Contents

Message from Director of the Research Center for Integrative Evolutionary Science

Overview of the Research Center for Integrative Evolutionary Science

Faculty Profiles

FUKUZU Hirono Associate Professor
TACHIDA Tsuyoshi Assistant Professor
KUBOTA Seiko Professor (Chair)
WATANABE Yuki Professor
TOKI Yuki Professor
KOKI Hayashi Associate Professor
BIKI Masakazu Professor
SATAN Yuki Professor
KITA Tatsuya Assistant Professor
GOHORI Jun Lecturer
TANAGA Takayuki Associate Professor
SASANO Hata Professor
OHTSUKI Fumio Associate Professor
HITACHI Hidetaka Professor (Director)
IBA Keiji Associate Professor
ONISHI Makoto Lecturer
SAGAWA Akinobu Lecturer
Overview and Features of OUR Educational Program

Message from Director

In April 2022, the Research Center for Integrative Evolutionary Science (RCIES) was established, serving as the sole domestic research hub centered around “evolution.” In RCIES’s precursor, we have specialized research on evolution of organisms. The new center seeks to expand this scope more broadly to define “integrative evolutionary science.” Beyond biological realms, it embraces the study of the evolution of all living organisms, including ourselves, and their surrounding environments: societies, technologies, and cultures.

At present, the environment surrounding us is evolving at an extraordinary pace, with the evolution of AI being particularly remarkable, surpassing our imaginations. My personal realization of this occurred in 2016 when I encountered the research paper on AlphaGo published in Nature. The proclamation that “AI had defeated the world champion of Go” shook the community. While computer programs had already conquered games like chess and go, Go was considered beyond the reach of computers for this century due to its vast \(5x5\)-board and the challenge of evaluating the game’s unique “atmospheric moves.” Consequently, the reputation from professional Go players in Japan, China, and Korea at the time was skeptical, especially when the “world champion” defeated by AlphaGo was deemed vastly inferior to the real professional Go players in Asia. However, within a few weeks, AlphaGo dramatically evolved and began defeating top professionals. Now, it has become commonplace for professionals to learn from AI from this close-to-home event. As an evolutionary scholar, learned profound lessons. Go books have a history spanning a millennium, with its predecessors conducting relentless research to find optimal moves, culminating in established patterns called “joseki.” Learning Go starts with studying these joseki, yet AI confidently plays moves deemed bad moves in the established literature. Since what we believed to be optimal was certainly adaptive or at the time, optimality lay in spaces we once considered flawed. Even in the context of simple and straightforward rules, traditional Go under conditions without any environmental changes, optimization through evolution led to such discoveries. This insight reveals the rather arbitrary nature of evolution. The complexity of the natural world has exceeded the scope of Go, and evolution processes are in a sense left to chance. It is not hard to imagine real optimization through evolution in such circumstances is multiple, hit or miss through time.

We must approach any discussion on our understanding of evolution and its rationalization.

By directing our focus towards the evolution of entities beyond biology, there is much to be learned. Conversely, some of the innovations generated through biological evolution have contributed to the advancement of technology. Examples include nanomaterials inspired by shark skin and micro-nano-structured surfaces inspired by the gecko. Furthermore, genetic algorithms and applications in AI’s learning process in the realm of integrative evolutionary science, valuing feedbacks among diverse evolutionary studies, we strive to comprehend the material world technically.
Response Center for Integrative Evolutionary Science
Integrative Evolutionary Science 2023

Contents

Message from Director of the Research Center for Integrative Evolutionary Science .................................................. 3
Overview of the Research Center for Integrative Evolutionary Science ................................................................. 4
Faculty Profiles .................................................................................................................................................. 5

