Graduate School of Science and Technology
Degree Programs in Life and Earth Sciences
List of research fields (Master's Programs)

Master's Program in Biology

Field of Research	Faculty	Detailed Description of Research Field
Systematics and Evolutionary Biology	ISHIDA Ken-ichiro	① Classification of micro-and macro-algae based on ultrastructure and molecular phylogenetic analyses ② The endosymbiotic acquisitions and evolution of plastids ③ Searching for new useful algae for algal biomass research
	HONDA Masanao	① Taxonomy of reptiles based on morphological data ② Molecular phylogeny and biogeography of reptiles and birds ③ Conservation genetics of amphibians and reptiles
	WADA Hiroshi	① Comparative embryology of marine invertebrates, including bivalves and echinoderms ② Population Biology of Echinoderm Development ③ Evolution of the unique bodyplan of the cephalopods
	DEGAWA Yousuke	① Natural history and biodiversity of the Kingdom Fungi ② Taxonomy and phylogenetic studies of the basal lineage of Fungi (Zygomycota and Chytridiomycota) ③ Fungal ecology focused on their interactions with other organisms and their life cycles
	NAKANO Hiroaki	① Natural history of placozoans, xenacoelomorphs, and echinoderms ② Origins and evolution of deuterostomes and metazoans ③ Diversity and evolution of marine invertebrates
	NAKAYAMA Takeshi	① Classification of protists including microalgae based on ultrastructural characters and molecular phylogenetic analyses ② Searching for new useful algae for algal biomass research
	YAHATA Kensuke	① Comparative morphological studies on ovarian structure and mode of oogenesis in arthropods ② Comparative studies on structures for appendage autotomy in arthropods ③ Phylogenetic studies of myriapods based on comparative morphological methods
	SHIRATORI Takashi	① Studies on early evolution of eukaryote through the screening of novel protists ② Studies on the evolution of predatory bacteria
	TAKENAKA Masaki	① Developmental Genetics Using Non-Model Insects ② Evolutionary and Ecological Studies Using River Ecosystems ③ Phylogeography
Ecology	HIROTA Mitsuru	① Plant response to environmental changes, perspective from ecology ② Ecosystem ecology focused on carbon cycling in terrestrial ecosystem
	TSUDA Yoshiaki	① Population genetics/genomics and population demographic inference of several species (e.g. trees, fishes, insects, mammals) ② Ecosystem management and conservation using molecular ecology approaches ③ Impact of human activities on forest ecosystems and their history
	TOQUENAGA Yukihiko	① Experimental ecology with field and laboratory populations ② Theoretical biology with mathematical models

Ecology	OHASHI Kazuharu	① Foraging behavior of pollinators with special reference to their cognitive abilities ② The evolution of floral phenotypes via ecological interactions with flower visitors
	SATO Yukie	① Behavioral ecology and evolutionary ecology in terrestrial arthropods ② Geographic variation in behavior and ecology, and speciation
	HARVEY Benjamin	① Marine community ecology, utilizing field surveys, aquarium experiments and modelling. ② Understanding the effects of environmental change on coastal systems, such as ocean acidification, global warming, and marine heatwaves
	MASUMOTO Shota	① Community assembly for plants and microorganisms ② Plant-fungal interactions and function in ecosystems
	OMORI Yuko	① Research on carbon cycling driven by marine microorganisms ② Dynamics of marine-derived organic matter and air–sea interactions
	YOKOI Tomoyuki	① Entomology ② Behavior and life history of bees ③ Pollination service and conservation of flower-visiting insects
Plant Physiology and Developmental Biology	KIKUCHI Akira	① Study on diversity of environmental stress responses in higher plants ② Study on expression of totipotency in higher plants
	SUZUKI Iwane	① Photosynthetic acclimation and signal perception to environmental stress ② Production of useful metabolites by metabolic engineering in algae ③ Application of quantum beams and nuclear resonance reaction for biological breeding
	SUZAKI Takuya	① Studies on molecular mechanisms of plant-microbe symbiosis ② Studies on molecular mechanisms of plant development and environmental responses
	MAEDA Yoshiaki	① Functional analyses of genomes and chromosomes in algae ② Production of useful metabolites by metabolic engineering in algae ③ Digital transformation of algal research
	MINODA Ayumi	① Investigating environmental responses in photosynthetic organisms using unicellular algae as a model system ② Understanding the role of photosynthetic organisms in global elemental cycles
	IRVING Louis John	① Effect of nutrient status on the host – parasite interaction ② Exploring the influence of abiotic factors on grass plant growth and competition
Animal Physiology and Developmental Biology	SASAKURA Yasunori	① Developmental mechanisms of animals ② Metamorphosis of ascidians ③ Molecular biology of mimicry ④ Development and Evolution
	CHIBA Chikafumi	① Molecular mechanism of adult newt body-part regeneration ② Molecular mechanisms of injury responses and injury-caused disorders in mammalian tissues ③ Induction and regulatory mechanisms of transdifferentiation
	★NIWA Ryusuke	① Molecular, cellular, and systemic mechanisms of the interaction between insects and parasitoid wasps ② Mechanisms of interorgan communication in the regulation of development, stem cell proliferation, post-mating responses, and aging ③ Studies on molecular mechanisms of cancer cachexia using Drosophila as a model ④ Structural biology and chemical biology of insect growth control agents

