

## Outline of Graduate School of Agriculture, Kyoto University for 2017

### Division of Agronomy and Horticultural Science

Laboratory	Research contents	Research staff
Crop Science	Development of theories for efficient and stable production of agricultural crops in harmony with the environment Physiological and ecological research on the characteristics of crops, especially in relation to the interaction of gene and environment on yield and quality	Tatsuhiko Shiraiwa Tomoyuki Tanaka Yu Tanaka
Plant Breeding	Search and isolation of useful genes which are the basis for breeding staple plants such as rice, wheat and soybeans, and physiological analysis of their mechanism of phenotype expression Investigation of the activation mechanism of the transposable element of rice, specifically MITE, isolation of genes by transposon-tagging, and development of molecular markers for useful genes	Yutaka Okumoto Masayoshi Teraishi
Vegetable and Ornamental Horticulture	Physiological and ecological researches on the production and quality control of vegetables and ornamental plants, with special emphasis on the development of environmental control techniques, production and propagation techniques for disease-free plants and new breeding techniques by tissue culture	Motoaki Doi Munetaka Hosokawa Sho Ohno
Pomology	Physiological and ecological investigation of the whole lifecycle of fruit trees, specifically flowering, pollination physiology, growth and ripeness of fruits; systemic biology of genetic resources of fruit trees; and proliferation and breeding of fruit trees by utilizing a tissue and cell culture system	Ryutaro Tao Hisayo Yamane Takashi Akagi
Weed Science	Weed biology for the establishment of rational weed management programs. Ecological and genetic analyses on the evolution of life history strategies of weeds, the origin and reproductive biology of herbicide resistant biotypes of weeds and alien weeds, crop-weed complex through introgression, and man's impacts on the diversity of weed flora and genetic structure of weed populations.	Tohru Tominaga Yoshiko Shimono Satoshi Iwakami
Plant Production Systems	Basic and empirical research aimed at clarifying current problems in agricultural production systems in Japan from the perspective of the mechanisms and functions of an agricultural ecosystem, conserving the ecosystems and creating a highly-productive and sustainable agricultural production system	Tatsuya Inamura Hiromu Inoue Naoki Moritsuka
(Uji) Food Quality Design and Development	Basic research aimed at developing high quality food proteins Mechanism of folding and quality control of soybean storage proteins in the endoplasmic reticulum Mechanism of transport of seed proteins to the protein storage vacuoles Relationship between protein structure and food function Protein engineering and X-ray crystallographic analysis of dietary and functional proteins	Reiko Urade Nobuyuki Maruyama Taro Masuda
(Uji) Quality Analysis and Assessment	Quality analysis and assessment of food crops and processed food materials Food science of emulsions and gels Mechanism of oral sensory reception mainly for taste sensation Analysis of aroma compounds of foods and horticultural plants to reveal their physiological effects	Yasuki Matsumura Yukako Hayashi Kentaro Matsumiya
(Farm) Plant Production Control Science	Physiological, ecological, genetical, and molecular biological basic research and applied research in the agricultural field on important elements for increasing productivity and high-quality production with a decrease in environmental loads among agricultural and horticultural crops	Akira Kitajima Tetsuya Nakazaki Keisuke Katsura Hiroki Saito Rihito Takisawa Takashi Kawai

(Uji) Uji Campus ..... Gokasho, Uji-shi, Kyoto

(Farm) Experimental Farm of Graduate School of Agriculture, Kyoto University ..... Shiroyamadai, Kizugawa-shi, Kyoto