Message from Director

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At present, the environment surrounding us is evolving at an extraordinary pace with the evolution of AI being particularly remarkable. Surpassing our imagination, my personal realization of this occurred in 2016 when I encountered the research paper on AlphaGo published in Nature. The proclamation that “AI has defeated the world champion of Go” shook the community. While computer programs had already competed games like chess and shogi, Go was considered beyond the reach of computers for this century due to its vast search space and the challenge of evaluating the game’s unique “atmospheric moves.” Consequently, the recognition from professional Go players in Japan, China, and Korea at the time was skepticism, especially when the “world champion” defeated by AlphaGo was deemed vastly inferior to the real professional Go players in Asia. However, within a few weeks, AlphaGo dramatically evolved and began defeating top professionals. Now, it has become commonplace for professionals to learn from AI from this close-to-home event. It is an evolutionary scholar, learned profound lessons. Go books are a history spanning a millennium, with its precursors conducting relentless research to find optimal moves, culminating in established patterns called “gekkei.” Learning from small, yet AI confidently plays moves deemed too subtle in the established literature. What we believed to be optimal was actually suboptimal, and the true optimality lay in places we once considered flawed. Even in the context of simple and straightforward rules, such as Go, under conditions without any environmental changes, optimization through evolution led to such discoveries. This insight reveals the earlier arbitrary nature of evolution. The complexity of the natural world has excess that allows the board and evolution’s processes are in a sense, left to chance. It is not hard to imagine that optimization through evolution in such circumstances is much more hit or miss than we assume.

We must approach any discourse on our understanding of evolution with utmost caution.

By focusing our research towards the evolution of entities beyond biology, there is much to be learned. Conversely, some of the innovations generated through biological evolution have contributed to the advancement of technology. Examples include systems inspired by shark skin and injection needles based on the patterns of geckos. Furthermore, genetic algorithms find applications in AI’s learning processes in the realms of integrative evolutionary science. Value feedback among diverse evolutionary studies will prove to be a cornerstone of evolution biologically.

Iwano Midori
Director
Introduction and description of the center

The Research Center for Integrative Evolutionary Science (RCIES) aims to be the sole domestic research hub focused on "evolution," collaborating with both domestic and international research institutions to create a novel academic domain called "integrated evolutionary science." While the term "evolution" may evoke images of biological evolution, "integrated evolutionary science" encompasses research into the changes and evolutions brought about in scientific, technological, cultural, and societal realms by human activities. It seeks to encompass all these aspects under the definition of "integrated evolutionary science."

Over the course of the 3.8 billion years of the history of life, this field will explore how living systems have been constructed and transformed. Additionally, it will investigate how various human activities, such as social, psychological, linguistic, and cultural aspects, have undergone changes. Furthermore, it will take an evolutionary perspective to holistically consider the global challenges faced in the Anthropocene epoch, examining how they have progressed and exploring potential solutions. "Integrated evolutionary science" thus reevaluates the concept of "evolution," aiming not only for the advancement of the knowledge system in biology but also to incorporate the insights of evolutionary studies into the understanding of human phenomena and resolution of societal issues.
Introduction and description of the center

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Environmental Archaeology (Zoology and Palaeoanthropology)

Aim for a comprehensive understanding of humankind and the environment in the past, present and future.

I investigate the socioeconomic and cultural changes of past human societies through the relationship between human groups and the environment. Emergence of sedentary settlements in c. 15000 years ago and domestication of plants and animals brought significant changes in human history and facilitated the development of complex societies. On the other hand, influence of human activities on the ecosystem has increased and eventually led to the global environmental crisis today. Aiming for an integrative understanding of relationships between humans and their environment in the past, present, and future, I carry out research in southeastern Turkey, one of the domestication centers, as well as other parts of West Asia. Since domestication is a coevolutionary process of humans and animals or plants, the process needs to be studied both from biological and sociocultural points of view. Therefore, cooperation of researchers from various fields, such as archaeology, genetics, environmental sciences, behavioral ecology, and anthropology, is essential for the investigation of domestication process.