Animal Physiology and Developmental Biology	HARUMOTO Toshiyuki	① Molecular mechanisms underlying reproductive manipulation induced by insect symbiotic microorganisms ② Studies on endosymbiosis between insects and microorganisms
	YAGUCHI Shunsuke	① Axis specification/formation of the sea urchin embryo ② Development of the serotonergic neurons in the sea urchin embryo ③ Evolution of the anterior neuroectoderm
	OKAMOTO Naoki	① Insect hormones and its regulation during development ② Neuro-endocrine control of physiology and behavior in insects
	SHIMADA Yuko	① Action machinery and diversity of parasitoid wasp venom proteins ② Nutrient-dependent neuronal network underlying growth and maturation
	SAKURAI Keisuke	① Electrophysiological studies on molecular mechanisms of signal transduction in retinal neurons ② Studies on non-visual photoreceptor cells in CNS
	ISHIKAWA Yuki	① Neural mechanisms underlying the evolution of animal behavior ② Sensory and behavioral mechanisms underlying plant–insect interactions
	SUZUKI Daichi	① Evolutionary morphology and behavioral neurobiology mainly focusing on cyclostomes (lampreys and hagfish) ② Early evolution of vertebrate brain, behavior, and consciousness.
Molecular and Cellular Biology	※INABA Kazuo	① Structure, motility, and regulation of cilia and flagella ② Diversity of cilia and eukaryotic evolution ③ Mechanism of fertilization and reproduction of marine organisms (protists, marine invertebrates and fishes)
	CHIBA Tomoki	① Genetic analysis of selective protein degradation ② Cell biology of the ubiquitin family ③ Knockout mice analysis of the ubiquitin system
	NAKANO Kentaro	① Investigation of signal transduction controlling cytoskeleton and membrane dynamics ② Studies on the molecular diversity and evolution of cytoskeleton and its regulatory systems ③ Molecular biology of the mechanisms of cell division using yeast and protist
	MIURA Kenji	① Signaling mechanisms for abiotic stress response and sugar accumulation in plants ② Production of useful proteins (pharmaceutical proteins, etc.) with plant biotechnology ③ Production and evaluation of genome editing crops
	ISHIKAWA Kaori	① Analyses of influences by mutations of mitochondrial DNA on cellular and physiological functions ② Studies on the interactions between nuclear-coded genes and mitochondrial functions ③ Investigation of disease mechanisms of mitochondria-related diseases using model animals
	TSURUTA Fuminori	① Molecular basis of the developing brain regulated by microglia ② Neuron-glia communication coordinating the brain environment in the neonatal period ③ Mechanisms of the architecture of neural circuits influenced by environmental stresses
	HIRAKAWA Yoshihisa	① Plastid evolution via secondary endosymbioses ② CO_2 fixation in microalgae ③ Genome evolution in microalgae
	TANI Kazutoshi	① Structural analysis of biomolecules using cryo-electron microscopy ② Structural mechanism of light energy absorption in anoxygenic photosynthetic bacteria

Molecular and Cellular Biology	NOSAKI Shohei	① Molecular functional analysis of plant-specific signaling factors based on protein science ② Structural basis of the evolution of transcription factors that drove the acquisition of species-specific traits in plant
Genomics and Bioinformatics	INAGAKI Yuji	① Molecular phylogeny of eukaryotes ② Evaluation of the impact of lateral gene transfer to genome evolution ③ Estimation of protein functions combining evolutionary parameters and tertiary structures
	KUWAYAMA Hidekazu	① Molecular analysis of biological soliton in multicellular movement ② Functional analysis of a genetic disease in intracellular signaling pathway ③ Memory of cell and spatio-temporal pattern recognition ④ Analyses of a novel anti-tumor factor and the mechanism of caffeine-dependent enhancement of anticancer drugs
	NAKADA Kazuto	① Functional morphology of mammalian mito-chondria ② Generation of mouse models for mitochondrial DNA-based diseases ③ Therapeutics for mitochondrial DNA-based diseases
	SAWAMURA Kyoichi	① Evolutionary Genetics ② Genetic analysis of hybrid inviability and sterility in Drosophila ③ Genetic analysis of sexual isolation in Drosophila ④ Interspecific introgression in natural populations of Drosophila
	HARADA Ryuhei	① Computational Biophysics and Theoretical Biology ② Molecular dynamics simulations for analyzing biological functions ③ *In silico* drug design based on molecular simulations
	NAKAYAMA Takuro	① Symbiogenesis in unicellular organisms ② Genomic research on evolution and diversity of protists
	SUZUKI Shigekatsu	① Genome evolution in eukaryotic microorganisms ② Evolutionary process of multicellularity ③ Intercellular communication in eukaryotic microorganisms
	TOKUNOU Yoshihide	① Research on microbial interactions and microbial energy metabolism ② Application of 3D biofilm imaging to medical and energy technologies ③ Development of electricity-generating wastewater treatment technologies using microbes (microbial fuel cells) ④ Biotechnology utilizing microbe-derived membrane vesicles
Advanced Cellular Biology	ITO Yuzuru	① Basic technology of the regenerative medicine using human iPS/somatic stem cells ② Drug discovery support technology based on regenerative medicine technology
	*Takenouchi Takato (NARO, Tsukuba)	① Establishment and utilization of mammalian immune cell lines ② Development of in vitro models for analyzing host-pathogen interactions ③ Studies on genetic disease resistance in pigs
	*NAGAMUNE Kisaburo (NIH, Tokyo)	① Understanding the infectious mechanism of parasitic protozoa ② Study about the unusual organelle of parasitic protozoa ③ Basic research for the development of anti-parasitic drug
	*MARUYAMA Kyonoshin (JIRCAS, Tsukuba)	① Comparative genomic research in crop plants ② Transcriptional and metabolic network research in crop plants ③ Development of improved crop varieties
	*SHITARA Hiroshi (IGAKUKEN, Tokyo)	① Molecular genetics of mitochondrial DNA in mammals ② Generation of new mouse strains using transgenic technology ③ Imaging techniques for visualizing mitochondria in mammals
	*YABUKI Akinori (JAMSTEC, Yokosuka)	① Diversity and classification of microbial eukaryotes ② Ecological function and role of microbial eukaryotes in ocean ③ Diversity and functional evolution of RNA-editing and its related phenomena in microbial eukaryotes ④ Monitoring of the diversity of microbial eukaryotes on ocean environmental changes

