

Research Areas

The research department consists of four fields.

Graduate students are assigned to one of the following divisions within the Department of Biological Sciences, Graduate School of Science: Ecological Science I (Zoology), II (Botany), or III (Primatology/Wildlife). Ecological Science I & II are located at the Seta Campus, and III is at the Inuyama Campus.

Biodiversity Ecology

In nature, a number of species form entangled webs of interactions. We focus on such webs (networks) of species interactions to elucidate the mechanisms that maintain and create biodiversity. Based on interdisciplinary approaches integrating fieldwork, molecular biology, and theoretical ecology, we explore ways for conserving biodiversity and restoring natural ecosystems.

Akira Yamao / Yumiko Higuchi / Takuya Sato

Environmental Ecology

Biological organisms and/or ecosystems show various responses to environmental changes, and vice versa. In "Anthropocene", the present time with remarkable deterioration of natural environments through human activities, understanding the interactions among biological organisms, ecosystems and environments is crucial for human well-being. We have been conducting studies on the investigation, assessment and conservation of ecosystem and/or biodiversity for our sustainable use of natural resources.

Nakano Shin-ichi / Atsushi Ishida / Goro Hanya
Hiroyuki Tanaka / Yurie Otake

Molecular Ecology

We are working on various ecological phenomena by utilizing techniques such as stable isotopic ratio and molecular analysis. Such new techniques reveal environment fluctuation, material flow, their mechanisms, or genetic basis of ecological phenomena that cannot be seen by ordinary methods. We are opening up new frontiers of ecological studies.

Hiroshi Kudoh / Keisuke Koba / Mie N. Honjo

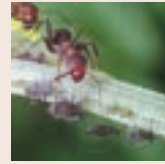
Theoretical Ecology

Targeting various phenomena related to evolution, ecology, and human activities in the global ecosystem, we aim to elucidate the patterns of phenomena and the mechanisms that cause them, mainly through theoretical considerations based on mathematical models and simulations.

Atsushi Yamauchi / Shigeo Yachi

Researchers

Biodiversity Ecology



Akira Yamao

Professor
Evolution & Community Ecology



Plants grow and thrive through various interactions with animals, microbes, and neighboring plants. Our laboratory aims to uncover the ecological and evolutionary roles of these interspecies relationships and to understand how they have shaped plant evolution and global biodiversity patterns.



Yumiko Higuchi

Associate Professor
Plant Ecology



We are fascinated by the diverse forms exhibited by wild plants and aim to understand how these forms function and evolve in their natural environments. Currently, we primarily investigate the role of leaf shapes and patterns in interactions with herbivores through field studies and laboratory experiments.



Takuya Sato

Associate Professor
Community Ecology



Our research group focuses on life-history diversity, population dynamics, and their associations with community organization and ecosystem functions in meta-ecosystems connecting forests, rivers, and oceans. Additionally, we study the causes and consequences of host manipulation by parasites as an example of the extended phenotypes.

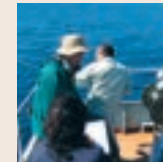
Environmental Ecology

Shin-ichi Nakano

Professor
Freshwater Ecology



I have been studying food webs among bacteria, protists, and phytoplankton, primarily in lakes. In particular, my research in the interactions between organisms surrounding cyanobacteria in lakes would be unique to aquatic ecology. Recently, I am also interested in the ecology of benthic animals (benthos).



Atsushi Ishida

Professor
Tropical Ecology



I study tropical forests in Thailand and subtropical forests in the Ogasawara Islands, focusing on the physiological mechanisms that enable woody plants to tolerate drought by global climate change. I am also involved in the ecosystem conserving of the Ogasawara Islands, a UNESCO World Natural Heritage site.

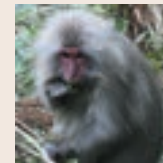


Goro Hanya

Associate Professor
Primate Ecology



I study feeding ecology, population ecology, gut microbiome, and relations with sympatric organisms of various wild non-human primates in Asian and African countries, in particular Japanese macaques in Yakushima.

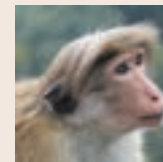


Hiroyuki Tanaka

Assistant Professor
Conservation genetics



I am conducting research on the conservation genetics of three species of large diurnal monkeys in Sri Lanka (the toque monkey, the purple-faced langur, and the gray langur), with investigating the phylogenetic relationships and gene flow among regional populations of each species.



Yurie Otake

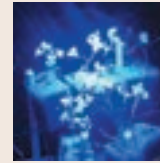
Assistant Professor
Freshwater Ecology



My research focuses on lake ecosystems and zooplankton, a major component of these ecosystems. Using them, I am engaged in a wide range of ecological and evolutionary topics, from population genetic structure to ecosystem function. In addition to microscopic observation and culture of zooplankton, I also reconstruct long-term dynamics using lake sediments.



Molecular Ecology



Hiroshi Kudo

Professor
Plant molecular Ecology



Aiming to understand the life history of plants from a molecular perspective, we conduct research on the perennial plant, *Arabidopsis halleri*, in its natural habitat. By examining the relationship between the long-term changes in gene expression phenology and chromatin structure, I seek to understand the robust responses of plants under fluctuating environmental conditions.

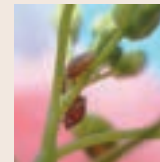


Keisuke Koba

Professor
Ecosystem Ecology



Using stable isotope ratios (such as the natural abundance ratio of ^{14}N to ^{15}N), we study interactions among organisms in various ecosystems, as well as between organisms and their environments. By examining ecosystems through the lens of biogeochemical materials, we focus particularly on the dynamic interrelationships between life and the environment.



Mie N. Honjo

Associate Professor
Plant molecular Ecology



Our research focuses on how plants interact with other organisms, such as microorganisms and insects, and how they survive in natural environments. We also study to understand their diversity and adaptive strategies at the genetic level using community structure and gene expression.

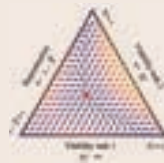
Theoretical Ecology

Atsushi Yamauchi

Professor
Mathematical Ecology



My research aims to uncover the factors and mechanisms that shape ecological phenomena by formulating ecological processes as mathematical equations and analyzing them. The scope of my work is broad, encompassing both organic evolution and ecological dynamics. One of my current research topics focuses on the evolution of division of labor.

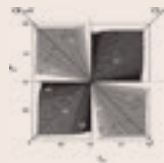


Shigeo Yachi

Associate Professor
Theoretical Ecology



Using mathematical models (mathematical formulas), I have been trying to solve the mysteries of life phenomena occurring in the Earth's ecosystem. Currently, I am summarizing theoretical considerations on how multicellular organisms have evolved and the mechanisms by which human society and biodiversity can coexist.



CER is the DIWPA secretariat.

DIWPA (DIVERSITAS in the Western Pacific and Asia) is an international network that promotes collaborative research and information exchange on biodiversity in the Western Pacific and Asia.