Major Publications


In the Laboratory of Biological Anthropology, we reconstruct the lived experiences, life histories, and evolutionary processes of Homo sapiens and evolutionarily related primates using various cross-disciplinary approaches. How were human and primate individuals born, grew up, reproduce (or not), and died? By revealing these lived experiences, we can investigate the impact of cultural and natural environmental differences on the evolutionary process over long time scales in human evolution. Specifically, data are obtained by applying stable isotope analysis, palaeoproteomics, and ancient DNA analysis to specimens and materials from the fields of archaeology, palaeontolgy, and primate ecology. Such data are interpreted and discussed within the framework of ecology, history, and evolution. This allows us to reconstruct, for example, how chimpanzees and orangutans live in tropical rainforests, childrearing practices in past human populations from the Jomon to the Edo period, and how extant Homo sapiens had evolved.
Environmental Archaeology (Zooarchaeology) and Palaeoanthropology

Aiming for a comprehensive understanding of humankind and the environment in the past, present and future

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Major Publications


The observation of animals leads us to a number of questions such as: “How do animals live?”, “Why do animals behave in a certain way?”, “What do animals know and understand?”, and “Why are there so many species?” A goal of my studies is to understand animal behavior and ecology from a standpoint of evolution. I have two ongoing projects. The first one is on social evolution in group-living mammals. I want to know how individuals should behave in order to maximize their (inclusive) fitness in a complex social environment. So far, I have been working on cooperation, conflict, conflict resolution, and communication in mammals and other vertebrates (birds, amphibians, and fish; reptiles not yet, unfortunately). The second one is on phenotypic evolution and comparative approaches with information of phylogeny. I am applying a new computational framework of phylogenetic comparative analyses to complex and heterogeneous data to infer processes of trait evolution.

Major Publications


Animal behaviour, ethology, behavioral ecology, primatology

How do animals live and what do they think?

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Major Publications


Ecology, Marine Biology

Measuring and understanding the behavior, ecology, and physiology of marine predators

I study the ecology of marine predators (large fishes, marine mammals, and seabirds) using the technique called biologging, where miniaturized sensors are attached to animals. With modern biologging devices, it is now possible to record the behavior, surrounding environment, and internal state (e.g., body temperature, heart rate) of marine predators. It is also possible to observe what they do in the water by attaching video cameras to the back of the animals. My main approach is to obtain such data in the field and then analyze data from ecological perspectives, often with the information collected using other research methods or from the literature. By doing so, I aim at understanding the ecological significance (or ultimate causes) of the behavioral or physiological traits shown by the species in question. My main research target is currently sharks, although I also conducted many field studies on marine mammals and seabirds in the past. My study areas include Kochi and Okinawa Prefectures in Japan as well as various areas off Taiwan, Australia, and Canada. In addition, I recently began fieldwork in Sagami Bay near the Hayama Campus of SOKENDAI. A key component of biologging studies is the development of new devices. Thus, I am collaborating with several manufacturers in Japan, aiming to record truly innovative data from free-moving marine predators.

Major Publications


Today, many species inhabit the earth, and their interactions generate biodiversity. Biodiversity has been acquired through "speciation" (one species divides into two species) and through "adaptation" (organisms survive in their habitat). We focus on four primary research areas to elucidate the mechanisms of adaptation and speciation in organisms.

- **Speciation: a genomic approach**
  Based on genomic analysis, we are studying the speciation of seven species of macaques endemic to Sulawesi Island and corals.

- **Adaptation by symbiosis**
  We are studying the mechanism of adaptation to a new environment by symbiosis, using a volcanic fencer that grows only in the areas where volcanic gases are venting.

- **Adaptation to the Human environment**
  The ancient genomes of the Japanese wolf and the ancient dog are used to study the origins of the dog and how dogs have adapted to their living environment with humans.

- **Adaptation of vision to light environments**
  We use fish and insects to study how organisms have adapted their vision to different light environments underwater.

### Major Publications


The impact of differences in culture and natural environment on lived experience of "us" (Hmoob-speaking and other evolutionarily related species)

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Adaptation of vision to light environments
We use fish and reply to study how organisms have adapted their vision to different light environments underwater.

Major Publications

The sensory world of animals can be very different from ours. One of the fields to reveal their sensory world is behavioral neuroscience. My research interest is "Biology of flower foraging butterflies." I have studied visual abilities and spectral organization of the compound eye in the Japanese swallowtail butterfly, Papilio xuthus. Papilio butterflies have sophisticated color vision, which rivals our own. The compound eye, providing the most peripheral light processing, contains at least six classes of spectral receptors in a complicated manner. Based on the previous studies, we further explore visual processing in higher brain regions and the integration processes of visual and olfactory signals for flower foraging. I recently started two new projects. One is a comparative study on the brain structure in Lepidoptera insects. The other is visual ecology to investigate which flower species butterflies visit in their habitat. These studies would reveal the evolution of flower foraging behavior.