Advanced Molecular Biology	*OKAMOTO Akihiro (National Institute for Materials Science)	① Extracellular electron transfer mechanism in electrogenic bacteria ② Data-driven chemical biology research using a high-throughput electrochemical system ③ Development of resource recovery technology using the interaction between materials and bacteria
	*HOSAKA Kentaro (National Museum of Nature and Science)	① Taxonomy, phylogenetics and biogeography of fungi, especially mushrooms ② Fungal diversity in the environment (soil, water and air) ③ Natural history of fungi based on museum specimens, DNA and other metadata
Biology	*TAJIMA Yuko (National Museum of Nature and Science)	① Life history on marine mammals ② Comparative morphology on marine mammals ③ Health assessments on marine mammals
	*CHIBA Youko (RIKEN, Wako)	① Search for novel metabolisms in microorganisms.(Prokaryote) ② Diversity of CO2 fixation and amino acid synthetic pathways ③ Analysis of metabolic evolutionary by physical chemistry
	*FUJIWARA Sumire (AIST, Tsukuba)	① Basic studies of transcriptional regulation mechanisms in higher plants ② Research and development of useful plants by modifications of transcription factors or genes ③ Functional analyses of transcription factors in higher plants
	*MORIYA shigeharu (RIKEN, Yokohama)	① Research and development of biomass utilization process ② Research and development of symbiosis based biotechnology ③ meta- and single-cell transcriptome analysis

※ The faculty member marked with ※ will be retired by March 31,2028.

Note: *Adjunct Professor of the Cooperative Graduate School

★The faculty member marked with ★ is a dual-role faculty member and cannot be a primary supervisor.

Master's Program in Agro-Bioresources Science and Technology

	Field of Research	Faculty	Detailed Description of Research Field
Agro-biological Sciences Field	Plant Breeding	YOSHIOKA Yosuke	① Study on conversation and efficient utilization of genetic resources ② Genetic analysis of important traits in crops ③ Pollination biology for seed multiplication of crops ④ Development of digital phenotyping method
	Animal Science	ASANO Atsushi	① Integrated physiology of homeostatic functions useful for animal production ② Study on molecular and cellular basis for fertilization and development in model animal ③ Development of reproductive and genomic biotechnologies for livestock production
	Plant Genome Sciences	TAKAYAMA Mariko ★ LOMBARDO Fabien Claude Renaud	① Exploring molecular mechanism for fruit development in tomato ② Identification of genes related to important breeding traits in crops and horticultural plants by genome analysis. ③ Rapid and efficient development of new cultivars by genome editing technology. ④ Establishment of large-scale tomato mutant populations, and integration and utilization of phenotypic, metabolomic, and genomic data ⑤ Innovation of gene modification technology by modified CRISPR/Cas9 system.
	Olericulture and Floriculture	FUKUDA Naoya KANG Seung Won NONAKA Satoko	① Elucidation of gene functions related to important traits in vegetables and ornamental plants ② Research on adding high value and increasing yield in vegetables and ornamental plants ③ Research on adding high value and increasing yield in vegetables and ornamental plants ④ Research on the advancement of transformation efficiency and genome editing technology ⑤ Research on introduction of beneficial traits into Cucurbitaceae, Solanaceae, and Asteraceae plants using genome editing technology
	Pomology and Postharvest Physiology of Fruits	SUGAYA Sumiko SEKOZAWA Yoshihiko	① Studies on fruit tree physiologies under cultivation and effects of environmental factors on the physiology ② Study on mechanisms of fruit tree flower development and postharvest physiology of the fruit
	Crop Science	MATSUKURA Chiaki WANG Ning	① Comparative studies on the efficient crop production systems and its management ② Establishment of sustainable crop production systems and its assessment ③ Physiological and ecological researches for yield and quality of crops ④ Physiological research on the mechanisms and control of stress tolerance in crops ⑤ Analysis of gene function for critical agronomic traits in crops
	Plant Parasitic Mycology	OKANE Izumi ISHIGA Yasuhiro	① Systematics of plant parasitic fungi including symbiotic fungi, particularly rust fungi, blue stain fungi, endophytes and mycorrhizal fungi. ② Studies on ecology and physiology of these fungi and bacteria. ③ Studies on the mechanisms of pathogenicity in plant pathogenic bacteria ④ Studies on plant–microbe interactions

Agro-biological Sciences Field	Applied Entomology and Zoology	FURUKAWA Seiichi KURAMITSU Kazumu	① Insect immune mechanisms against pathogens and parasitoids ② Elucidation of strategies of parasitoids to survive in the host insect species ③ Improvement of biological control of insect pests ④ Ecology and ethology of parasitoids
	Forest Ecology	KAMIJO Takashi KAWADA Kiyokazu	① Dynamics and function of forest ecosystem ② Vegetation science and management ③ Conservation and restoration of arid and semi-arid Ecosystem ④ Conservation of endangered species
	Conservation of Regional Resources	SEINO Tatsuyuki TSUDA Yoshiaki	① Genetic diversity of forest tree species ② Evolution and local adaptation of forest tree species ③ Study on conservation of regional resources
	Environmental Soil Chemistry	ASANO Maki	① Environmental chemistry of forest soils ② Soil ecological studies on soil organic matter ③ Soil conservation under grassland in Eurasian steppe
	Biological Systems Regulation Science	KUSANO Miyako SHIBA Hiroshi	① Development of analytical platforms to capture quantitative and qualitative changes of metabolite levels ② Metabolic network biology using “omics” datasets ③ Flavor analysis of important crops and vegetables ④ Molecular mechanisms of epigenetic regulation in heterosis ⑤ Molecular mechanisms of epigenetic regulation in sexual plant reproduction
	Epigenetics	BUZAS Diana Mihaela	① Molecular genetic analysis of the perennial life history in *Arabidopsis halleri gemmifera* ② Analysis of seasonal response in Wasabi japonica– ③ Identification of memory DNA elements in crucifers Reciprocal conversion between annual and perennial life histories using CRISP/Cas9 ④ Integration of circadian clock with all year memory ⑤ CRISP/Cas9-mediated Jacksonian domestication of “the smart cousin of tomato”
	Plant Cell and Synthetic Biology	KINOSHITA Natsuko	① Plant and insect interaction ② Production of high added value products in plants ③ Visualization of plant environmental response mechanisms
Agricultural Economics and Sociology	Agricultural and Bioresource Economics	SHUTO Hisato	① Farm production and consumer behavior ② Analysis of food industries with specific attention to issues of productivity, R&D, scale economies, and economics of organization ③ Economic analysis of agricultural and food security policies
	Resource Economics and Development Studies	SHUTO Hisato	① International trade analysis of agricultural commodities and resources ② Agricultural and rural development ③ Regional planning and resource management
	Forest Resources Economics	(*)	① Study on forest policy and economics ② International comparative study on forest management and forest products market ③ International comparative study on production and marketing of forest products
	Forest Policy	KOHROKI Katsuhisa	① Historical study of forest management in Japan ② Socioeconomic study on regional forest management in Japan ③ Comparative study on forestry organizations

