ Plant physiology

Asst. Prof. Dr.
YAMASHITA Jun

■Research Themes
Wild plant/Database/ Evolution/Adaptation/ Resources

Plant Diversity Analysis

We conserve and evaluate barley genetic resources (varieties and lines) collected from all over the world. These genetic resources vary in characteristics depending on the location of collection and purpose of use, for example, there are regional differences in vernalization requirements (the degree of low-temperature exposure required for flowering). Based on our evaluation of genetic resources, we carry out genetic analysis, gene isolation, and functional analysis of stress tolerance, such as grain dormancy and disease resistance, for application use.

Prof. HISANO Hiroshi

■Research Themes
Plant molecular breeding/ Plant genetic resources/Barley

Assoc. Prof. SAISHO Daisuke

■Research Themes
Plant breeding/Plant Molecular genetics/ Population genetics/Barley

Integrated Genomic Breeding

Rice is cultivated globally and exhibits a wide range of phenotypic variations resulting from genetic diversity. These variations serve as valuable genetic resources for enhancing rice plants to meet human needs. Although many of these traits are governed by numerous genes, the genetic foundations and biological functions of the majority remain largely unknown, hindering their practical application. To address this, we leverage useful phenotypic variations from diverse rice germplasms and identify the underlying genes by combining recent advancements in genomics and bioinformatics. Our efforts are focused on developing new breeding materials and proposing more effective breeding methodologies.

Prof.
YAMAMOTO Toshio

■Research Themes
Crop breeding/Genome/
Polyploidy

Assoc. Prof.
NAGAKI Kiyotaka

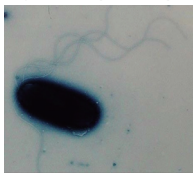
■Research Themes
Genome/Chromosome/
Haploid

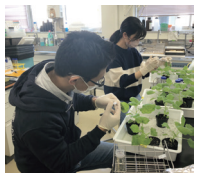
Assoc. Prof.
FURUTA Tomoyuki

■Research Themes
Crop breeding/
Wild species/Bioinformatics

Genetic Engineering

Understanding the pathogenicity of plant pathogens and elucidating plant defense mechanisms against plant pathogens is essential for plant disease control. Our research is focused on elucidating the pathogenicity of plant pathogens and plant resistance mechanisms at the genetic level using molecular genetic methods, with a view to their application in disease control.



Prof. ICHINOSE Yuki

■Research Themes

Pathogenicity of phytopathogenic bacteria/Virulence factor

Assoc. Prof. MATSUI Hidenori

■Research Themes

Pathogenicity of phytopathogenic bacteria/Virulence factor

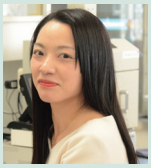
Asst. Prof. SAKATA Nanami

■Research Themes

Pathogenicity of phytopathogenic bacteria/Virulence factor

Plant Genome Dynamics Analysis

Our laboratory conducts genetic and breeding research on sweetpotato. Using a Next Generation Sequencer (hereinafter referred to as NGS) that outputs a huge amount of DNA sequence data, we are working on the development of DNA markers and gene identification related to important agricultural traits such as disease and pest resistance and yield. We are also conducting gene expression analysis (Iso-Seq, RNA-seq analysis, etc.) to elucidate the mechanism of disease resistance, and also developing novel genotyping systems applicable to polyplpoid crop species.

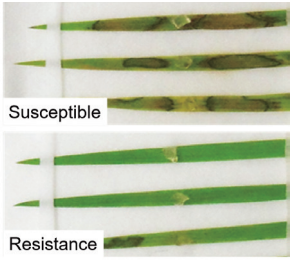



Prof. MONDEN Yuki

■Research Themes

Sweetpotato/Plant breeding and genetics/Genetic analysis/NGS/Poyploid/Cultivar discrimination/DNA marker

Plant Pathology



The Food and Agriculture Organization (FAO) reports that over 850 million people face insufficient access to food, and an estimated 24,000 people succumb to hunger daily. Given that plant diseases cause annual yield losses of up to 20% in food and cash crops, continuous improvement and advancement of pest management systems is essential to sustainably feed a growing world population. To achieve this goal, we focus on elucidating the molecular mechanisms that govern plant immunity and pathogen virulence, and on innovating new technologies to control plant diseases.

Prof. TOYODA Kazuhiro

■Research Themes

Plant pathology/Molecular plant pathology/Plant-microbe interactions

Prof. NOUTOSHI Yoshiteru

■Research Themes

Plant pathology/Plant immunity/Plant chemical biology/Infection strategy of filamentous plant pathogen/Plant defense activators/Biocontrol

Plant Genetics and Breeding

Molecular genetic study on diversity of crops and their wild relatives and its application to breeding

Prof. Dr. NISHIDA Hidetaka

■Research Themes

Plant breeding

Studies on genetic diversity and agronomic traits in crop genetic resources including wheat, and development of DNA markers available for marker-assisted selection

Asst. Prof. Dr. NISHIMURA Kazusa

■Research Themes

Plant breeding

Identification of useful genes in crops, especially wheat and barley.