Major Publications
Most insects undergo metamorphosis to develop into adults. The brains of holometabolous insects (e.g., flies, butterflies, bees) drastically change their morphology during metamorphosis, which is required to prepare neural circuits for adult-specific behaviors. On the contrary, the brains of direct-developing insects (insects develop without pupal stage; e.g., cockroaches, crickets) show moderate structural changes throughout post-embryonic stages. However, similar to holometabolous insects, adults of direct-developing insects exhibit adult-specific behaviors such as courtship and mating behaviors, which are not observed in juveniles. This raises a question from the viewpoint of evolutionary developmental biology; when and how the brain of direct-developing insects becomes adult without the pupal stage? To address this question, Takayuki Watanabe is investigating the development of the neural circuits for adult-specific behaviors in a model hemimetabolous insect Gryllus bimaculatus (two-spotted cricket).

Major Publications


The evolution of organismal characteristics (phenotypes) is not completely free in any direction, and some characteristics are more likely to change throughout evolution than others. How do such differences arise? It may simply be due to the difference between the pressures of positive selection toward different phenotypes. On the other hand, it is also possible that some phenotypes have less potential to produce phenotypic variations due to their intrinsic characteristics, which leads to less chance to diversity. In fact, a growing number of recent theoretical and experimental studies support this possibility. Then, what is the mechanism behind this difference in phenotypic evolvability? We aim to answer this question using a variety of methods, including experiments on animals and large-scale bioinformatic analyses. Ultimately, we hope to contribute to changing the field of evolutionary studies from a study that focuses mainly on events that happened in the past, but to a field of study with predictive theories for phenotypic evolution.

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Population Genomics, Evolutionary Physiology

Evolution of the human genome has been driven culturally and socially, as found in food-mediated changes of digestion enzyme genes, toxin-mediated alterations of detoxification enzyme genes, and sociocultural modifications of mental disorder genes.

Modern humans, Homo sapiens sapiens, migrated from Africa approximately 60,000 years ago and rapidly spread to every corner of the Earth. In this migration process, our ancestors encountered new environments and developed various cultures to survive. Culture is a strong evolutionary agency that drives evolution of human and other organisms’ genomes. Gene-culture coevolution is exemplified by lactase persistence alleles in milk-drinking pastoralist populations and Schizophrenia resistant SNP variants in almost all countries. It is possible to learn the process of culture-driven evolution by looking at positive Darwinian selection that operates on particular genomic regions. To this end, we conduct our evolutionary researches on 1) metabolizing enzyme genes, 2) detoxification enzyme genes, 3) mental disorder-related genes. In particular, detoxification enzyme variants are intimately related to metabolisms of luxury grocery items (e.g. spices, coffee, alcohol) as well as drugs, both essential to modern life. Learning the history of variants in these systems will provide some answers about how we got here.

Major Publications


Molecular Evolution

Study evolution of biological systems, such as vertebrate immune systems and plant reproductive systems, at molecular level.

As analyses of omics such as genomes and transcriptomes have been progressed for the increasing number of species, it becomes possible to study an organism as a whole, with recognizing each and every underlying system as product of complexed products of genes expressed. In our laboratory, with emphasizing the viewpoints of molecular evolution and population genetics, a few biosystems have been studied to solve questions such as “How have the mutations of individual genes led to phenotypical changes and become subject to natural selection?”, and “How have complex systems been formed through the accumulation of mutations?”, With the aims in mind, we are conducting specific research on the followings:

1. The evolution of vertebrate immune systems such as adaptive and innate immune systems of fishes.
2. Origin and genomic history of domesticated cultivated plants such as Azuki bean and buckwheat.
3. The evolution of reproductive systems in Polygonaceae, including buckwheat.