## Division of Forest and Biomaterials Science

Research fields	Research contents	Research staff
Forest Resources and Society	Ecological and socio-economic studies on timber production and environmental services of forest in Southeast Asia and in Japan. Specifically, studies focusing on biodiversity conservation, carbon pool function, ecologically sustainable forest management, non-timber forest products and ecotourism	Mamoru Kanzaki Koji Matsushita
Tropical Forest Resources and Environments	Research on forest ecology, forestry and environmental issues in the tropics. Specifically, functional ecology of forest plants, seedling regeneration and maintenance mechanism of tropical forests, plant-soil interactions, restoration and reforestation of degraded tropical forests, options for sustainable timber production and land-use systems, responses of tropical forests to climate change, and the environmental services of tropical forests	Kaoru Kitajima Takayuki Kaneko
Forest Utilization	Research on the evaluation of multilateral functions of forests and sustainable utilization of those functions. Specifically, evaluation of the structural development of forests and carbon accumulation in a forest ecosystem, the ecophysiology of tropical forests, and the investigation of forest resource management measures using remote sensing data, etc.	Akira Osawa Naoki Okada Masako Dannoura
Forest Biology	Ecological research on plants in forests, the structure and function of communities, the genetic structure of wild populations, forest damage caused by wild animals and insects, and damage prevention and forest protection. Conservation genetics and ecology of forest plants and animals	Yuji Isagi Atsushi Takayanagi Michimasa Yamasaki
Landscape Architecture	Principles, landscape ecology, greenery engineering, landscape planning and environmental design for the protection, conservation, regeneration and creation of landscapes (the nature and culture of the land) Researches on gardening culture, urban revegetation, forest landscapes, the conservation of natural environment and damage mitigation, etc.	Shozo Shibata Katsue Fukamachi Junichi Imanishi
Erosion Control	Researches on sediment production and discharge phenomena such as landslide and debris flow, rainfall infiltration and outflow phenomena and their impacts on forests, measures against sediment-related disasters in mountainous terrain, slope greening, and mountain stream environments	Ken'ichiro Kosugi Kana Nakatani Naoya Masaoka
Biomaterials Design	Fundamental investigation and application of physical properties of biomaterials Specifically, 1) Searching physical properties of biomaterials and designing new materials, 2) Fracture and fatigue mechanics of wooden material and wood structural materials, 3) Scientific studies on the affinity of humans and biomaterials	Masashi Nakamura Koji Murata
Wood Processing	Basic and applied researches on the processing and utilization of wood. Specifically, the mechanism of wood cutting, the non-destructive inspection of wooden materials and structures in production and in service, involving the evaluation of wood surface using sensory test and pattern recognition, the analysis of moisture migration in wood drying, detection of physical properties and biodegradation, using acoustic, microwave, millimeter wave and X-ray CT.	Yoshihisa Fujii Yutaka Sawada Yoshiyuki Yanase
Fibrous Biomaterials	Development and application of advanced utilization methods of biomass The creation of cellulosic functional materials with magnetic processing Crystal structure analysis by X-ray, neutron and solid nuclear magnetic resonance for polysaccharides and physiologically active substances using magnetically aligned samples	Tsunehisa Kimura Masahisa Wada Ryosuke Kusumi
Tree Cell Biology	Ultrastructure of lignified secondary wall Cytochemical investigation on cell wall formation in woody plants Biosynthesis and accumulation of cell wall components and their functional analysis Topochemical analysis of cell walls and their utilization for biomass resources The relationship between morphological characteristics and solid state properties of biomaterials	Keiji Takabe Arata Yoshinaga Tatsuya Awano
Chemistry of Composite Materials	Creating excellent functional high-polymer materials from biomass such as wood, cellulose, chitin, and glucose via diverse chemical composition techniques, Specifically, designing and developing biodegradable plastic, liquid crystals, optical materials, adhesive materials, foam and molded materials, magnetic materials, soft materials (gels), etc.	Yoshiyuki Nishio Mariko Yoshioka Kazuki Sugimura

Chemistry of Biomaterials	Basic and applied chemistry of biomaterials, mainly wood components. (1) Chemical analysis of biomaterials (chemical structure elucidation of lignin carbohydrate complex (LCC) etc.); (2) Development of new reaction of biomaterials (regio-selective reaction of cellulose, electro-oxidation of lignin etc.); (3) Functionalization of biomaterials (preparation of cellulosic LB film for photo-current generation system, new cellulose derivative for drug delivery system etc.).	Toshiyuki Takano Hiroshi Kamitakahara
(FSERC) Forest Information	Researches on analyses of environmental changes in forested watersheds, the evaluation of multifunctional roles of forests, and the optimal management of forest resources based on the scientific and sociological valuations. Specifically on 1) mechanisms of material outflow from forests and evaluation of their impacts on water systems, 2) the management of forest resources, wood distribution and consumption processes, 3) the interaction between plant and soil and 4) the proper management based on the ecological knowledge.	Takahito Yoshioka Ryunosuke Tateno Tadashi Nakashima Michinori Sakimoto Nao Sakanoue Asami Nakanishi
(FSERC) Silviculture	Research on biogeochemical cycle in forest ecosystems and the application of ecosystem approaches toward the conservation and development of sustainable and resilient forest ecosystems. Researches on various problems with the production and maintenance of forest resources, such as timber production, and the mechanism of maintenance and restoration of forests. Researches on various problems relating to the preservation, regeneration and adaptation of environmental slope-related species.	Naoko Tokuchi Hisashi Hasegawa Takeshi Ise Masae Ishihara Hikaru Nakagawa Wakana Azuma
(RISH) Biomass Morphogenesis and Information	Fundamental research to understand how the nature produces wood and its cell walls. Chemometrical analyses toward the novel utilization of plant biomass. Biosynthesis, biodegradation and related ultrastructure of cellulose and other natural polymers. Tomography as a tool for 3D wood anatomy and identification for cultural heritage. Assessment and preservation of historical and archeological wooden objects. Structural analysis of cell walls using genetically engineered plants	Junji Sugiyama Tomoya Imai Kei'ichi Baba Suyako Tazuru
(RISH) Active Bio-based Materials	Nanostructural analysis of biological resources for the utilization of wood materials Development of high-performance nanomaterials for vehicles and information technology devices using plant biomass resources Solid state properties of wood under high pressure and high temperatures Temperature and humidity control functions of wood in a housing environment Analysis of crystal structure of polysaccharides and their derivatives Analysis of structural functions using computational chemistry, and upgrading their performance with a computer-aided molecular design Deeply understanding the mechanism of how trees support their huge body	Hiroyuki Yano Kentarō Abe
(RISH) Sustainable Materials	Research and development of a cyclical system, which contributes to sustainable production, processing, product use, and disposal and recycling of wood biomass. More specifically, creating new environmentally-friendly wood based materials by making use of the structure and component of wood biomass and comprehensive development of a production system and recycling technology.	Kozo Kanayama Kenji Umemura
(RISH) Innovative Humano- habitability	Research and development of the integrated wood protection system Feasibility of wood-degrading agents for environmental bioremediation and new-energy options Diversity of wood-deteriorating organisms in the tropical plantation forests Microtextural analysis of carbonized wood and development of non-platinum cathode catalysts for fuel cells Development of functional materials by fast pyrolysis Insect pathology and microbiological control for sustainable agricultural production Disease resistant behavior characteristic in social insects	Tsuyoshi Yoshimura Toshimitsu Hata Aya Yanagawa
(RISH) Structural Function	Development of high performance residential and non-residential timber building made of wood and wood-based composite materials Evaluation of mechanical properties of wooden structural components and connections Examination of bio-deterioration effect on structural performance of timber buildings	Hiroshi Isoda Takuro Mori Akihisa Kitamori