Development of rapid genotyping methods, and cultivar identification methods.

Postharvest Physiology

We focus on a molecular understanding of fruit ripening and senescence using the omics approach, gene engineering and genetic analysis in fruit, vegetables and flowers. Based on the basic understanding, we develop functional technology to improve quality and to reduce postharvest loss of horticultural crops, which are useful in both developed and developing countries.

Prof. USHIJIMA Koichiro

■Research Themes

Molecular Physiology/Plant Genetics

Control of Flowering

Our research includes breeding, flowering regulation, cultivation, and post-harvest utilization techniques based on the physiology of flowers and vegetables. Future agriculture must be friendly to plants, people, and the environment. We contribute to future agriculture by developing rational and simple environmental control, fertilization, and irrigation technologies.

Prof. GOTO Tanjuro

■Research Themes

Root restriction/High temperature/ Physiological disorder/Flowering control

Assoc. Prof. ENDO Minori

■Research Themes

Vegetable horticulture/Strawberry/ Asparagus

Plant Production Science




過繁茂する雑草の防除

Development and systematization of production technology for crop cultivation based on improvement of productivity and environment conservation

Assoc. Prof. TANAKA Yu

■Research Themes
Crop Science

Assoc. Prof.
NAKASHIMA Yoshitaka

■Research Themes
Weed Science Establishment of an appropriate management system for weed vegetation and its effective use for environmental protection

Pomology

Okayama prefecture, known as a "Fruit Kingdom", is famous for the production of high-quality fruit, mainly peaches and grapes. One of the aims of our laboratory is to establish new resolution and cultivation methods to improve the productivity and quality of peaches and grapes. We also attempt to elucidate the physiological and genetic mechanisms regulating important agronomic traits, such as fruit development, ripening, texture, and inner disorder, by combining field-based experiments and molecular biological approaches.

Prof.
FUKUDA Fumio

■Research Themes
Peach/Grape/Fruit development/Fruit ripening/Fruit quality/Inner disorder/Nondestructive evaluation/Postharvest storage/Cultivation method/Eye tracking/Smart agriculture

Assoc. Prof.
HIRANO Ken

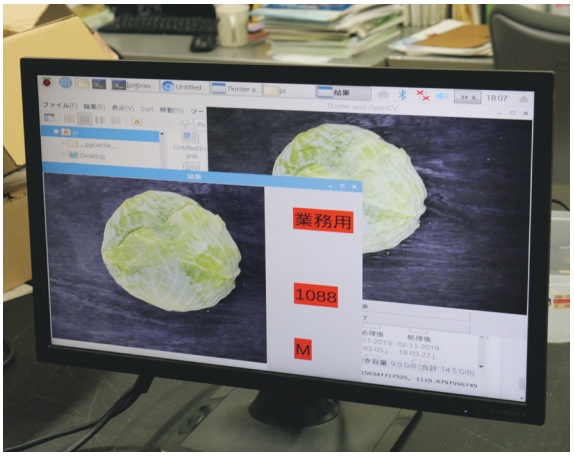
■Research Themes
Grape/Fruit development/Fruit ripening/Fruit quality/Seedlessness/Parthenocarpy/Plant growth regulator/Aroma component

Assoc. Prof.
KAWAI Takashi

■Research Themes
Peach/Fruit development/Fruit ripening/Fruit quality/Inner disorder/Nondestructive evaluation/Postharvest storage/Softening trait/Genetic analysis/3D point cloud analysis

Vegetable Crop Science

Investigation of physiological characteristics related to vegetable production and development of production systems



We are conducting research on vegetable production, such as tomatoes and strawberries, from the perspective of how the growing environment affects crop quality, yield and other agricultural traits. Recently, we especially focus on efficient environmental control in greenhouse cultivation and pollination control in strawberry production.
Another research theme is the use of the flowering hormone (florigen) in vegetable production and breeding. We are conducting basic research and developing technologies to efficiently deliver florigen using grafting for cruciferous vegetables such as cabbage and radish.
We are also carrying out various other studies on vegetables, such as the evaluation of quality characteristics of traditional vegetables, the development of efficient watering technology in cucumber cultivation, and the development of vapor pressure deficit (VPD) control methods in the cultivation of melons and eggplants.