Bioresource Environment Engineering Field	Food Resources Engineering	Marcos Antonio das NEVES	① Micro / nano-engineering for advanced bioresource processing ② Microchannel technology for advanced food processing ③ Formulation of food micro /nano-dispersions and evaluation of their gastrointestinal digestion ④ Effective utilization of food processing waste for value addition
	Environmental Colloid and Interface Engineering	KOBAYASHI Motoyoshi SUGIMOTO Takuya	① Water and solute transportation in soil. Salinity and erosion of soil ② Water resource engineering in arid land, water quality control, water treatment ③ Physics and chemistry of soil, soil pollution,colloid and interface
	Watershed Conservation	NASAHARA (NISHIDA) Kenlo	① Mechanism of sediment production and transport ② Sabo planning in harmony with natural environment ③ Environmental analysis through remote sensing
	Ecosystem Structure Engineering	YAMAKAWA Yosuke	① Processes and mechanisms of rainwater runoff in mountainous watersheds ② Erosional processes and collapse mechanisms of mountain slopes
	Water Resources Management Engineering	※ISHII Atsushi	① Development and management of irrigation systems ② Water resources evaluation for development ③ Participatory irrigation management
	Farmland System Engineering	KOBAYASHI Motoyoshi	① Farmland engineering, soil conservation engineering ② Soil Physics, Environmental materials
	Bioproduction and Machinery	Tofael AHAMED	① Intelligent machinery and robotics for agricultural production ② System analysis for bioenergy production and utilization ③ Real-time crop monitoring systems for site-specific management
	Chemistry of Biomaterials	NAKAGAWA-IZUMI Akiko	① Chemistry for wood pulping and pulp bleaching ② Chemical utilization of biomaterials and bio-refinery ③ Micro-analysis of wood components (lignin, tannin, carbohydrate and others) and the related compounds
	Engineering of Biomaterials	OBATAYA Eiichi	① Acoustic property and property enhancement of biomaterials used for musical instruments ② Development of intelligent processing to utilize the cellular structure and FRP structure of wood
Applied Biochemistry Field	Biochemistry of Bioactive Molecules	USUI Takeo SUNOHARA Yukari FURUKAWA Jun MATSUYAMA Shigeru NAGUMO Yoko	① Identification of molecular targets of the bioactive compounds in mammalian and plant cells and their action mechanisms ② Antioxidative responses to oxidative stresses ③ Semiochemicals mediating interactions among insects, plants and animals ④ Mechanisms how to accumulate various metals in plants
	Genomic Biology	TANIMOTO Keiji KAKO Koichiro DAITOKU Hiroaki MATSUZAKI Hitomi	① Modification and function of methyltransferases ② Aging regulated by methylation and metabolism (C. elegans & mouse) ③ Genomic imprinting ⑤ Gene expression mechanism for homeostasis

Applied Biochemistry Field	Structural Biochemistry	※TANAKA Toshiyuki	① Analysis of the structure-function relationships of proteins involved in signal transduction and transcription regulation ② Analysis of the chromophore-protein interactions of chromoprotein antitumor antibiotics ③ Protein engineering based on detailed structural information on functional proteins
	Molecular Microbial Bioengineering	HASHIMOTO Yoshiteru KUMANO Takuto	① Screening of new metabolism of natural and unnatural compounds, and functional analysis of their physiological functions ② Metabolic engineering and screening/analysis/design/remodeling of useful enzymes and genes ③ Functional analysis of enzymes involved in cleavage and synthesis of a C-N bond and their molecular evolution ④ Development of super biological catalysts with novel functions of microorganisms and their enzymes ⑤ Functional analysis of gene promoters and their application to the production of useful compounds.
	Bioreaction Engineering	ICHIKAWA Sosaku HIRAKAWA Hidehiko	① Application of polymolecular aggregates for bioprocesses ② Production of useful materials by enzymes and microorganisms ③ Development of tools for selective protein conjugation ④ Interdisciplinary studies for practical use of cytochrome P450s
	Applied Microbiology	NOMURA Nobuhiko UTADA, Andrew S. TOYOFUKU Masanori YAWATA Yutaka	① Bacterial cell- cell communication and biofilm formation ② Microfluidics for analysis of bacterial communities ③ Biophysical analysis of biofilm formation ④ Bacterial interactions through membrane vesicles ⑤ Molecular microbiology of environmental bacteria and their applications
	Cell Cultivation Engineering	AOYAGI Hideki TAKAHASHI Masato	① Development of cultivation system for cell and protoplast with novel functional activities and their biotechnological application ② Analysis of naturally-occurring microbial symbiotic association, construction of artificial symbiotic system and their application for various bioprocesses ③ Cell cultivation engineering and development of novel bioreactors ④ Development of cultivation system for uncultured microbes (microbial dark matter), animal cells, and plant cells and their biotechnological application
	Biomimetic Chemistry	OGAWA Kazuyoshi	① Studies on complex of protein and polymer ② Basic and applied technical studies on polyelectrolyte gel
	Molecular and Developmenta l Biology	KASHIWABARA Shin-ichi	① Transcriptional and translational regulation of genes during gametogenesis ② Functional analysis of RNA-associated factors using genetically modified mice
	Biology for Gene Regulation	KIMURA Keiji	① Analysis for dynamics of mitotic chromosomes. ② Analysis for function of condensin complex. ③ Analysis for novel function of the nucleolus.

