

Laboratories, Areas of Research, and Staff

Department	Laboratory	Area of Research	Research Key Words	Staff			
				Professor	Associate Professor	Lecturer	Assistant Professor
1. Forest and Environmental Resources Sciences	1. Resources Cycling in Pedosphere	Cycles of carbon, nitrogen, and trace elements in pedosphere and related environments. Chemical structure, function, and dynamics of soil organic matter, in particular humic substances.	Soil organic matter, humic substances, black carbon, greenhouse gas, dissolved organic matter	WATANABE, Akira			
	2. Plant-Soil Systems	Studies on nutrient dynamics in forest ecosystems. Our specific focus is to evaluate forest health by disentangling tripartite interactions among plant, soil, and microbes.	biogeochemistry, coastal forests, forest soil science, Ground penetrating radar, plantation forests		TANIKAWA, Toko		
	3. Forest Hydrology and Disaster Mitigation Science	Research for elucidating hydrological cycle, sediment dynamics, and disaster vulnerability of local community in regional and watershed scales. Research and its social implementation for sustainable resources management is included.	hydrological processes in watersheds, biosphere-atmosphere interaction, human-nature interaction, disaster resilience and sediment dynamics	GOMI, Takashi	TANAKA, Takafumi		KOTANI, Ayumi
	4. Forest Ecology	Our laboratory covers a wide range of studies related to forest ecology, forest genetics, and forest ecophysiology. Especially structure, dynamics, and functions in forest communities. Also genetic diversity, reproductive ecology, ecophysiology, and dry matter production in tree populations.	Forest tree, Reproductive ecology, Population genomics, Molecular ecology, Conservation, Tropical forest	TOMARU, Nobuhiro	NAKAGAWA, Michiko	OGAWA, Kazuharu (Scheduled to retire in March 2024)	
	5. Forest Protection	Forest entomology focusing on insect-fungus and insect-plant interactions. Forest ecosystem conservation based on the management of biological communities.	Forest insects, Interactions among organisms, Forest pests, Arthropod communities, Forest microbes, Symbiosis	KAJIMURA, Hisashi		TOKI, Wataru	
	6. Forest Resource Management	Research on development of cutting edge measurement technology of forest, construction of theory concerning forest resource management, development of future planning and evaluation method of forest management.	Remote Sensing, GIS, Forest planning, Forest measurement, LiDAR	YAMAMOTO, Kazukiyo			
	7. Forest Resources and Society	Studies on forest management policy for realizing both forest conservation and improvement of local livelihoods, forest certification, participatory forest management, community forestry and timber procurement strategies of enterprise	Forest policy, National park, Community forestry, Ecotourism, Forest resource use	HARADA, Kazuhiro	IWANAGA, Seiji		
	8. Forest Chemistry	Organic chemical, biochemical, and analytical chemical studies on the formation process, structure, and advanced utilization of woody biomass.	woody biomass, plant cell wall, lignin, chemistry	FUKUSHIMA, Kazuhiko	AOKI, Dan		
	9. Biomass Resource Utilization	Isolation and structural elucidation, biosynthesis, distribution and utilization of wood extractives.	Wood extractives, Isolation and structural elucidation, Biosynthesis, Visualization, Chemical analysis		IMAI, Takanori		
	10. Wood Physics	Generation processes of growth stress and wood properties during tree growth, Growth and maturation of tropical plantation species, Analysis of reaction wood formation by molecular approach, Physical and mechanical properties of wood materials.	Cell wall, cellulose, secondary growth, growth stress, plantation resources	YAMAMOTO, Hiroyuki	YOSHIDA, Masato		
	11. Timber Engineering	Mechanical durability in structural use of wood and wood-based materials, Analysis of mechanical behavior in timber structure, Quality-of-material distribution and the plan for demand and supply of forest resources, Wood utilization in urban design.	Timber engineering, Strength, Failure and fatigue, Woodutilization, Woodurbanism	YAMASAKI, Mariko			ANDO, Kosei
	12. System Engineering for Biology	Studies on nondestructive measurement system and data science for biological resources.	Nondestructive measurement, Spectroscopy, Imaging analysis, Data science, Machine learning, Mechanical engineering	TSUCHIKAWA, Satoru	INAGAKI, Tetsuya		

*** Designated Assistant Professor

(as of October 1, 2023)

