

Research Outline

(Updated: April 1st, 2025)

| Department/Center | Laboratory | Faculty | Research outline |
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| | Genetic Informatics | KAWAMOTO, Shoko /Associate Professor | We are working on research and development of databases and information retrieval system for the national bio-resource project (NBRP). |
| | Genome Evolution | KUROKAWA, Ken / Professor HIGASHI, Koichi / Assistant Professor | We are interested in understanding about microbial genome evolution and microbial community dynamics, and we are currently reaching out in the following two major research directions; I. Facilitate the development of an integrated database “MicrobeDB.jp”, II. Microbial community dynamics. |
| | Genome Diversity | MORI, Hiroshi / Associate Professor | Our main research goal is to understand the relationships between the habitat of organisms and genome diversity. To facilitate the studies using comparative genomics and metagenomics, we are also developing various bioinformatics methodologies. |
| | Biological Networks | ARITA, Masanori / Professor KOSHIMIZU, Shizuka / Assistant Professor | Network analysis of metabolic pathways based on comprehensive identification and quantification of metabolites (metabolomics); Bioinformatics related to plant secondary metabolism and lipid metabolism |
| | Genome Informatics | NAKAMURA, Yasukazu / Professor TANIZAWA, Yasuhiro / Assistant Professor | Intelligent information technology for structural and functional annotations of large-scale nucleotide sequences. |
| Department of Genomics and Evolutionary Biology | DNA Data Analysis | IKEO, Kazuho / Associate Professor | Evolutionary study of genomic structure and gene expression pattern to elucidate the evolutionary mechanism of central nervous system and sensory organs. Evolutionary genomics analysis of various species. Metagenome analysis. Developing databases and computer software for biological research. |
| | Plant Genetics | SATO, Yutaka / Professor | The goal of our research is to understand molecular mechanisms governing early processes of plant development using a series of rice embryogenesis defective mutants. Currently we are focusing on the mechanism of regulating the cell division pattern and plasticity in cellular differentiation in rice embryo. |

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| | Evolutionary Genetics | AKASHI, Hiroshi / Professor | We infer mechanisms of genome evolution using population genetic and comparative genomic approaches. Current interests include global forces such as biosynthetic constraints that underlie weak selection. |
| | Ecological Genetics | KITANO, Jun / Professor YAMASAKI, Yo / Assistant Professor | We use threespine stickleback fishes to investigate the genetic and molecular mechanisms underlying adaptation and speciation. |
| | Comparative Genomics | TOYODA, Atsushi / Project Professor | We have been conducting advanced genomics research on the plasticity of genome structure and functions using most advanced genome technology such as New-Generation Sequencers. |
| | Molecular Life History | KURAKU, Shigehiro / Professor KAWAGUCHI, Akane / Assistant Professor | We focus on vertebrates and bridge molecular-level laboratory approaches and genome informatics, in order to document genome evolution and elucidate its mechanism. |
| Department of Gene Function and Phenomics | Symbiosis and Cell Evolution | MIYAGISHIMA, Shin-ya / Professor FUJIWARA, Takayuki / Assistant Professor | In order to understand endosymbiotic evolution of eukaryotes, we are studying coordinating mechanisms of eukaryotic cell and organelle/endosymbiont proliferation using algae, plants, and protists. |
| | Plant Cytogenetics | NONOMURA, Ken-ichi / Professor | We aim to elucidate the regulatory system of plant germ-cell development and chromosome kinetics, mainly using seed-sterile rice mutants. |
| | Mammalian Neural Circuits | IWASATO, Takuji / Professor MATSUMOTO, Naoyuki / Project Assistant Professor | We are studying molecular and cellular mechanisms of neuronal circuit development in the mammals, using mouse genetics and other related methods. |
| | Neurobiology and Pathology | ASAKAWA, Kazuhide / Associate Professor | Using zebrafish as a primary model, we study the biology and disease of the motor system at the behavioral, circuit, cellular, and molecular levels. The ultimate goal is to identify the root causes of ALS and to develop therapeutic strategies through comprehensive and multidimensional basic research. |
| | Multiscale Sensory Structure | YONEHARA, Keisuke / Professor MATSUMOTO, Akihiro / Assistant Professor | We use mice and marmosets to understand the structure, function, development, disease, and environmental adaptation of visual neural circuits at multi-levels, including genes, neural circuit physiology, and behavior. |