Major Publications

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The left phylogenetic tree shows that when 1% of nucleotide changes (SNPs) has been exchanged. The right shows (1) that (b) is an unique point mutation of selection.

The map shows frequencies of the types of variants in a sample consisting of 100 SNPs.

The figure shows phylogenetic relationship between the LEK and non-LEK type samples, indicating that positive selection has been operating in the LEK type.

Molecular Evolution

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*Please visit our website for more information.*

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**Major Publications**


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**To applicants**

Graduate university is the starting point of your research life. Why do you try to find research subject? problem worth for your time in life together?

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**Research details**

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**OTA, Tatsuya**

Associate Professor

Department of Biology, Tokyo University

B.S. 1997, Kyoto University


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**Satta, Y.**

Professor

Research keywords:

- molecular evolution
- systematics
- phylogeny
- population genetics
- immunoglobulin heavy chain isotype within the Dipnoi reveals an evolutionary paradox.

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**Ohta, T.**

Associate Professor

Graduate School of Integrated Science for Molecular Biology and Evolution, Japanese Society of Taxonomy. 10, 469-482.

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**Mita, Y.**

Professor

Graduate School of Science and Technology, National University of Singapore.

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**Satta, Y.**

Professor

Graduate School of Science and Technology, National University of Singapore.

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Professor

Graduate School of Science and Technology, National University of Singapore.

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Graduate School of Science and Technology, National University of Singapore.
How our species, Homo sapiens, emerged? To address this question, I take two approaches. One is to understand the evolution of human specific traits. The other is to understand the demographic history of human after they appeared in Africa. I study Molecular Evolution and Population Genetics to understand these processes of human evolution at DNA level. One of the current targets is tandem repeat of single amino acids, which is called homopolymeric amino acid repeat. It is known that unusual length of this repeat causes genetic diseases, which affect central nervous systems and skeletalogenesis. These kinds of diseases related to human specific traits such as large brain size or bipedal locomotion. I expect that the evolution of homopolymeric amino acid repeats can be a key to understand human evolution. And there are many projects aim to find markers or genes that are responsible for human genetic disease. As a consequence of these projects, massive amount of human SNP data or human genetic variation data are produced. I apply these medical data to human evolutionary study and try to connect medical and evolutionary researches. My interest is not only limited to human evolution but also includes evolution of primates, mammals and vertebrates.

Major Publications


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Major Publications
Pathogens like human immune deficiency virus and Trypanosoma brucei, the causative agents of AIDS and sleeping disease, are known to repeatedly change their cell surface coat proteins, thereby escaping the host immune response and enabling their persistent infection. To predict such rapid and complicated evolutionary processes of pathogens, we need to develop mathematical models to describe the evolution of pathogens’ cell surface protein and immune response within an infected host. With these mathematical models, I have been studying, for example, the antigenic drift of HIV and influenza viruses to escape host immune system, the evolution of pathogen virulence with host spatial structure or metapopulation heterogeneity, the evolution of viral mutation rates, and the optimal strategies for vaccination and drug therapy. Other topics I am studying intensively include Müllerian mimicry and formation of spatial mosaic, coevolutionary cycles and their geographical asynchrony, species packing and sympatric speciation, the evolution of division of labor in mutualism, and the evolutionary fragility of mutualist systems.

Major Publications


When starved, cells of slime mold, Dictyostelium discoideum, aggregate and some of them die to form stalks in order for others to disperse to a better location. In most eusocial insects such as bees and ants, queens dominate reproduction whereas workers are specialized in various labors in the colony. Reciprocal cooperation forms, a basis of human society. Cooperation is ubiquitous in biology, yet its evolutionary origin is paradoxical because one can expect the emergence of “social parasites” which do not pay the cost but enjoy the benefit of cooperation. One of my main goals is to theoretically unveil the origin of cooperation. My research topics include: kin recognition in microorganisms, dynamic optimization in ant colonies, generalization of inclusive fitness theory, interplay between population structure and evolutionary dynamics, indirect reciprocity in humans, evolution of punishment and reward, and evolution of dominance hierarchy. I also work on modeling of animal behavior, species diversity, cultural evolution, social networks, human life-history evolution, and cancer progression. In addition, I study mathematical foundations of evolutionary game theory and adaptive dynamics theory.
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Major Publications

Population genetics

Understanding the mechanisms of molecular evolution

We aim to theoretically understand the mechanism of molecular evolution. The genetics-based theory can be applied to a wide range of species. Genomic polymorphism data are analyzed to understand how and when Darwinian selection worked in the genome.