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2. Plant Production Sciences	13. Plant Physiology and Morphology	Studies from both aspects of structure and function on functional differentiation of plant cells and tissues, and response and tolerance to environmental stresses.	Rice, C4 plants, Photosynthesis, Salinity, Environmental stresses, Stress tolerance, Ultrastructure, Electron microscope	TANIGUCHI, Mitsutaka	MITSUYA, Shiro		OI, Takao
	14. Plant Genetics and Breeding	Breeding, molecular genetical, molecular biological, and physiological researches related to the evolution, morphogenesis, development, and environmental stress tolerance of cultivated plant species.	Crop plants (rice, maize, wheat and soybean), Abiotic stress tolerance, Flooding, Root, Panicle, Molecular genetics, Molecular breeding,	NAKAZONO, Mikio	TAKAHASHI, Hirokazu		AGATA, Ayumi
	15. Crop Science	Physiological and ecological studies on crop production: nutrient acquisition and growth response to environment.	Crop productivity, Environmental stress, Nutrient acquisition, Sink-source relationship, Symbiosis	KONDO, Motohiko	YANO, Katsuya	SUGIURA, Daisuke	
	16. Horticultural Science	Physiological, biochemical, and molecular biological approaches to clarify the characteristics and growth of horticultural crops, i.e. flowers, vegetables, and fruit trees, to improve their quality and productivity.	Horticultural crops, Molecular breeding, Genome editing, Multi-omics, Metabolomics and metabolic engineering		SHIRATAKE, Katsuhiko		
	17. Plant Pathology	Physiological, biochemical and molecular-biological researches on defense mechanisms of plants against plant pathogens, and interactions of plant pathogens and beneficial environmental microorganisms with host plants. Development of biocontrol measures and understanding of its mechanisms.	Plant disease resistance, Elicitor, Plant-associated microbes, Plant and Fungal viruses, Biological control		TAKEMOTO, Daigo CHIBA, Sotaro		SATO, Ikuo
	18. Plant Immunology	Studies on the molecular mechanisms of plant immune response in plant-pathogen interactions. Development of a plant vaccine based on the mechanisms.	NADPH oxidase, ROS burst, MAP kinase, Plant immunity, Plant pathology		YOSHIOKA, Hirofumi		
	19. Information Sciences in Agricultural Lands	Studies to improve agricultural production by analyzing information from field (crop DNA sequences, morphology, physiological characteristics, yield, soil, environment, etc.) by means of informatics/ data science	Agricultural informatics, Soil and rhizosphere microbiome, Genetic diversity, Breeding, Field informatics	MURASE, Jun	DOI, Kazuyuki		NISHIUCHI, Shunsaku SAWADA, Kozue***
	20. Food Economics	Socioeconomic studies on food system, regional resource management and multifunctional roles of agriculture.	Agricultural Economics, Farm Management, Rural Resource Management, Food System	TOKUDA, Hiromi	TAKESHITA, Hironobu		MIURA, Satoshi
	21. Plant Gene Function	Studies on plant gene function and its application.	Rice, Stem elongation, Water tolerance, Molecular breeding	ASHIKARI, Motoyuki			NAGAI, Keisuke
	22. Developmental and Systems Plant Biology	Studies on genomic information for development of useful traits of rice and creation of novel plant regulators.	Rice, QTL, GWAS, GA, Structural biology	TSUJI, Hiroyuki	YAMAUCHI, Takaki		
	23. Plant Genomics and Breeding	Study on plant genomics and breeding to solve various problems of modern society, i.e. environment, energy, food problems, etc.	sorghum, energy crop, QTL, GWAS, heterosis	SAZUKA, Takashi			OKADA, Satoshi
	24. Bioindustry	Studies on plant grafting and systemic signaling in plants to improve plant resources for future sustainability.	Grafting, long distance signaling in plants, micro devices for plant science, GA, Structural biology	NOTAGUCHI, Michitaka		KUROTANI, Kenichi** KASAHARA, Ryushiro**	
	25. Tropical Bioresources	Exploring and evaluating the traits of tropical plant resources for sustainable agricultural development in the tropics responding to diversification of food demand and climate change.	Crops (Sago palm, Rice, Cowpea), Cultivation technique, Environmental stress,	EHARA, Hiroshi			NAKATA, Mana
	26. Genetic Information for Bioresources	Aiming at stable crop production under climate change, we conduct research on the extraction and utilization of genetic information related to useful traits from bioresources.	Genetics, Breeding, Rice, Abiotic stress, Stress avoidance	INUKAI, Yoshiaki			
27. Practical Studies in Africa	Research on environmental response of crop genetic resources and cultivation technology development for improving and stabilising crop production in Africa.	Africa, Crop, Cultivation technology, Practical study, Rice		MAKIHARA, Daigo			
28. Practical Studies in Asia	Studies on agriculture and rural development including natural resources management in Asia for better livelihoods, poverty reduction and food security.	International Cooperation Official Development Assistance Agricultural and rural development		ITO, Kasumi			