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| | Multicellular Organization | SAWA, Hitoshi / Professor NEGISHI, Takefumi / Assistant Professor | We are studying the mechanisms that produce a variety of cell types through asymmetric cell divisions using the nematode <i>C.elegans</i> . |
| | Brain Function | HIRATA, Tatsumi / Professor | Development of the vertebrate nervous system with special focus on neuronal network formation. |
| | Microbial Physiology | NIKI, Hironori / Professor | We investigate higher order structure of chromosomes and their dynamics in yeast and bacteria through genetic and cell biological analysis. |
| | Mouse Genomics Resource | KOIDE, Tsuyoshi / Associate Professor | For understanding genetic basis of behavioral diversity, behavioral and genetic analyses are applied on a variety of mouse resources including wild-derived strains. We are developing genome editing methods in mice for analyzing function of genes. |
| Department of Chromosome Science | Genome Dynamics | MAESHIMA, Kazuhiro / Professor | Our research interest lies in determining how a long string of genomic DNA is three-dimensionally organized in living cells, and how the organized genome functions during cellular proliferation, differentiation, and development. We are using a novel combination of molecular cell biology and biophysics to elucidate 3D-organization and dynamics of human genome chromatin. |
| | Cell Architecture | KIMURA, Akatsuki / Professor TORISAWA, Takayuki / Assistant Professor | To understand the three-dimensional architecture of the cell and its dynamics, quantitative imaging and modeling approaches are employed. Specific targets of the research are size and shape of organelles, the mechanics of cytokinesis, and cytoplasmic streaming in the <i>C. elegans</i> embryo. |
| | Chromosome Biochemistry | MURAYAMA, Yasuto / Associate Professor KUROKAWA, Yumiko / Assistant Professor | We investigate molecular mechanism underlying regulation of chromosome organization and dynamics by recapitulating their biochemical reactions using purified proteins. We now especially focus on SMC complexes. |
| | Physics and Cell Biology | SHIMAMOTO, Yuta / Associate Professor | Our laboratory studies self-organization and mechanical properties of subcellular structures, such as the nucleus and the mitotic spindle. We develop and use quantitative subcellular micromanipulation, optical tweezers, single-molecule imaging and in vitro reconstitution to unveil the underlying biophysical mechanisms. |

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| | Molecular Cell Engineering | KANEMAKI, Masato / Professor YAMAGUCHI, Kosuke / Assistant Professor | To understand DNA transactions in human cells, we generate conditional cells using the auxin-inducible degron technology for genetic and cytological analyses. We also develop new technologies for construction of mutant human cells. |
| | Invertebrate Genetics | SAITO, Kuniaki / Professor MIYOSHI, Keita / Assistant Professor | We are conducting research on the physiological significance of the epitranscriptome and human rare diseases, using <i>Drosophila melanogaster</i> as a model. |
| Center for Frontier Research | Gene Quantity Biology | SASAKI, Mariko / Associate Professor | We study molecular mechanisms underlying genomic changes in eukaryotic cells. We mainly use budding yeast and human cell cultures and analyze genomic changes that result in changes to DNA quantity, using genetic and molecular biology tools. We specialize in isolating Mbp-sized DNA and separating it by Pulsed-Field Gel Electrophoresis. |
| | Plant Evolution | FUKUSHIMA, Kenji / Associate Professor | Our research aims to demystify evolutionary innovations by integrating computational and experimental approaches to study a wide range of organisms, with a particular focus on plants. |
| | Theoretical Ecology and Evolution | YAMAMICHI, Masato / Associate Professor | We combine mathematical models, microcosm experiments, and meta-analyses to investigate complex feedbacks between rapid evolution and ecological processes. |
| Chemical and Radioisotope Management Unit | | ANDACHI, Yoshiki / Assistant Professor | We study microRNA-mediated post-transcriptional regulation in <i>C. elegans</i> using our original methods for the detection of microRNAs and target genes. |