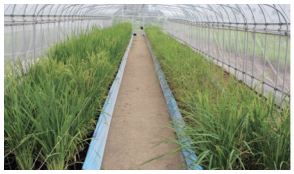
Prof. YASUBA Ken-ichiro

■Research Themes
Vegetable crop science/Agricultural information science

Asst. Prof. MOTOKI Ko

■Research Themes
Vegetable crop science

Crop Science



Environmental destruction is progressing now at an unprecedented scale, in the form of global warming and accompanying desertification, salt accumulation in soil, depletion of water resources, and so on. On the other hand, the human population continues to increase, and there is strong demand for expansion of food production. Therefore, in addition to improving the grain yield in arable land suitable for cultivation, production of agricultural crops is necessary even in inadequate lands affected by water shortage, salt accumulation etc. In this field we conduct physiological and ecological research and education concerning various crops for the purpose of improving crop production under defective environmental conditions.

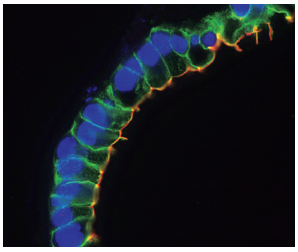
Prof. HIRAI Yoshihiko

■Research Themes
Rice/Salt tolerance/Grain yield

Asst. Prof. TOMITA Asami

■Research Themes
Rice/Breeding/Abiotic stress tolerance

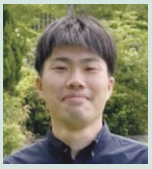
Reproductive Physiology



We investigate the reproductive mechanisms of mammals, particularly the functions of the ovary, oviduct, and uterus, aiming contribution to the efficient production of livestock animals and human reproductive medicine.

Prof. KIMURA Koji

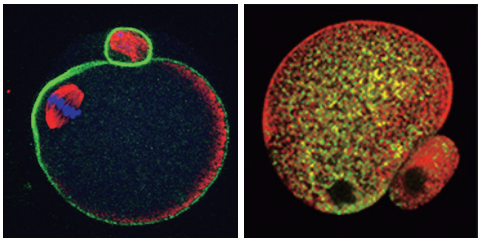
■Research Themes
Reproductive Physiology/Endocrinology/Cell Physiolo



Asst. Prof. KAWANO Kohei

■Research Themes
Reproductive Physiology/Endocrinology/Cell Physiolo

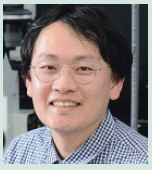
Animal Development and Reproductive Biotechnology



We are developing new more effective IVF systems and micromanipulation techniques for gametes in mammals including humans. Through these technological developments, we are also undertaking basic studies to make clear the systems of gamete (oocytes and spermatozoa) formation, fertilization and early development, as well as applied studies to improve the efficiency in the production of more value-added useful animals. The details are as follows.

Prof. FUNAHASHI Hiroaki

■Research Themes
Reproductive biology/Oocyte maturation/Sperm capacitation/In vitro embryo production/Mitochondrial quality control

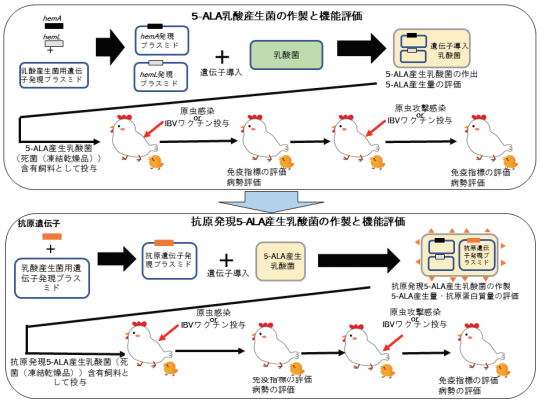


Assoc. Prof. WAKAI Takuya

■Research Themes
Reproductive biology/Oocyte maturation/Sperm capacitation/In vitro embryo production/Mitochondrial quality control

Animal Physiology

To obtain the knowledge for homeostasis system by elucidating pathogenesis and immune system using chicken and parasite as an experimental model. Also, exploration of beneficial microorganisms, feed crops, nutrients etc. that have protective effects against infectious diseases or effects of symptom alleviation, and vaccine development for livestock.

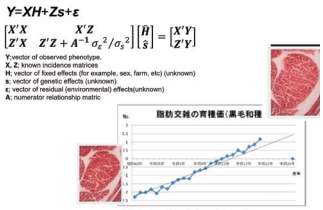


Prof. HATABU Toshimitsu

■Research Themes
Host-Parasite relationship/Probiotics/Avian coccidiosis/Vaccine development

Animal Breeding and Genetics

The aim of animal breeding and genetics is to investigate invisible genetic events using statistical and molecular genetics analysis. In particular, we are interested in genetic evaluation using genomic information and the genetic diversity in the animal population. Through our research activity, young scientists are encouraged to acquire the necessary knowledge and techniques to pursue scientific careers in quantitative genetics in the post-genome era. Additionally, we are studying the effects of pre-slaughter fasting stress on meat quality and skeletal muscle protein degradation. By accurately estimating the genetic traits of animals and elucidating the mechanisms by which stress impacts productivity, we strive to optimize animal production systems..



