Research Outline

(Updated: November 1st, 2026)

Department/Center	Laboratory/Division	Faculty	Research outline
Department of Informatics	Genetic Informatics	**KAWAMOTO, Shoko** /Associate Professor	We are working on research and development of databases and information retrieval systems for the national bio-resource project (NBRP).
	Genome Evolution	**KUROKAWA, Ken** / Professor	We are interested in understanding microbial genome evolution and microbial community dynamics, and we are currently pursuing 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	Intelligent information technology for structural and functional annotations of large-scale nucleotide sequences.
	Human Population Genomics	**KAWAI,Yosuke** / Professor **FUJIWARA, Kazumichi** / Assistant Professor	By leveraging data from large-scale genomic analyses, we pursue both fundamental studies of human population history and evolution, as well as applied research to elucidate the mechanisms underlying human diseases.
Department of Genomics and Evolutionary Biology	DNA Data Analysis	**IKEO, Kazuho** / Associate Professor	Evolutionary study of genomic structure and gene expression patterns 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.
	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 three-spined stickleback fish 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 advanced genome technologies 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	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.
	Bacterial Motility Machinery	**MINAMINO, Tohru** / Professor	Many bacteria move through their environments using flagella. By combining genetic and biochemical analyses with biophysical and structural biology approaches, we aim to elucidate the molecular basis underlying flagellar assembly and motility.
	Plant Cytogenetics	**NONOMURA, Ken-ichi** / Professor **Harsha Somashekar** / Assistant 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 **NAKAJO, Haruna** / Assistant 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.
	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 *C. elegans*.
	Brain Function	**HIRATA, Tatsumi** / Professor	Development of the vertebrate nervous system with special focus on neuronal network formation.
	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 *C. elegans* embryo.
	Chromosome Biochemistry	**MURAYAMA, Yasuto** / Associate Professor **KUROKAWA, Yumiko** / Assistant Professor	We investigate the molecular mechanisms underling 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 **TANAKA,Masahito** / Assistant 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.
	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	We are conducting research on the physiological significance of the epitranscriptome and human rare diseases, using *Drosophila melanogaster* as a model.
Department of 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.
BioData Science Initiative(BSI)	**Database Division for Life Science (DBCLS)**	**GOTO, Susumu** / Professor	We are conducting research and development for promoting (re)usability of life science, medical and pharmaceutical data, and building databases. We also aim to connect these databases and applications to applied research, including drug discovery.
Integrated Research Core(NIGiRC)	**Advanced Genomics Division Data Analysis Laboratory**	**NOGUCHI, Hideki** / Project Professor	Development of new algorithms for *de novo* sequence assemblies, and analytical tools for comparative genomics employing massive data produced from next generation sequencers.