Applied Biochemistry Field	Ecological Molecular Microbiology	TAKAYA Naoki ※NAKAMURA Akira YING Bei-Wen TAKESHITA Norio MASUO Syunsuke	① Environmental response and morphogenesis of filamentous fungi ② Enzymology and molecular biology of microbial enzymes ③ Bacterial metabolisms and communication ④ Development and application of host-vector system in *Thermus thermophilus* ⑤ Study on microbial catabolic pathway of L-form sugars ⑥ Multilevel analyses and computational prediction of microbial growth dynamics ⑦ Experimental evolution for investigating the microbial survival strategies ⑧ Physiological functions of sulfur-containing amino acids and its applications
	Functional Foods and Food Chemistry	※YOSHIDA Shigeki	① Structure and function of bioactive compounds in food ② Production of bioactive compounds by using bioconversion process ③ Development of industrial enzymes for food production
	Environmental Plant Biochemistry	YAMAJI Keiko	① Effect of endophytic microbes on heavy-metal stress tolerance in plants ② Effect of endophytic microbes on environmental stress tolerance in plants ④ Effect of endophytic microbes on radio Cs accumulation in plants
	Fungal Interaction and Molecular Biology	URAYAMA Syunichi	① Investigating the interactions between filamentous fungi and intracellular/extracellular elements. ② Elucidating the physiology and ecology of filamentous fungi and their interacting elements.
Biosystem Sciences Field	Bioprocess Engineering	NOMURA Nakao	Development of sustainable agriculture, forestry and fisheries industry using bioengineering technique
	Chemical Biology	MIYAMAE Yusaku	① Small molecule control for cellular protein stability and function ② Development of drug screening systems by focusing on the unique character of target receptor ③ Chemical biology on natural products
	Plant Physiology and Chemistry	YAMADA Kosumi	① Isolation and identification of plant-derived bioactive compounds against abiotic and biotic stimuli ② Evaluation of their biosynthetic pathway and mode of action ③ Application of these compounds to precision crop farming
	Industrial Microbiology and Bioresource Science	NAKAJIMA-KAMBE Toshiaki	Isolation and screening of microorganisms with potential for bioproduction/biotransformation. (plastic degradation, biotransformation of oil/fat-related biomass, and methane conversion)
	Bioindustrial Resources	OGUCHI Taichi	Plant biotechnology, plant physiology on environmental response, Environmental and health risk assessment of biotech plants, Detection method biotech foods
	Animal Cell Biotechnology	ITO Yuzuru	① Basic technology of the regenerative medicine using human stem cells (Quality control, mass cultivation, differentiation) ② Drug discovery support technology (organ cell differentiation for drug discovery using knowledge from regenerative medicine, microphysiological system)
	Bio-Environmental Control Engineering	UTSUMI Motoo	Diversity and function analysis of marine and freshwater microorganisms and its role in cycling of matter, Bio eco-engineering
	Food System	KOKAWA Mito	Post-harvest technologies, Processing of functional foods, development of novel alternative, Non-destructive analysis of food quality using light

	Biological and Material Cycles	YANG Yingnan	① Photocatalytic technology, Solar light utilization system, ② Bioreactor, High efficiency conversion and effective utilization of bioresources, Renewable energy
Agro-biological Sciences Field	Plant Stress Biology	*FUJITA Yasunari (Japan International Res. Center for Agricultural Sci. (JIRCAS))	① Molecular elucidation of stress tolerance mechanisms in plants ② Development of environmental stress-tolerant crops
	Animal Functional Biology	*SAKUMOTO Ryosuke (Institute of Livestock and Grassland Science, NARO)	① Factors involved in the animal productive functions. ② Study on animal reproductive biology, especially on the establishment of pregnancy and its maintenance in ruminants. ③ Development of effective technique to improve reproductive performance of domestic animals
	Insect Functional Regulation	* TABATA Jun (Institute for Plant Protection,NARO)	① Chemical ecology of insects and associated plants ② Development of insect functional regulation techniques based on chemical ecological studies
	Climate Change Impact Assessment on Vegetation	*MATUI Tetsuya (Forestry and Forest Products Research Institute (FFPRI))	① Relations between distributions of forest vegetation and climatic conditions ② Changes in the distribution of forest vegetation since the last glacial period
	Tropical Forestry	*TANI Naoki (Japan International Res. Center for Agricultural Sci. (JIRCAS))	① Improvement of tropical forestry using indigenous genetic resources in Southeast Asian tropical forest ② Reproductive biology in Southeast Asian tropical forest and its application to sustainable forest management
	Environmental Agronomy	*MINAMIKAWA Kazunori (Japan International Res. Center for Agricultural Sci. (JIRCAS))	① Development and assessment of climate change mitigation and adaptation technologies in rice production ② Observation and modeling of greenhouse gas emission and carbon and nutrient cycling in rice production
Agricultural Economics and Sociology Field	International Agriculture and Forestry Development	*IIYAMA Miyuki (Japan International Res. Center for Agricultural Sci. (JIRCAS))	① Trends and prospects of international agriculture research agendas on global food systems. ② Sustainable agricultural intensification of smallholder systems.
	Regional Forest Resource Development	* ISHIZAKI Ryoko (Forestry and Forest Products Research Institute (FFPRI))	① Identification of social conflicts over forest resources ② Study on how to lead rural development by utilizing forest resources
	Farming System	* SAWADA Mamoru (Central Region Agricultural Research Center (NARO))	① Agricultural Workforce and Human Resource Development ② Local Agricultural Support Systems to Revitalize Rural Communities
Source Environment Engineering Field	Rural Environment Improvement	* MIYAMOTO Teruhito (Institute for Rural Engineering,NARO)	① Irrigation and drainage management in farmland ② Modeling, measurement and interpretation of mass and energy flow in soil ③ Hydrological investigations and conservation of groundwater resources in rural areas
	Nano and Micro-scale Food Analysis	* MANO Junichi * GENKAWA Takuma (Institute of Food Research,NARO)	① Development of analytical methods for evaluating food quality ② Development of food processing methods using biotechnology