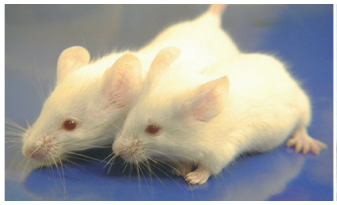
Assoc. Prof. IBI Takayuki

■Research Themes
Animal Breeding

Asst. Prof. KATSUMATA Sachi

■Research Themes
Animal Nutrition and Physiology

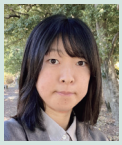
Applied Animal Genetics



Our lab investigates the genetic factors underlying human and animal diseases by analyzing genes responsible for hereditary diseases in experimental animals and livestock. We mainly focus on the functions of genes involved in reproductive function and bone growth by utilizing mutant mice and genetically modified mice/rats through genome editing. For industrial animals, we explore favorable and unfavorable genetic variants and evaluate genetic diversity from genome sequences, with the aim of utilizing these genetic characteristics.

Prof. TSUJI Takehito

■Research Themes
Animal genetics/Genome/Genetic disease/Mouse/Cattle



Asst. Prof. NAGAE Mayuko

■Research Themes
Reproductive biology/Reproductive endocrinology/Developmental engineering/Animal genetics/Genetic diseases/Mouse/Rat

Animal Nutritio and Feed Science

Nutrition is the study of a series of biological processes necessary for life. The goal of nutrition study is to improve human health and quality of life. Animal nutrition is a field that has been expanded to include animals. In our laboratory, we are doing research using a variety of animals, i.e., model animals, food-producing animals (livestock), wild animals, and companion animals. The research using model animals aims to clarify biochemical and physiological mechanisms associated with nutrition and metabolism. The members working on the projects use model animals and cultured cells for functional analyses of food. Several students work on food processing and its control. They are examining the characteristics of microorganisms involved in fermentation to improve the safety and value of food and feed. Our goal is to solve problems in the industries, clarify the functions of food and feed, and achieve technological innovation related to nutrition, metabolism, and health.

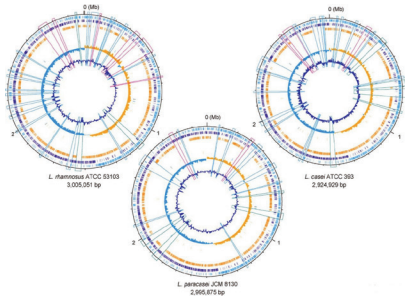
Prof. NISHINO Naoki

■Research Themes
Nutrition/food/Hygiene/management/Farm animal/Wild animal/Companion animal

Assoc. Prof. TSURUTA Takeshi

■Research Themes
Food Immunology/Functional Food Science

Animal Applied Microbiology

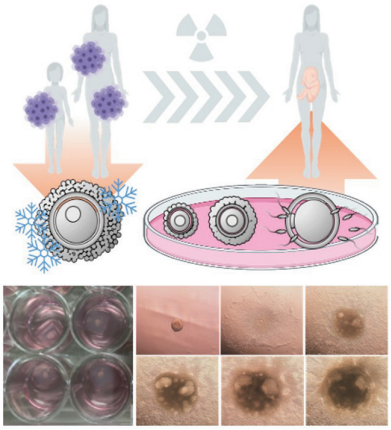


It has become clear that gut microbiota (microflora) changes depending on the food components ingested by humans and their lifestyle, and that differences and changes in the microflora affect human health and disease. Morita group analyzes the gut microbiota of humans and animals, and tries elucidating the functions of the microbiota.
In Arakawa group, roles and application of beneficial microorganisms, mainly lactic acid bacteria, for processing and preservation of milk and egg products are researched. In particular, it is aimed to create novel safe and high quality milk and egg products using functional substances from and fermentation techniques with lactic acid bacteria.
In addition, both groups also carry out whole-genome analysis of intestinal bacteria, bifidobacteria and lactic acid bacteria radically to understand them.

Assoc. Prof. ARAKAWA Kensuke

■Research Themes
Milk and egg science/Lactic acid bacteria/
Food microbiology

Assisted Reproductive Technology



Our laboratory aims to develop safer and more reliable assisted reproductive technologies by analyzing in detail the effects of the environment surrounding oocytes, sperm, and embryos. We are engaged in research on cryopreservation of gametes and embryos for the purpose of fertility preservation (ability to conceive) due to cancer treatment, etc., and in vitro culture of ovarian tissue and oocytes. We are committed to conducting research to contribute not only to the medical field but also to animal production and species conservation.

Asst. Prof. TASAKI Hidetaka

■Research Themes
Reproductive Medicine/Oocyte/Ovary/
Fertility Preservation