(FSERC) Field Science Education and Research Center

Forest Station

Ashiu Forest Research Station ..... Ashiu, Miyama-cho, Nantan-shi, Kyoto

Hokkaido Forest Research Station ..... Tawa, Shibeche-cho, Kawakami-gun, Hokkaido

Wakayama Forest Research Station ..... 76 Kamiyukawa, Aridagawa-cho, Arida-gun, Wakayama

Field Station

Kamigamo Experimental Station ..... 2 Kamigamo Motoyama, Kita-ku, Kyoto

Tokuyama Experimental Station ..... Tokuyama-hachikubo, Sunan-shi, Yamaguchi

Kitashirakawa Experimental Station ..... Kitashirakawa Oiwake-cho, Sakyo-ku, Kyoto

(RISH) Research Institute for Sustainable Humanosphere ..... Gokasho, Uji-shi, Kyoto

## Division of Applied Life Sciences

Research fields	Research contents	Research staff
Cellular Biochemistry	Researches to understand how the membrane meso-domains are formed and reorganized and how the membrane meso-domains affect various cellular functions such as growth and differentiation. Membrane transporters (especially ABC proteins), receptors, ion channels, cell adhesion molecules, cytoskeletons, and signaling molecules of animal cells, which are related to various diseases, are studied using methods of biochemistry, molecular biology, cell biology, and structural biology.	Kazumitsu Ueda Noriyuki Kioka Yasuhisa Kimura Atsushi Kodan *1 Koh Nagata *1
Biomacromolecular Chemistry	Correlations between the molecular structure of biomolecules and the expression of physiological functions Basic analysis of cell kinetics and dynamics Fundamental analysis of bioinformation and application to its integration Practical researches relating to life, environmental, health, and food sciences based on biological measurement such as omics analysis Development of frontier molecular biotechnology such as combinatorial bioengineering and nanobiotechnology	Mitsuyoshi Ueda Kouichi Kuroda Wataru Aoki
Bioregulation Chemistry	Organic chemistry and biochemistry of biologically active substances and their structure-activity relationships. Regulation of insect molting and metamorphosis using chemical growth regulators. Searches for insecticidal peptides and plant defense inducing peptides. Chemical regulation of secondary metabolism in plants. Metabolism of auxin plant hormone	Hisashi Miyagawa Yoshiaki Nakagawa Masahiro Miyashita
Chemical Ecology	Characterization of chemical factors related to interactions among organisms and analysis of their ecological significance The main research themes are chemical analyses of physiologically active substances such as insect pheromones, and chemoecological investigation of semiochemicals affecting the mutual interactions between insects and plants Clarification of growth regulation and environmental adaptation mechanisms of insects by hormones	Naoki Mori Hajime Ono Naoko Yoshinaga
Plant Nutrition	Physiobiochemical and molecular biological researches on the absorption of essential elements in plants and clarification of their functions Researches on element circulation in soil and its utilization Research on organic fertilizers	Toru Matoh Masaru Kobayashi Kumiko Ochiai
(Uji) Bioenergy Conversion	Molecular enzymology and evolution of restriction-modification enzymes Biological function and application in biotechnology of restriction-modification system Molecular cell biology research on the mechanism of adapting organisms to environmental stress with yeast as a model organism	Keiko Kita Yoshiharu Inoue
Fermentation Physiology and Applied Microbiology	Screening and application of microbial functions Researches on clarifying microbial metabolism and biosynthesis at enzyme, gene and molecule levels Metabolic engineering for lipids, nucleic acids, amino acids, organic acids, and sugars productions Chiral technology utilizing microbial enzymes Bioenergy production Development of ecosystem controlling technology These researches are carried out in collaboration with Laboratory of Industrial Microbiology (Contributed Chair) and Research Unit for Physiological Chemistry.	Jun Ogawa Shigenobu Kishino Akinori Ando Satomi Takahashi *2 Makoto Hibi *2 Michiki Takeuchi*2
Microbial Biotechnology	Search for new cellular regulatory functions based on cellular metabolism, gene expression, dynamics of cell structures, and their application to useful metabolite and protein production, innovative resource development and environmental conservation technology.	Yasuyoshi Sakai Hiroya Yurimoto Masahide Oku Jun Hoseki
Bio-Analytical and Physical Chemistry	Clarification of the functions of biodynamic molecules and molecular aggregates relating to energy conversion and information conversion, and application of these functions Oxidation and reduction enzymes, electron transport reactions, photosynthetic reactions, biological membrane iron transportation, biosensors, biofuel cells, etc.	Kenji Kano Osamu Shirai Yuki Kitazumi
Biofunction Chemistry	Bioorganic chemical researches to elucidate the mechanisms of enzymes closely related to mitochondrial functions, such as the respiratory enzymes and membrane transporters, based on the design synthesis of chemicals possessing unique physiological activities and the functional characterization of them.	Hideto Miyoshi Masatoshi Murai Masato Abe