**Designated Lecturer

*** Designated Assistant Professor

(as of October 1, 2023)

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3. Animal Sciences	29. Animal Genetics and Breeding	Studies on the genetic basis of qualitative and quantitative traits in mammals and birds; evolutionary genetics research of animals using genetic engineering such as genome editing; evaluation, conservation and utilization of animal genetic resources; and development of new laboratory animal models for human disease and biological functions.	qualitative (Mendelian) traits, quantitative traits, evolutionary genetics, developmental animal genetic engineering, livestock resources, poultry, laboratory animal models	SUMIYAMA, Kentaro	ISHIKAWA, Akira		YAMAGATA, Takahiro
	30. Genome and Epigenome Dynamics	Epigenetic regulatory systems for transposons and genes in vertebrates. Epigenome regulation during germ cell development. Genome-epigenome interactions during evolution. Mechanism of cancer cell growth inhibition by activation of transposons.	Epigenetics, Germ Cells, iPS cells, Transposable elements, Transgenerational Inheritance, Diabetes, Cancer	ICHIYANAGI Kenji			OHTANI, Hitoshi
	31. Animal Morphology	Formation and deformation of the traits in vertebrates. Viral endogenization and the roles of the viral-derived element in vertebrates. Transgenerational epigenetic inheritance (TEI).	morphology, molecular genetics, reproductive system, Vertebrates	HONDO, Eiichi			IIDA, Atsuo
	32. Animal Integrative Physiology	Understanding the regulatory mechanisms of circadian and seasonal rhythms in vertebrates. Development of transformative bio-molecules that improve animal production and human health. Studies on physiological regulation of gene expression and release of growth factors in birds.	Seasonal Rhythm, Circadian Rhythm, Growth Hormone, Comparative Biology, Chemical Biology	YOSHIMURA, Takashi	OHKAWA, Taeko	KON, Naohiro**	TSUKADA, Akira NAKAYAMA, Tomoya*** CHEN, Junfeng***
	33. Animal Reproduction	Basic studies on the neuroendocrinological mechanism regulating animal reproduction and its application to animal production and drug discovery.	Gonadotropins, GnRH, Kisspeptin, Gonads, Brain, Neuroendocrinology	TSUKAMURA, Hiroko	UENOYAMA, Yoshihisa INOUE, Naoko		
	34. Animal Nutrition	Studies on the metabolic properties of nutrients (amino acids and vitamin C etc.) and their physiological functions in avian and mammalian species. Analysis of the uptake mechanism of biomolecules into avian eggs and its application to production of valuable protein.	Nutritional factors, Animal disease model, Metabolic diseases, Fatty liver, Egg production	MURAI, Atsushi			FURUKAWA, Kyohei
	35. Animal Production Science	Studies on regulatory mechanism of physiological functions in ruminants and its utilization for animal production.	Reproduction, GnRH, Uterine function, Ovarian activity, Heat stress	OHKURA, Satoshi	MATSUYAMA, Shuichi NAKAMURA, Sho*		
	36. Avian Bioscience	Functional genomics-based identification of genes that control useful phenotypes of birds. Production of genetically manipulated birds for model animals and industrial use.	Animal model, Genetic resource, Biopharmaceutical production	NISHIJIMA, Ken-ichi			OKUZAKI, Yuya
	37. Fish Biology	Morphological, physiological, and behavioral studies of the brain, sensory receptors, motor systems, and peptidergic neurons in aquatic animals.	fish, nervous system, sensorimotor circuit, peptidergic neurons, behavior	YAMAMOTO, Naoyuki	ABE, Hideki		GOTO, Maki HAGIO, Hanako***
	38. Sericulture and Entomoresources	Molecular mechanisms of baculovirus infection, baculovirus-host interaction and antiviral responses in insects.	Insect pathology, Baculovirus infection, Antiviral response, Host range determination	IKEDA, Motoko			HAMAJIMA, Rina
39. Applied Entomology	Studies on the development of insect pest management methodology via physiological and molecular approaches.	Insect hormone and pest management		MINAKUCHI, Chieka			