	Sustainability of Biomass Resources	*KOSUGI Akihiko (Japan International Res. Center for Agricultural Sci. (JIRCAS))	Development of biomass utilization technology using microbial function
	Regional Forest Resource Development	*YAMADA Tatsuhiko (Forestry and Forest Products Research Institute (FFPRI))	① Development of lignin based functional bio-materials ② Chemical conversion of cellulosic biomass for preparing useful chemicals, liquid fuels and fuel additives Rapid analysis of lignocellulosics to evaluate potential of forest biomass
Applied Biochemistry Field	Animal Bioresource Engineering	*INOUE Kimiko (RIKEN)	① Characterization of the germ cell genome using a nuclear transfer technique ② Analysis of the mechanisms for zygotic gene activation using a nuclear transfer technique ③ Development of techniques for preservation of male germ cells using microinsemination
	Evolutionary Biology of Symbiosis	*FUKATSU Takema (AIST)	① Biological function, evolution and origin of endosymbiotic associations between insects and microorganisms ② Molecular, physiological and regulating mechanisms underlying sophisticated inter-organismal interactions in symbiosis, parasitism, manipulation and sociality
	Molecular Neurobiology	*DOI Motomichi (AIST)	① Analysis of factors controlling nervous system formation and its functional maintenance ② Search for factors that prevent breakdown or diseases of the nervous system associated with aging, using novel disease model animals ③ Development of live-cell imaging methods using fluorescent and luminescent techniques
	Applied Bioengineering of Microbial Ecosystems	*TAMAKI Hideyuki (AIST)	① Culturing the uncultured fastidious microorganisms in the environment and exploring their novel biological functions ② Omics-driven discovery of novel microbial and genetic resources ③ Ecophysiology and diversity of uncultured microorganisms in the environments (gut, plants, deep subsurface, etc.)
	Food Molecular Engineering	*KOBORI Toshiro （Institute of Food Research,NARO)	① Screening and utilization of biomolecules for sensing food quality. ② Analyses on structure-function relationship of advanced glycation end products.

※ The faculty member marked with ※ will be retired by March 31,2028.

*Adjunct professor of the Cooperative Graduate School (not assigned an academic advisor's position for research students [kenkyusei]).

★The faculty member marked with ★ is a dual-role faculty member and cannot be a primary supervisor.

(＊) Please contact the Chair of Doctoral Program in Life and Agricultural Sciences (e-mail: aoyagi.hideki.ge#@#u.tsukuba.ac.jp）) in regard to this research field. (*Replace "#@#" with "@".)

Master's Program in Geosciences

Field of Research	Faculty	Detailed Description of Research Field
Atmospheric and Hydrospheric Sciences	IGARASHI Yasunori Igarashi.yasunori.gm@u.tsukuba.ac.jp	Ecohydrology, Biogeoscience, Environmental dynamics of radionuclides
	UEDA Hiroaki ueda.hiroaki.gm@u.tsukuba.ac.jp	Atmosphere-ocean-land interaction involved in the climate system
	※ONDA Yuichi onda@geoenv.tsukuba.ac.jp	Transfer of radionuclides in Environment, Hydro-geomorphology, Forest hydrology
	KATO Hiroaki kato.hiroaki.ka@u.tsukuba.ac.jp	Forest hydrology, Soil erosion, Environmental radioactivity
	KUSAKA Hiroyuki kusaka.hiroyuki.ff@u..tsukuba.ac.jp	Urban climatology, Mountain meteorology, Applied meteorology (wind energy prediction, biometeorology)
	TSUJIMURA Maki mktsuji@geoenv.tsukuba.ac.jp	Groundwater hydrology, Groundwater and surface water interaction, Water governance in watershed
	TSUMUNE Daisuke tsumune.daisuke.gw@u.tsukuba.ac.jp	Oceanic material cycle, simulation of oceanic radioactivity dynamics.
	DOAN Quang Van doan.van.gb@u.tsukuba.ac.jp	Extreme weather and climate, regional climate change, urban environment, numerical modeling, artificial intelligence/machine learning methods
	YAMANAKA Tsutomu tyam@geoenv.tsukuba.ac.jp	Water and material cycle, Isotopic tracer, Eco-hydrometeorology
Human Geosiences	IKEDA Atsushi aikeda@geoenv.tsukuba.ac.jp	Cold region geomorphology, Permafrost monitoring, Mountain environments
	KUBO Tomoko tmkkb@geoenv.tsukuba.ac.jp	Urban Geography, Housing Studies. Regional Geography of North America and Japan
	KUREHA Masaaki mkureha@geoenv.tsukuba.ac.jp	Regional geography of Europe and Japan, Geography of tourism
	SEKIGUCHI Tomohiro sekiguchi@ied.tsukuba.ac.jp	Sedimentary processes, Bedform, Experiment
	TSUTSUMI Jun jtsu@geoenv.tsukuba.ac.jp	Regional geography of Australia, Urban geography, GIS
	HATTANJI Tsuyoshi hattan@geoenv.tsukuba.ac.jp	Hydrogeomorphology, Landslides, Rock weathering, Karst geomorphology
	MATSUI Keisuke jiji@geoenv.tsukuba.ac.jp	Cultural geography, Geography of tourism and religion, Theory of cultural tourism
	Matsushita Bunkei matsushita.bunkei.gn@u.tsukuba.ac.jp	Remote Sensing, GIS, Global Environment, Water Quality of Lakes
	MORIMOTO Takehiro tmrmt@geoenv.tsukuba.ac.jp	Agricultural and Rural geography, Sustainability of agriculture and rural area, GIS
	YAMASHITA Akio akio@geoenv.tsukuba.ac.jp	Regional geography of Latin America, Water environment in urban area, Water supply-demand on watershed scale