(Uji) Applied Structural Biology	X-ray crystal structure analysis and protein engineering of food related proteins and enzymes such as egg albumins, amylase, transglutaminase and serine protease inhibitors The mechanisms of protein folding and unfolding The mechanism of large protein crystal growth for neutron diffraction study	Bunzo Mikami Nobuyuki Takahashi Kimihiro Mizutani
(ICR) Chemistry of Molecular Biocatalysts	Rational molecular design and synthesis of transition-state analogue, intermediate analogue and mechanism-based inhibitors and activators of enzymes to unravel the structure, function and reaction mechanisms of biocatalysts Creation of novel artificial compounds with unprecedented biological activities by controlling the activities of specific enzymes, and the applications to medicinal and agricultural chemicals for novel drug lead discovery and optimization Bioorganic and chemical studies on defining the physiological roles of biocatalysts at the molecular level and controlling their function by using finely designed chemical probes	Bunta Watanabe
(ICR) Molecular Microbial Science	Studies on the molecular basis of environmental adaptation of extremophilic microorganisms and their application Mechanistic analysis of enzyme reactions and their application Biochemical analysis of specific functions of lipids and proteins in biological membrane and the mechanism of their biosynthesis	Tatsuo Kurihara Jun Kawamoto Takuya Ogawa
(RISH) Plant Gene Expression	Isolation and functional analysis of genes related to the transport and accumulation of valuable natural products (secondary metabolites) in higher plants Molecular breeding of plants with these genes Mechanisms of nodule formation and symbiotic nitrogen fixation in legume plants Development of environmental purification technology using plants (phytoremediation)	Kazufumi Yazaki Akifumi Sugiyama
(RISH) Metabolic Science of Forest Plants and Microorganisms	Chemical, biochemical, molecular biological and system biological researches of regulatory mechanisms of lignocellulosic biomass formation in plants Creation of highly durable trees, grass plants which are adaptable to biorefinery, and trees adaptable to a recycling-oriented society Biosynthesis of antitumor lignans Elucidation of supramolecular structures of lignocellulose	Toshiaki Umezawa Yuki Tobimatsu Shiro Suzuki
(RISH) Biomass Conversion	Fundamental and applied studies of conversion of lignocellulosic biomass into biofuels, chemicals and functional substances with microorganisms, enzymes and chemical reactions in electromagnetic field Molecular biological and biochemical studies of basidiomycetous fungi for biorefinery and bioremediation; Regulation mechanism of extracellular free radical reactions through secondary metabolites and enzymes Expression and catalytic mechanism of lignin-degrading enzymes Analysis of superfine structure of plant cell wall components and their interaction with cellulolytic enzymes and peptides	Takashi Watanabe Takahito Watanabe Hiroshi Nishimura

(Uji) Uji Campus ..... Gokasho, Uji-shi, Kyoto

(ICR) Institute for Chemical Research ..... Gokasho, Uji-shi, Kyoto

(RISH) Research Institute for Sustainable Humanosphere ..... Gokasho, Uji-shi, Kyoto

\*1 Institute for Integrated Cell-Material Sciences, Kyoto University (iCeMS)

\*2 Laboratory of Industrial Microbiology (Contributed Chair)