* Designated Associate Professor

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4. Applied Biosciences	40. Organic Chemistry	Bioorganic studies on naturally occurring organic molecules possessing novel structure and biological activity: development of new synthetic methodologies, total synthesis of natural products, elucidation and control of the biofunctions.	organic synthesis, natural products, chemical biology, molecular design	NISHIKAWA, Toshio			MIYASAKA, Tadachika
	41. Bioactive Molecules	Studies on identification, action mechanism, and application of bioactive molecules produced by plants and microorganisms. Mechanistic analysis and application of carbohydrate-binding small molecules.	natural products, antibiotics, carbohydrates, peptides		NAKAGAWA, Yu	KONDO, Tatsuhiko	
	42. Chemical Biology of Natural Products	Isolation, structure determination, synthesis, biosynthesis, and modes of action of bioactive natural products that regulate biologically and physiologically intriguing phenomena. Anesthetic substances from venomous mammals, and key substances for marine symbiotic relationships. Development of new analytical methods for target molecules using fluorescent probes.	natural products, chemical biology, chemical probe, mode of action, toxins, symbiosis	KITA, Masaki	TSUNEMATSU, Yuta		
	43. Polymer Chemistry	Studies on controlled syntheses and functions of biomaterials and medical polymers including artificial glycoconjugates, bifunctional polymers and environmentally friendly synthetic polymers.	Biomaterials, Biopolymers, Functional Polymers, Polymer Synthesis, Organic Synthesis	AOI, Keigo	NOMURA, Nobuyoshi		
	44. Applied Enzymology	Mechanistic enzymology of flavin and pyridoxal enzymes. Physiological function of isoprenoid, amino acids, and vitamins. Microbial and enzymatic production of useful substances. Lipid biosynthesis in Archaea.	enzyme, isoprenoid, archaea, D-amino acid, pyridoxal phosphate	HEMMI, Hisashi	ITO, Tomokazu		
	45. Molecular Biotechnology	Molecular bioengineering for novel biomolecules, bioprocesses and analytical processes. Currently, novel monoclonal antibody screening, single molecule technology for protein engineering, and the mechanism of translation-enhancing peptide are major research topics.	Bioinformatics, Enzyme engineering, Protein Engineering, Antibody Engineering, Next Generation Sequencing, High-throughput Screening	NAKANO, Hideo		DAMNJANOVIC, Jasmina	KATO, Teruyo
	46. Soil Biology and Chemistry	Studies on the microbial population, and the chemical and biological processes occurring in the paddy field ecosystem.	Agricultural land, Biogeochemical cycles, Microbial ecology, Microbial physiology, Microbial taxonomy	ASAKAWA, Susumu	WATANABE, Takeshi		
	47. Applied Microbiology	Molecular and chemical genetic studies on gene regulation of agriculturally and industrially important microorganisms, especially filamentous fungi.	Filamentous fungi, Food microbiology, Polysaccharide-degrading enzymes, Transcriptional regulation, Secondary metabolites	KIMURA, Makoto			MAEDA, Kazuyuki
	48. Food and Biodynamics	Chemical biology of electrophilic ligands, such as lipid peroxidation products and functional food molecules.	Oxidative stress, Covalent modification of proteins, Functional foods, Lifestyle-related diseases, Extracellular vesicles	SHIBATA, Takahiro			NAKASHIMA, Fumie
	49. Molecular and Cellular Regulation	Biochemical and molecular cell biological studies on signal transduction, intracellular traffic, gene expression regulation in animal cell differentiation, growth and cell death.	Ca ²⁺ -binding proteins, Cell death, Cell growth, Membrane traffic, Molecular interactions		SHIBATA, Hideki	TAKAHARA, Terunao	
	50. Molecular Bioregulation	Biochemistry and molecular cell biology on the biosynthesis and dynamics of proteins, nucleic acids and their complexes in mammals, and on the functions and regulations of these molecules in living organisms, including cell proliferation and tissue differentiation. Specifically, we are studying mammary gland development and milk synthesis, translational control including ribosomes, and the epithelial responses to bioactive factors.	Mammary gland, Milk, Ribosome, Epithelial cell		NADANO, Daita		OHSHIMA, Kenji
	51. Glyco-Life Science	Interdisciplinary studies between bioagricultural, medicinal, and pharmaceutical sciences on regulatory mechanisms for glycans-involved phenomena to attain better health, environment, and food	Glycocalyx, glycans, glycosyltransferase, glycosidase, immune system, neural system	SATO, Chihiro			HANE, Masaya
	52. Animal Cell Function	Studies on impacts of metabolic changes of glycans in proteins and lipids at the organism level, using medaka models and their integrated omics including glycomics.	Glycobiology, Sialic acid metabolism, Membrane microdomain, Reverse genetics of Medaka, Glycomics, Glycoproteomics	KITAJIMA, Ken			WU, Di
	53. Animal Cell Physiology	Studies on functions of extracellular matrix, transporter proteins, and signal transduction.	Bone, Heart, Molecular Biology, Electrophysiology, Imaging		MATURANA, Andrés Daniel	NIIMI, Tomoaki	
	54. Nutritional Biochemistry	Nutritional regulation of enzyme and gene expression in mammals. Molecular mechanisms for hepatocyte differentiation in 3-dimensional culture systems. Physiological significance of liver circadian rhythm. Metabolism and physiological functions of branched-chain amino acids.	Gene expression, Liver clock, Branched-chain amino acids (BCAA), Muscle		ODA, Hiroaki	KITaura, Yasuyuki	
55. Alimentary Neuroscience	Omnivorous animals including human evaluate and select specific foods among several candidates before consumption. Our goal is the identification of the neural mechanism for food choice.	Brain, Gustatory, Food preference, Appetite	NAKAJIMA, Ken-ichiro			RATTANAJEARAKU L, Nawarat***	