Solid Earth Sciences	IKEHATA Kei ikkei@geol.tsukuba.ac.jp	Volcanology, Geochemistry
	UJIIE Kohtaro kujiie@geol.tsukuba.ac.jp	Structural geology and tectonics
	OKUWAKI Ryo rokuwaki@geol.tsukuba.ac.jp	Seismic source processes of earthquakes and non-earthquakes
	KAMATA Yoshihito yoshi_kamata@geol.tsukuba.ac.jp	Geological evolution of Southeast Asia
	KYONO Atsushi kyono@geol.tsukuba.ac.jp	Mineralogy, Crystallography, Mineral physics
	KUROSAWA Masanori kurosawa@geol.tsukuba.ac.jp	Mineralogy, Fluid inclusion analysis
	TSUNOGAE Toshiaki tsunogae@geol.tsukuba.ac.jp	Petrology of metamorphic rocks, Collisional orogeny, Gondwana
	FUJINO Shigehiro shige-fujino@geol.tsukuba.ac.jp	Sedimentology and stratigraphy, Geological records of tsunamis in Japan and Asian countries
	YAGI Yuji yagi-y@geol.tsukuba.ac.jp	Earthquake rupture process and seismicity
Biogeosciences	AGEMATSU Sachiko agematsu@geol.tsukuba.ac.jp	Conodont, Graptolite, Tentaculite, Paleozoic historical geology of Southeast Asia
	TANAKA Kohei koheitanaka@geol.tsukuba.ac.jp	Vertebrate paleontology and paleoecology
Solid Earth Sciences / Biogeosciences Complex	FUJISAKI Wataru wataru-fujisaki@geol.tsukuba.ac.jp	History of life on earth, Tectonics
	MARUOKA Teruyuki maruoka.teruyuki.fu@u.tsukuba.ac.jp	Isotope geology, Geochemistry
[Cooperative Graduate School system] Atmospheric and Hydrospheric Sciences	IIZUKA Satoshi iizuka@bosai.go.jp	Atmosphere-ocean interaction, Meteorological disaster, Extreme event
	ISHII Masayoshi maish@mri-jma.go.jp	Oceanography, Atmosphere-Ocean Interactions, Climate Variations
	KAJINO Mizuo kajino@mri-jma.go.jp	Atmospheric Chemistry, Aerosol-Cloud-Radiation Interactions
	SHIMOKAWA Shinya simokawa@bosai.go.jp	Physical oceanography, Coastal disasters, Marine ecosystem
	SHUSSE Yukari shusse@bosai.go.jp	Clouds and precipitation meteorology, Rader meteorology
[Cooperative Graduate School system] Biogeosciences / Solid Earth Sciences Complex	SHIGETA Yasunari shigeta@kahaku.go.jp	Paleobiology of cephalopoda
	TSUTSUMI Yukiyasu ytsutsu@kahaku.go.jp	Geochronology

※ The faculty member marked with ※ will be retired by March 31,2028.

Master's Program in Environmental Sciences

https://www.envr.tsukuba.ac.jp/eng/

Faculty	Detailed Description of Research Field
TSUJIMURA Maki	Age dating of groundwater/ spring water using CFCs/ tritium, Hydrogeological processes by using the isotopes, Rainfall-runoff processes in mountainous catchment
ASANUMA Jun	Surface hydrology, Evapotranspiration and precipitation, Precipitation sources, Hydrological cycle, flood and flood mitigation
※ONDA Yuichi	Transfer of radionuclides in Environment, Hydro-geomorphology, Forest hydrology
KATO Hiroaki	Forest hydrology, Soil erosion, Environmental radioactivity
★SAKAGUCHI Aya	Applications of natural/artificial radionuclides as tracers for environmental dynamics
KAMAE Yoichi	Monsoon and global climate variability
YAMAJI Keiko	Chemical Interaction between Plants and Microorganisms in the Rhizosphere under stress environments
SUNOHARA Yukari	Action mechanisms of bioactive substances that regulate plant growth or biological functions
SUZUKI Iwane	Photosynthetic mechanism of microalgae, Microalgal biomass and carbon-nitrogen metabolism
MAEDA Yoshiaki	Molecular biology, Genome science, Biotechnology, Production of useful compounds and environmental cleanup with microalgae
NOMURA Nobuhiko	Bacterial cell-cell communication and bacterial biofilm
TOYOFUKU Masanori	Microbiology
LEI Zhongfang	Biological waste and wastewater treatment, Biogranulation, Resource and energy recovery
YUAN Tian	Anaerobic digestion for waste and wastewater treatment, Toxicity assessment and remediation of environmental pollutants
UTSUMI Motoo	Aquatic Biogeochemistry and Engineering
※ISHII Astushi	Development and management of irrigation systems, Water resources evaluation for development, Participatory irrigation management
KAMIJO Takashi	Vegetation dynamics on volcano and revegetation of volcanically devastated sites
KAWADA Kiyokazu	Conservation and restoration of ecosystems
YOKOI Tomoyuki	Insect ecology, Behavior and life history of bees, Pollination service and conservation of flower-visiting insects
HIROTA Mitsuru	Ecosystem Ecology, Plant Physiological Ecology, Carbon cycle and greenhouse gases (GHGs) dynamics in terrestrial ecosystem, Response to environmental change in alpine ecosystem: species, community and ecosystem components