## Division of Applied Biosciences

Research fields	Research contents	Research staff
Plant Genetics	Heredity of useful higher plants, specifically, cytogenetics, population genetics, evolutionary genetics and molecular genetics. Metagenome analysis and community genetics of soil bacteria.	Naohiko Miyashita Shuhei Nasuda
Crop Evolution	Researches on crop evolution and plant genetic resources Genetic diversity of crops and closely related wild plants Ethnobotany and Archaeobotany	Ryohei Terauchi Yasuo Yasui
Plant Pathology	Biochemical and molecular biological researches on phytopathogens and researches on the interactions between pathogens and plants. Specifically, researches on the infection mechanism of filamentous fungi, the proliferation mechanism of RNA viruses, and the mechanism of plant defense against pathogens.	Yoshitaka Takano Kazuyuki Mise Masanori Kaido
Insect Ecology	Researches on the ecology of insects, specifically, their life history strategy, behavioral ecology, population dynamics and insect pest management Researches on the evolution of termite reproductive systems Theoretical studies on insect sex ratios Molecular basis of the extended longevity of reproductives in social insects Development of novel termite control technology	Kenji Matsuura Shigeto Dobata Takehiko Kakutani (The Kyoto University Museum)
Insect Physiology	Molecular endocrinology of insects, focusing especially on hormonal control of molting and metamorphosis Chemical ecology, physiology, and evolution of insect sex pheromones Development of novel genetic tools for genome engineering of non-model insects	Takaaki Daimon
Animal Breeding and Genetics	Theory and practice of genetic evaluation of resource animals QTL analysis and selection methods of useful traits Theory and practice of conservation and breeding of rare animals	Yukio Taniguchi Hirokazu Matsuda
Animal Reproduction	Clarification of molecular mechanisms on oocyte maturation and early embryonic development in mammals The production of useful animals and conservation of rare animals using animal cloning, genetic engineering and stem cell technologies Clarification of molecular mechanisms of nuclear reprogramming and the regulation of cell differentiation of somatic cells	Hiroshi Imai Masayasu Yamada Naojiro Minami Yoichiro Hoshino (Livestock Farm)
Nutritional Science of Animals	Nutritional physiology of ruminants Metabolism and function of micronutrients in animals Roles of the TGF- $\beta$ family in the proliferation, differentiation and maturity processes of mesenchymal cells Attenuation of stress responses by early nutrition	Tohru Matsui Masayuki Funaba Shozo Tomonaga
Animal Physiology and Functional Anatomy	Research on the physiology, immunology and production functions of animals Clarification of the effects of highly functional elements, environmental alteration and pollution on physiological and reproductive functions Researches on functional morphology and its regulation of mammalian reproductive organs	Shinichi Kume Miki Sugimoto Shuntaro Ikeda
Animal Husbandry Resources	System research on beef cattle production Research on the conservation of indigenous animal resources Research on the utilization of livestock and feed in tropical regions Utilization of unused resources Research on the behavior of grazing animals with GPS and acceleration loggers	Hiroyuki Hirooka Hajime Kumagai Kazato Oishi
Fisheries and Environmental Oceanography	Researches on the nutrient transport, which allows sustainable production in coastal areas Researches on the mechanisms of eutrophication and hypoxia (oxygen depleted water) Researches on the marine ecosystems Researches on the physical-biological interactions in the sea Research on the aquatic animals' behavior using biologging	Nobuaki Arai Kotaro Ichikawa Shiho Kobayashi
Marine Stock-Enhancement Biology	Physiology, ecology and systematics of fish, as a basis for stock-enhancement of marine biological resources in a broad sense Researches on life history relating to early mortality, and developmental endocrinology of flatfish metamorphosis Molecular genetic research on population structure, as a basis of marine stock-enhancement Researches on taxonomy and phylogeny of fish based on morphology, DNA analysis, and geographical distributions	Masatomo Tagawa Kouji Nakayama

Marine Molecular Microbiology	Molecular biology, physiology and metabolomics of novel thermophilic microbes for construction of a platform towards production of new materials and enzymes. Molecular biology of hydrospheric microbial viruses for next-generation fermentation using their host takeover system. Ecology, genomics and metagenomics of hydrospheric microbes and their viruses for understanding of their roles in global nutrient cycling and their evolution.	Yoshihiko Sako Takashi Yoshida
Marine Environmental Microbiology	Researches on genetic analyses and manipulations of microalgae to produce carotenoids, biofuels and useful chemicals Researches on physiology and ecology of marine methanogens and fungi Researches on physiology and ecology of microbes living in extreme environments Researches on molecular mechanisms underlying symbiosis	Shigeki Sawayama Satoshi Nakagawa
Marine Bioproducts Technology	Screening of novel bioactive components contributing to our healthy life style from oceanic lives and elucidation of their functional mechanisms based on cellular and molecular biology, especially clarification of effects of marine compounds on the lipid metabolism through nuclear receptors Recent research focuses on preventing obesity, allergy and cardiovascular diseases, and maintaining sound skin	Tatsuya Sugawara Yuki Manabe
Marine Biological Function	Clarification of adaptive functions of marine organisms to diverse ecosystems and development and utilization of genetic engineering. Elucidation of health promoting functions of aquatic products. Functions of marine/aquatic organisms from molecules, individuals to ecosystem are integrated for exploring new academic field.	Kenji Sato Haruhiko Toyohara Masato Kinoshita
(FSERC) Coastal Fisheries Ecology	Studies on ecosystem and biological production structure in coastal waters and effects of terrestrial areas including forests, agricultural fields and towns through river discharge Ecology and behavior of marine animals Systematics and biogeography of fish and aquatic invertebrates Environmental DNA	Yoh Yamashita Reiji Masuda Yoshiaki Kai Keita Suzuki