Major Publications


Population genetics

Thoroughly Genetic Research (Best Orange)

Examples of changes in the effective population size of humans

History of science and technology

Let’s think about the landscape of knowledge. What do we know and what don’t we know? Why?

My main interests are in history of biology in Japan. I have examined how genetics developed in Japan from the 1920s to 1960s through dynamic social contexts such as modernization, imperial expansion, postwar reconstruction /democratization, and Cold War. My current interests include how concepts of radiation and its effects were shaped after the war and what roles the Japanese community played in that shaping.

Major Publications


Population genetics
Understanding the mechanisms of molecular evolution

We aim to theoretically understand the mechanism of molecular evolution. The genetics-based theory can be applied to a wide range of species. Genomic polymorphism data are analyzed to understand how and when Darwinian selection worked in the genome.

Major Publications


History of science and technology

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Major Publications


Philosophy of Science

Analyzing the nature of science and scientific knowledge

Today, science and technology have a profound impact on every aspect of our lives. While it brings us tremendous benefits, the emergence of new science and technology can also lead to unprecedented disasters and ethical challenges. Therefore, the relationship between science and society has been actively discussed from various aspects and using knowledge from various fields. Philosophy of science is one of these fields.

To fully understand the relationship between science and society, it is first necessary to understand more deeply what science is. For example, what characteristics of science make it special and distinguish it from other activities called ‘pseudoscience’? Is science affected by social values? If individual scientists are not influenced by the specific social and cultural context in which they conduct their research, how is this possible? If they are, does this undermine the authority and rationality of science? These questions have been discussed in the philosophy of science.

My own interest in this area is mainly in the analysis of scientific knowledge. In particular, I have been studying the “scientific realism controversy” (the controversy over the approximate truth of what scientific theories say about the world, including unobservable things) and have attempted to apply various theories in epistemology (theory of knowledge, justification or warrant) to this controversy. In addition, I am interested in various issues related to scientific representations (how scientific theories represent the world, such as the relationship between so-called ‘models of data’ and raw data).

Major Publications


Communal Microscope Facility

The RCIEs provides the microscope facility for promoting collaborative research. Here we introduce our unique pieces of equipment with state-of-the-art techniques.

1. Transmission electron microscope
   - Technical supports: From biological sample preparation for conventional electron microscopy and immunocytochemistry, to image acquisition
   - Specimen examples: Insect compound eyes, optic lobes, antennal lobes, and central brain. Butterfly wing scales, electrosensory region of midbrain in weakly electric fish: reproductive organ of mice

2. Scanning electron microscope
   - Technical supports: From biological sample preparation to image acquisition
   - Specimen examples: Insect wing scales, compound eyes, antennal sensilla. Archeological animal/plant remains and their replicas, and extant species for comparative studies

3. Confocal laser-scanning microscope
   - Applications: 2D/3D multicolor/confocal imaging in vivo imaging, time series imaging, spectral analysis, photo-activation imaging, etc.
   - Specimen examples: Tissues of echinoderms (nervous system, developmental processes); insect brains (cockroach, butterflies)
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Major Publications


Overview and Features of the Course’s Education

The Integrative Evolutionary Science course is one of only a few programs in Japan specializing in evolution. We offer a unique and innovative program to foster scientists with broad perspectives who can address questions such as “What current advances in life science contribute to our society?” and “How should we as humans bring with the issues surrounding these advances?”

Every living organism is the product of a long evolutionary history. Furthermore, organisms do not exist in isolation but rather are interrelated via the biosystems that they form together. Evolution is the key to understanding the history and diversity of organisms. Unfortunately, conventional biology has narrowly focused on extremely segmented and specialized areas, making it hard to form a unified picture of biological phenomena.