OMORI Yuko	Marine Biogeochemistry, Oceanic carbon cycle and sea-air interaction
MURAKAMI Akinobu	Landscape planning, Urban and rural planning
YAMAMOTO Sachiko	Architectural planning, Regional planning
YABAR Helmut	Integrated waste management systems: policy and planning; environmental impact assessment; GIS for environmental management: applications in flood analysis, air pollution analysis, waste and wastewater management, renewable energy potential
MIZUNOYA Takeshi	Environmental economics, Environmental policy, Comprehensive evaluation of environmental policy and technology, Socio-environmental system simulation
KAIDA Naoko	Environmental psychology, environmental economics, pro-environmental behavior, environmental decision-making
NASAHARA Kenlo	Environmental monitoring and disaster prevention using satellite remote sensing
KUSAKA Hiroyuki	Urban climatology, Mountain meteorology, Applied meteorology (wind energy prediction, biometeorology)
MATSUSHITA Bunkei	Remote Sensing, Geo-ecology, Modeling
KOBAYASHI Motoyoshi	Environmental and Colloidal Engineering、Aggregation and Dispersion of Colloids, Electrokinetics
SUGIMOTO Takuya	Colloid Transport Phenomena
MATSUI Kenichi	Environmental dispute resolution and diplomacy; rural development and sustainability; environmental/water ethics and law; environmental and agricultural policies for sustainability; environmental disaster policies
※ISODA Hiroko	Mechanisms behind functional food resources for potential applications in food and cosmetics
MIYAMAE Yusaku	Chemical control of cellular protein stability and its biological function Screening and mechanism analysis of bioactive substances that modulate intracellular metabolism
TAKAHASHI Shinya	Risk sciences of radiation and chemicals, Plant molecular biology/Plant physiology, Environmental impact assessment
Farhana FERDOUSI	Bioinformatics, Omics Research, Clinical trial, Epidemiology
ASANO Maki	Soil Science
UCHIDA Taro	Policy and planning of natural disaster prevention, Sediment disaster mitigation, Watershed management
YAMAKAWA Yosuke	Forest science, Risk assessment and mitigation for natural disasters
MATSUMOTO Hironao	Paleo-environment of the Paleozoic and Mesozoic
Doan Quang Van	Numerical model, applied meteorology and climate, Southeast Asian climate, global warming, urban canopy model, urban climate

OGAWA Kazuyoshi	Polymer Chemistry、Polyelectrolyte、Nanoparticle、Polymer Complex、Stimuli-Responsive Gel or Polymer
NAGASHIMA Tatsuya [National Institute for Environmental Studies]	Atmospheric environment modeling related to climate and air quality changes
YAMAKOSHI Takao [National Institute for Land and Infrastructure Management]	International disaster management theory and disaster management planning for landslide and flood

※ The faculty member marked with ※ will be retired by March 31,2028.

★The faculty member marked with ★ is a dual-role faculty member and cannot be a primary supervisor.

Master's Program in Mountain Studies

http://mountain-studies.tsukuba.ac.jp/en/toppage/

Faculty	Detailed Description of Research Field
KUREHA Masaaki	Geography of Tourism
MATSUI Keisuke	Human Geography
IKEDA Atsushi	Geomorphology
YAMANAKA Tsutomu	Hydrologic Science
HATTANJI Tsuyoshi	Geomorphology
YAGI Yuji	Seismology
OKUWAKI Ryo	Seismology, Earthquake and non-earthquake source processes, Seismic array processing, Environmental seismology
KAMATA Yoshihito	Paleogeosphere Science, Accretionary Geology, Micro-biostratigraphy
NAKAYAMA Takeshi	Plant Systematic Taxonomy
ISHIDA Kenichiro	Plant and Protist Phylogeny and Systematics
DEGAWA Yousuke	Mycology, Plant Systematic Taxonomy
TOQUENAGA Yukihiko	Theoretical Ecology
OHASHI Kazuharu	Plant Evolutionary Ecology
SATO Yukie	Behavioral Ecology, Evolutionary Ecology
KAMIJO Takashi	Plant Ecology
SEINO Tatsuyuki	Forest Ecology
KOHOROKI Katsuhisa	Forest Resource Sociology
OBATAYA Eiichi	Wood Materials Engineering
NAKAGAWA-IZUMI Akiko	Wood Science
TSUDA Yoshiaki	Molecular Ecology, Population Genetics
KAWADA Kiyokazu	Plant Ecology
YAMAKAWA Yosuke	Erosion Control Engineering, Forest Hydrology
TSUJIMURA Maki	Aquatic Environmental Science
HIROTA Mitsuru	Ecosystem Ecology
MATSUI Kenichi	Environmental Policy
YOKOI Tomoyuki	Insect Ecology, Behavioral Ecology, Conservation Ecology
YAHATA Kensuke	Arthropod Systematics and Comparative Morphology
MASUMOTO Shota	Microbial Ecology, Community Ecology
ASANO Maki	Soil Science
TAKENAKA Masaki	Evolutionary development, Phylogeography, Environmental DNA,
IIJIMA Daichi	Community ecology, Ecosystem interactions, Climate change, Birds
MORIYA Shigeharu (RIKEN)	Biomass Utilization, Biological Symbiosis, Microbial Ecology, Molecular Evolution

TANI Naoki （JIRCAS: Japan International Research Center for Agricultural Sciences）	Tropical Forest Management, Molecular Ecology
MATSUI Tetsuya （Forest Research and Management Organization）	Vegetation Science, Impact of Climate Change
TANAKA Norio （National Museum of Nature Science）	Plant Phylogeny and Systematics, Aquatic Plants
ISHIZAKI Ryoko （Forest Research and Management Organization）	Forest Policy, Forest Administration, Public Finance, Forest Management System