The Kyoto University Museum ..... Yoshida-honmachi, Sakyo-ku, Kyoto  
Laboratory of Crop Evolution Plant Germ-plasm Institute ..... Mozume-cho, Muko-shi, Kyoto  
(FSERC) Field Science Education and Research Center  
Maizuru Fisheries Research Station..... Nagahama, Maizuru-shi, Kyoto  
Livestock Farm ..... Kyotanba-cho, Funai-gun, Kyoto

## Division of Environmental Science and Technology

Research fields	Research contents		Research staff
Comparative Agricultural Science	Comparative Agricultural Science	Complex research on various aspects of human-caused environment systems including food, life and the environment, and their mutual relationships across a broad spectrum. For example, the relationships between the dynamic state (degradation, absorption and metabolism) of environmental burden factors (agrochemicals, endocrine disrupting chemicals, etc.) and their chemical structures, the behavior of agrochemicals in the environment around suburban agricultural areas in tropical zones, genetic improvement in consideration of the domestic and overseas diversity of various livestock as well as regional peculiarities, clarification of the physiology and ecology of plants by chemical methods, and application of natural substances to agricultural production, development and application of measures evaluating land as a socio-ecological system for sustainable land use, etc.	Nobuhiro Hirai Miki Akamatsu Takeshi Miyake Hitoshi Shinjo
Forest Ecology	Biology and ecology	Studies on the nutrient-use efficiency of trees, tree eco-physiology, functions of biological diversity, and soil nutrient dynamics to understand the mechanisms of long-term maintenance of forest ecosystems. Studies on the mechanisms of the maintenance of biological diversity, and the biological interactions between insects and plants in forest ecosystems. Ecological studies to achieve sustainable forest management.	Kanehiro Kitayama Naoya Osawa Yusuke Onoda
Forest Hydrology		Gas exchange processes between forest and the atmosphere from the photosynthesis and transpiration on an individual leaf scale to the water and carbon fluxes at an ecosystem scale. Hydrological and hydrochemical processes in the forest, soil and stream system of a small catchment. Evaluating forest influences on the watershed management and forest-climate interactions based on the field observations in temperate and tropical forests.	Yoshiko Kosugi Katsuyama Masanori
Forest Biochemistry		Molecular and biochemical studies on recycling system of forest biomass by natural organisms. Basic and applied sciences of mushroom-forming fungi with respect to their unique properties such as lignin-degrading system and simple carbohydrate modification of protein. Molecular breeding of bamboos to create a new plant resource, by modifying flowering regulation and/or sugar translocation.	Yoichi Honda Masahiro Sakamoto Takehito Nakazawa
Tropical Agriculture		Clarification of environmental factors, especially water environment, which affect the agricultural productivity in the tropics, The impacts of farming conditions and environment on the eco-physiology of tropical crops, such as upland crops, vegetables and fruits, and their mutual interactions, Research on agricultural ecology in the tropics, Analyses on land use and farming systems in the tropics, The origin and dissemination of tropical crops	Eiji Nawata Hirokazu Higuchi
Soil Science		Dynamics of elements in soil ecosystems, Soil forming processes and classification methods from the tropical to the frigid zones, Interactions of plants and soil in natural ecosystems and cropland ecosystems, Evaluation of soil fertility, Development of environmentally sound land utilization and soil management, Methods making great use of environmental information with GIS and geostatistics	Shinya Funakawa Tetsuhiro Watanabe
Terrestrial Microbial Ecology		Researches on the nature of interactions between microbes and their biotic and abiotic environments in agricultural ecosystems. Special attentions are given to microbe-host interactions and molecular and cellular studies of parasites and symbionts in agricultural and forest plant	Chihiro Tanaka Yuko Takeuchi
Ecological Information		Basic and applied research on the ecological control of harmful pests, especially phytophagous mites, in agricultural ecosystems. The main research topics include interactions among host plant-pest-predator, ecology and utilization of predatory phytoseiid mites, and mechanism of pesticide-resistance development.	Hiroshi Amano Masahiro Osakabe Shuichi Yano