This course, therefore, emphasizes the importance of obtaining both depth and breadth of knowledge, so that our graduates can view biological phenomena within a wider evolutionary framework.

Our course welcomes prospective students not only from science majors - including biology engineering and agriculture - but also from humanities majors such as psychology, sociology, and philosophy. Introductory courses are provided for those from humanities majors so that they may acquire the fundamental biology skills and knowledge required for study at the graduate level. The course also offers programs for “Social Studies of Science”.

Students write a paper (‘sub-thesis’), the aim of which is to develop a broad perspective to understand the relationship between science and society. We expect that our graduates will become researchers, curators, and professionals in media and other intellectually intensive industries and will serve as contacts between life science and society bridging the conventional disciplinary boundary between “science” and “humanities.”

5 year doctoral Program
3 year doctoral Program

Educational Characteristics

Our educational program is structured so that individuals can establish their own perspective on life and is aimed at developing professionals who can be employed in the future development of society. The biggest feature is that all faculty members are involved in the management of learning and research processes for all students, and a number of novel initiatives are engaged in that are not found in conventional graduate school education.

● The Collective Leadership System

Every teacher pays attention to the progress of each individual student’s learning and research as they instruct them. Students may request research guidance and advice not only from instructors (one supervisor and two sub-supervisors) but also from other faculty members.

● The Sub-Thesis System

In order to cultivate the broad perspective that is also the philosophy of this university, the submission of sub-theses as well as degree papers in specialized fields (main papers) is required for the conferral of degrees. Students who write their primary thesis in Biosciences write their sub-thesis on the theme of Science and Society, while students who write their primary thesis in the field of Science and Society write their sub-thesis on a theme from Biosciences. Faculty members in the relevant field will provide guidance and support for research on sub-theses.

● Pioneering Scientific Research

We invite researchers who are active at the forefront of various fields, such as Biosciences and Chemistry and Society, to give guest lectures, holding eight seminars a year. Students can learn the latest research trends and historical context while having direct discussions with lecturers.

Comprehensive Support for Students

We will support students’ research activities and presentations of their results. Perhaps expand on what you mean by this.

● The Research Assistant (RA) Employment System

We will provide payment up to an amount equivalent to the annual tuition fee to RAs.

● Laptop Rentals

All students will be lent a laptop for use in research and learning.

● Support for Overseas Travel Expenses

The government will provide support for the presentation of research results overseas, as well as travel and accommodation expenses associated with research activities and the collection of materials at overseas research institutes.

● Support for Domestic Travel Expenses

We will provide support for travel and accommodation expenses for those taking Programs in other major fields of study or other graduate schools, as well as for the presentation of research results at Japanese academic societies, and experiments at institutions and shared laboratory facilities.

● SOKENDAI Publication Grant for Research Papers

We will cover expenses necessary for the publication of research papers, etc.

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The Model of the Study Process

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We held open-campus events and information sessions on the academic program. In addition, for those who so desire, we accept requests for trial enrollment, consultations on admissions, and laboratory visits at any time.

2023 Open Campus Information session on the Academic Program

- **May 13, 2023** (Held online)
  - "Research Frontline:
    Let’s study at graduate school!” lecture meeting
  - Entrance Examination information Session

- **November 11, 2023**
  - Information Session on the academic program
  - For details, please refer to the following URL: https://ies.soken.ac.jp/en_index.html

- **January 5, 2024**
  - Open Campus (Implementation method undecided)

Special Seminar Series: Seminars by external lecturers

Progress Report: Presentation of research progress and results

Please note: on the HP site For more information. https://ies.soken.ac.jp/
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**2023 On-line Session**

- **May 13, 2023 (Held online)**
  - Research Frontline:
  - Let’s study at graduate school!” lecture meeting
  - Entrance Examination information Session

**Briefing Session Flow**

- Overview of Sokenai and the program
- Curriculum/Explanation of Admissions
- Individual Discussions

- **November 11, 2023**
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  - For details, please refer to the following URL: https://ies.soken.ac.jp/en_index.html

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Do you have a few words for those who aim to enroll at SOKENDAI?