56. Plant Signaling	Studies on molecular mechanisms underlying optimization of plant growth and development in response to environmental cues with focusing on phytohormone function.	Nutritional response, Plant hormones, Growth regulation, Nitrogen, Iron	SAKAKIBARA, Hitoshi	KIBA Takatoshi	TABATA, Ryo** HASHIMOTO-SUGIMOTO, Mimi	BELLEGARDE, Fanny***
57. Biochemistry	Biochemical, molecular genetic, and microscopic studies on regulatory mechanisms of development of plant organs such as flowers, pollen grains, and roots. Studies on molecular functions and regulation of membrane proteins that support photosynthesis and inorganic nutrient assimilation in plants and cyanobacteria.	Flower development and anthesis, Pollen morphology, Meristem organization, Jasmonic acid, Transcription factors, Membrane transporter		ISHIGURO, Sumie		MAEO, Kenichiro MAEDA, Shin-ichi NAKANISHI, Yoichi
58. Molecular and Functional Genomics	Biochemical, cellular and genetic studies on molecular mechanisms of chlorophyll biosynthesis, nitrogen fixation, circadian rhythm and phytohormone signal transduction in cyanobacteria and plants.	Cyanobacteria, Chlorophyll biosynthesis, Nitrogen fixation, Plants, Circadian clock, Plant hormone signal transduction, Gene regulation	FUJITA, Yuichi	YAMASHINO, Takafumi		YAMAMOTO, Haruki
59. Plant Cell Function	Molecular mechanisms of plant growth and development, and their regulation in response to environmental signals. Studies on the construction of artificial membrane-less organelles in plant cells.	meristem, endosperm, stress, seed dormancy, jasmonic acid, membraneless organelles		UEGUCHI, Chiharu TAKEDA, Shin		
60. Plant Integrative Physiology	Understanding plant circadian rhythms and seasonal behaviors with multi-omics approaches. Improvement of plant biomass and productivity by controlling key genes for circadian and seasonal behaviors.	Plant circadian clock, Transcriptional network, Bioactive small molecules.	NAKAMICHI, Norihito			MURANAKA, Tomoaki
61. Plant Metabolic System	Studies on biological functions and regulatory mechanism of plant metabolism.	amino acids, environmental stress, mathematical modelling, metabolome, specialized metabolites	HIRAI, Masami			
62. Metabolic Balance of Ecosystem	Methodology development of analysis of metabolic balance of ecosystem and its application to applied sciences.	homeostasis, environmental analysis, complexity, NMR, data science, machine learning	KIKUCHI, Jun			

**Designated Lecturer

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(as of October 1, 2023)