Agricultural Facilities Engineering	Regional environmental engineering (Water, soil and greenery systems)	Optimization of efficiency and sustainability of irrigation structures through evaluating their safety, fragility and functionality, which is oriented toward comprehensive stock management of the infrastructures for agriculture, incorporating the disciplines of soil and fluid mechanics, environmental science and computational engineering. Development of numerical methods for data assimilation, soil-fluid interaction and granular assemblage.	Akira Murakami Kazunori Fujisawa Shoichi Kiyama
Water Resources Engineering		Fundamental and applied researches on the planning and management of water resources for agriculture, focusing on sustainable development of irrigation systems as well as conservation and restoration of sound agricultural water environment. Computational fluid dynamics approaches are used for numerical reconstruction of hydraulic phenomena and for identification of optimal management strategies.	Masayuki Fujihara Koichi Unami Junichiro Takeuchi
Hydrological Environment Engineering		Fundamental studies on the atmosphere, water and soil environments are being conducted for creating healthy agro-ecosystem. These studies are targeted to solve the environmental problems, including global warming, sustainable agriculture, and genetically modified crops. Understanding of the nature based on mathematical principle is a key to clarify the problems. Our studies are based on environmental physics, atmospheric sciences, hydrological sciences and soil physics.	Shigeto Kawashima Kimihito Nakamura
Rural Planning		Development of theories and methods on rural planning and rural improvement related to rural land use, infrastructure for agricultural production, infrastructure for rural living environment, conservation of natural environment, conservation of rural landscape and so on as well as practical researches on rural revitalization.	Satoshi Hoshino Kenichiro Onitsuka
(Research Reactor Institute) Radiation Safety and Control		Basic and applied researches on the risk evaluation and appropriate management of radiation and radioactive materials, including the discharge into the environment, the dynamic state in soil and underwater systems, and the impacts on the environmental organisms and human health. Lectures and experiments are provided at the site of Research Reactor Institute in Osaka Kumatori.	Sentaro Takahashi Tomoyuki Takahashi Yuko Kinashi Hiroshi Yashima Hidehito Nakamura
Agricultural Systems Engineering	Regional environmental engineering (Food and energy systems)	Researches on plant factory systems and environment control Fundamental and applied researches on terramechanics “terrain-vehicle systems” Modeling of biosystems Technological development for electrical agricultural vehicle Systems engineering for the optimization of agricultural production Basic research on farm work scheduling The utilization of biomass energy	Hiroshi Shimizu Hiroshi Nakashima Juro Miyasaka Katsuaki Ohdoi
Field Robotics		Development of agricultural machinery and robots to produce food Researches on machine intelligence for agricultural robot Application of variable control technology with smart machine Remote sensing to make a diagnosis of crop growth	Michihisa Iida Masahiko Suguri Ryohei Masuda
Bio-Sensing Engineering		Bio-sensor development Substance identification by spectroscopy Bio-instrumentation and application Quality evaluation of agri-products and foods Automation and robotization systems within controlled environments Informatization of food production	Naoshi Kondo Yuichi Ogawa Tetsuhito Suzuki

Research Reactor Institute ..... Asashiro-nishi, Kumatori-cho, Sennan-gun, Osaka

## Division of Natural Resource Economics

Research fields	Research contents	Research staff
Agri-food System Management	Market and structure of agribusiness/ food business/ food system, roles of local agricultural organizations, social responsibility and ethics in business management , coordination of price and quality in food system, fair trade, consumer behavior, social systems to maintain food safety, risk perception and risk communication, etc.	Yoko Niiyama Hideyuki Tsujimura
Farm Managerial Information and Accounting	1) Managerial development, management control, management information, and accounting structure in family-run, joint management, corporate management and community-run farming 2) Development of agricultural service and service business bodies 3) Agricultural human-resourcing, career establishment and the development of managerial competency 4) Theoretical and empirical researches on joint businesses combining agriculture, commerce and industry, agri-food industrial clusters, etc.	Shigeaki Oda Haruhiko Iba
Regional Environmental Economics	Theoretical and empirical researches on relations between resource environments and agriculture/forestry in the world, sustainable development, and dynamic optimisation 1) Basic theory of regional environmental economics 2) International comparison of regional environmental economics 3) Linkage of trade liberalization and regional industries	Umetsu Chieko Jinhu Shen
Agricultural and Environmental Policy	Theoretical and econometric researches on 1) food supply and demand balance in Asian countries, 2) land rental markets in agriculture, 3) mechanism design of agricultural and environmental policies, 4) rural producer organizations, 5) economic evaluation of environment, and 6) institutional analysis of common pool resource management.	Junichi Ito Shinichi Kitano
Forest Policy and Economics	Theoretical and empirical researches on domestic and overseas forest and forestry policies, problems with the supply and demand of timber and wood products, economic analysis of timber-related industries, the timber trade and the global environment, social economic problems in farming and mountain villages, global warming and forests, biodiversity conservation policy, national park management, etc.	Koichi Kuriyama Yohei Mitani
International Rural Development	Theoretical and empirical researches on 1)poverty alleviation, 2)environmental and resource management, 3) production, consumption, marketing and international trade of agricultural products, 4)human resource development, and 5) rural institutions and organizations, in developing worlds, using the methodologies of economic analysis and field studies.	Seiichi Fukui Atsuyuki Asami Yoshiaki Nakada
Comparative Agricultural History	Comparative history of Japan and other countries/regions on 1) farming and agricultural structure, 2) agricultural policy and farmer's movement from 1931 to 1961, 3) agriculture- forest resource development in the total war system. Social and environmental history on German agriculture and its rural community in 20 centuries	Yoshihiro Adachi Atsushi Ito
Philosophy of Agricultural Science	Theoretical, empirical and comparative researches on new challenges we face when pursuing sustainability of agriculture, food production and consumption, and rural societies in developing and developed countries from philosophical, sociological and ethical perspectives.	Motoki Akitsu Kazuo Oishi