Even if you have decided on what you want to do or a theme, it is not easy to bring it to tangible form in accordance with the framework of academia. The process is often difficult and disheartening. But beyond that, things that are exclusively your own will appear, so I want you to enjoy the process.

Your presence here is the most important thing.

Dr. SATO, Masato

― What was your motivation for entering SOKENDAI?

Since my childhood, I have been interested in how organisms evolve. When I graduated from my undergraduate program and went on to graduate school, I was particularly interested in the theory of evolution, and when I thought about where I could study this theory in Japan, I decided that it was at SOKENDAI. There is really nowhere else that you can study the theory of evolution specifically.

― What was your research life like?

When I first decided on the theme of my research after entering university, the research theme that I had brought with me was accepted. I believe that my greatest achievement was my ability to proceed with research into that topic and have it published in The American Naturalist, a famous international journal that I really admired.

― What is your greatest memory?

When I was in D1, I stayed at a Viennese research institute in Austria, the IIASA (International Institute for Applied Systems Analysis) for about two weeks and then had the chance to engage in collaborative research with prominent researchers. From the point of view of my career as a researcher, I was able to train myself to engage in research.

Do you have a few words for those who aim to enroll at SOKENDAI?

I am glad I came here, but of course I cannot guarantee what other people think. Those who think it is best to come here so that they may do what they want to do should definitely come.

Basicallly, in the doctoral course, the goal is to become a fully independent researcher. I think that if you have that mindset, you will be happy.

Message to you

I was allowed to proceed at my own pace; I had good relationships with my teachers and other researchers, and, honestly, I did not have any real hardships to overcome. When I was in D4, while it had nothing to do with my research, I was stung by a hornet and spent about two weeks in bed. I was in the process of proofreading the first paper I submitted for publication.

― What does it mean to be like SOKENDAI?

― What are the merits of SOKENDAI?

― What is your greatest memory?

― What kind of research did you engage in?

There is a strange creature called a venemous caterpillar that lives in the deep sea, and it contains with bacteria in the body. I was researching the theoretical model of the evolution of the symbiotic relationship by which the bacteria co-operate with the host. I submitted it when I was in my second year, and after lengthy proofreading, it was published in DS. It took quite a long time (haha!).

I think that if you have that kind of mindset, you can be happy.

― What was your research life like?

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I felt as if my research and my everyday life were in line with my original vision. I think that if you have that kind of mindset, you can be happy.

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Interview with Graduates

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What was your greatest challenge?

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What are the merits of SOKENDAI?

Since there is no undergraduate program here, my time is rarely taken up by classes, and it is really great that I can feel free to engage in casual discussions with faculty members and senior students. You do not have to worry about time, and even if you go to their room, they will make sure to listen to you.

What is your greatest memory?

When I was in D4, I stayed at a Viennese research institute in Austria, the IIASA (International Institute for Applied Systems Analysis) for about two weeks and then had the chance to engage in collaborative research with prominent researchers. From the point of view of my career as a researcher, I was able to train myself to discuss research in English, for which I was glad.

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Message to you

I think it is a good idea not to be bound by a narrow and entrenched perspective but to proceed with one’s research while recognizing the potential for things to emerge from the flanks. From high school, we are divided between students in the liberal arts and those in the sciences. As a researcher of humans, I like both ways of thinking. I was invited to participate in a lecture on the arts at SOKENDAI, and through this experience, I realized a variety of things. For one lecture, I went to a museum in Hokkaido and was shown their exhibits; for another, a folkloric teacher led me to visit museums in Shikoku. Although it is difficult to connect these experiences directly to my own field of research, my perspective expanded greatly.

— What is your current research project?

I was in the process of proofreading the first paper I submitted for publication.

— What kind of research did you engage in?

There is a strange creature called a vestimentiferan that lives in the deep sea, and it consists with bacteria in the body. I was researching the theoretical model of the evolution of the symbiotic relationship by which the bacteria co-operate with the host. I submitted it when I was in my second year, and after lengthy proofreading, it was published in DS. It took quite a long time (haha!).

— What do you think is the most important for researching archaeology, anthropology, and gerontology?

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