## Division of Food Science and Biotechnology

Research fields	Research contents	Research staff
Enzyme Chemistry	Elucidation of the relationship between structure and function of enzymes including protease, amylase, reverse transcriptase, and aminoacyl tRNA synthetase; Tailoring of enzyme function and controlling of enzyme reaction; Screening of enzyme inhibitors and elucidation of their inhibitory mechanisms; Application of enzymes and inhibitors in food and medical technologies	Kiyoshi Yasukawa Teisuke Takita Kenji Kojima
(Uji) Food and Environmental Science	Food chemical researches on biomaterials of proteins and polysaccharides: Organoleptic science of food macromolecules (Molecular biology, food biorheology of mechanoreception and/or chemosensation) , Food chemistry of novel components that control the gastrointestinal environment, Physicochemical structural analysis of food components and their molecular interactions in food processing	Fumito Tani Tetsuya Masuda
Organic Chemistry in Life Science	Chemical synthesis and functional analysis of various proteins (enzymes) related to lifestyle-related diseases such as cancer and Alzheimer's disease, and the development of therapeutic and preventive drugs targeting these diseases Investigation and analysis of the mechanisms of functional substances which prevent these lifestyle-related diseases, found in foods	Kazuhiro Irie Kazuma Murakami
Nutrition Chemistry	Nutritional chemical researches on interactions between food ingredients and living bodies: physiological and behavioral researches on the palatability of foods, nutrition science related to exercise and the sensation of fatigue, research on the mechanism of functional and structural maintenance of the digestive tract	Kazuo Inoue Satoshi Tsuzuki Shigenobu Matsumura
(Uji) Molecular Function of Food	Molecular mechanism of lipid metabolism and obesity Search for food ingredients which prevent and heal lifestyle-related diseases and their application to food products Clarification of an inter-organ information network to maintain somatic homeostasis Analyses on physiological roles of brown adipocyte regulating energy consumption Application of metabolomics on food science and energy metabolism	Teruo Kawada Tsuyoshi Goto Wataru Nomura
(Uji) Physiological Function of Food	Studies on nutritional signaling of protein ingestion regulating dispensable amino acid metabolism, and adaptive change of nutritional requirement and metabolism in relation to aging and exercise. Searches for physiological functions of orally active short peptides derived food proteins, which act on the nervous, gastrointestinal, cardiovascular, and immune systems, and applications of them to functional materials matched each life stage.	Ryuhei Kanamoto Kousaku Ohinata
Bioengineering	Food engineering researches on reasonable designing and operations of food manufacturing processes and on analysis of phenomena occurring in the processes: effective utilization of food and agricultural byproducts by their subcritical fluid treatment, characterization of nano-emulsion, engineering on pasta and noodle production, and liquid chromatographic separation.	Shuji Adachi Kyuya Nakagawa Takashi Kobayashi
(Uji) Basic and Applied Molecular Biotechnology	Microbial biotechnology in general (specifically, cell-surface structure of microorganisms, structure and function of microbial enzymes and their application to food products, and microbial production of useful substances), search for food-related microorganisms and their application to fermentation and brewery, structure-function correlation of proteins and enzymes (x-ray crystallography), cellular energy, biofuel production, and gas biology of nitrogen and oxygen	Wataru Hashimoto Shigeyuki Kawai

(Uji) Uji Campus ..... Gokasho, Uji-shi, Kyoto

## Affiliated Institutions

Name of facilities, etc.	Research and business contents	Research staff
(FSERC) Kii-Oshima Research Station	Clarification of origin and family tree of human life-related field ecosystems Registry and conservation of the constituents of evergreen broadleaf forests and the Black Current cultural sphere Researches on the management and utilization of heteromorphic elements in a wildlife sanctuary Development of the Kozagawa Project conducted with a forest, field and marine environmental perspective	Shinya Umemoto
Livestock Farm	Research on the characteristics of feeding stuffs for commercial cattle Research on raising environment-consciously reared beef cattle Basic research on the functional development of beef cattle Research on the reproduction of beef cattle	Yoichiro Hoshino
International Exchange Section	Programs related to support campus and daily life of foreign researchers and students enrolled at the Graduate School and Faculty of Agriculture, the education of international graduate school students, and international exchange events for example, guidance for new foreign students, welcome parties, lectures conducted in English for foreign students, issuance of newsletters, providing one-day tours, counseling work for foreign students, etc.	Nobuhiro Hirai Miki Akamatsu Takeshi Miyake Hitoshi Shinjo

(FSERC) Field Science Education and Research Center

Field Station

Kii-Oshima Research Station .....Sue, Kushimoto-cho, Higashimuro-gun, Wakayama

Livestock Farm ..... Kyotanba-cho, Funai-gun, Kyoto