FIELD SCIENCE EDUCATION AND RESEARCH CENTER

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   MAIZURU FISHERIES RESEARCH STATION
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FIELD SCIENCE EDUCATION AND RESEARCH CENTER

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HISTORY AND ORGANIZATION

The Field Science Education and Research Center (FSERC) was founded in 2003 by integrating the University Forests, the Subtropical Plant Institute and the Maizuru Fisheries Research Station affiliated with the Graduate School of Agriculture, and the Seto Marine Biological Laboratory with the Graduate School of Science. The year of foundation of each facility is as follows:

1922 Seto Marine Biological Laboratory founded as Marine Biological Research Station
1924 Kyoto University Forests founded
1937 Kii-Oshima Research Station founded as Oshima Warm Temperate Flora Station
1972 Maizuru Fisheries Research Station founded
2003 Integration of these four facilities into FSERC

The FSERC comprises the following three divisions each consisting of several laboratories:

DIVISION OF FOREST BIOSPHERE
• LABORATORY OF FOREST SPECIES AND ECOSYSTEM CONSERVATION
• LABORATORY OF FOREST RESOURCE MANAGEMENT
• LABORATORY OF FOREST INFORMATION AND ENVIRONMENTAL RISK ASSESSMENT SCIENCES

DIVISION OF HUMAN ECOSYSTEM
• LABORATORY OF SATOYAMA RESOURCE CONSERVATION
• LABORATORY OF HUMAN ECOSYSTEM CONSERVATION
• LABORATORY OF COASTAL FISHERIES ECOLOGY
• LABORATORY OF COASTAL FISHERIES RESOURCE MANAGEMENT
• LABORATORY OF ESTUARINE ECOLOGY

DIVISION OF BASIC MARINE BIOLOGY
• LABORATORY OF SYSTEMATICS AND TAXONOMY FOR MARINE ORGANISMS
• LABORATORY OF EVOLUTIONARY MORPHOLOGY OF MARINE ORGANISMS
• LABORATORY OF MARINE BIODIVERSITY CONSERVATION BIOLOGY
• NaGISA PROJECT

DIVISION OF INTEGRATED COASTAL MANAGEMENT

AIMS

The forest and coastal biospheres have been tightly related to one another, and have given plenty of benefits to human beings. The rapid expansion of human activity in recent times, however, threatens to sever this long-existing relationship and causes a severe environmental problem. In order to recover these biospheres and their proper relationship, and to make sustainable use of the benefits from them, the progress of the study on human ecosystem is much desired.

Under the circumstances above, the FSERC aims to establish the "Connected Rings of Forest-Human Habitation-Marine", a new frontier of field science which aids the coexistence of nature and human beings, and to become a hub organization of the field science in the temperate zone of East Asia. The details of research and education are shown in the description of each division.

PUBLICATIONS

The FSERC and its facilities publish the following periodicals: FSERC News (Newsletter in Japanese from the FSERC since 2004)
Forest Research, Kyoto (Scientific journal in Japanese from the University Forests since 1930)
The Report of the Kyoto University Forests (Annual report in Japanese from the University Forests since 1951)
Report of Fisheries Research Station, Kyoto University (Scientific journal in Japanese from the Maizuru Fisheries Research Station since 1992)
Publication of the Seto Marine Biological Laboratory (Scientific journal in English from the Seto Marine Biological Laboratory since 1949)
Special Publication Series (Irregularly published series of the above journal since 1958)

DIVISION OF FOREST BIOSPHERE

In this section three affiliated forest research stations and three experimental stations, field-based research and educational activities in diverse areas of forest and wood sciences are being undertaken mainly at the graduate school level of Kyoto University. These activities include research and educational instruction on integrated acquisition and analysis system for forest resource informatics, functional evaluation and spatial zoning technology of forested landscape based upon natural environment, ecological structure and socio-economic conditions, sustainable forest resource management system, and promotion of sustained forest resource and ecosystem productivities from silvicultural viewpoints.

LABORATORY OF FOREST SPECIES AND ECOSYSTEM CONSERVATION

Associate Professor
TOKUCHI, Naoko, D.Agr. (Kyoto Univ.), Forest Ecosystem Ecology
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The studies of our laboratory are focused on analyses of the formation and maintenance mechanisms of diversity and ecological systems at different levels (i.e., species, individual or gene, population, community, watershed, and landscape) in natural and artificial forests. We also focus on analyses of the life histories of forest species, especially plant species. In addition, to develop the methods for conservation of forest ecosystems and for sustainable utilization of forest resources, we are challenging the studies of large- and small-scaled experimental manipulations in forest fields.

LABORATORY OF FOREST RESOURCE MANAGEMENT

YOSHIOKA, Takahito, D.Sc. (Nagoya Univ.), Biogeochemistry
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Associate Professor
ANDO, Makoto, D.Agr. (Kyoto Univ.), Forest Ecology
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Assistant Professor
Sakanoue, Nao, D.Agr. (Kyoto Univ.), Distribution System of Forest Productions
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Targets of our laboratory are the quantification and evaluation of multi-functions (e.g., biological and environmental resources) of forest ecosystems, environmental impact analyses of the forested watershed environment, and analyses of the distribution system of forest productions. We also survey the importance of the environmental value judgment and the public involvement in processes on the planning and decision-making for environmental measures.

LABORATORY OF FOREST INFORMATION AND ENVIRONMENTAL RISK ASSESSMENT SCIENCES

Associate Professor
SHIBA, Masami, D.Agr. (Kyoto Univ.), Forest Resource and Environmental Management Planning
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Lecturer
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Keynote research theme of the laboratory is focused on the overall application of the state-of-the-art information technologies for sustainable forest management system interacting with socio-economic and environmental context, and concentrates on solving the problems faced by diverse forest stakeholders such as policy makers, managers, engineers, and general publics.
Current researches include the development of optimum forest management planning alternatives based on forest information technology and training program, applicability of GIS/GPS tools for forest management strategies, quantification of appropriate
mechanisms between forests and water environments, forest certification and appropriate harvesting systems, development of environmentally friendly timber harvest and road network systems, forests and their role in water supply and quality, life cycle assessment and risk analysis of production activities in forestry, and economical development through better value chains from forest to forest products.

DIVISION OF HUMAN ECOSYSTEM

In the broad and varied areas from mountainous zones to coastal zones, a lot of moderate interferences of human beings have been continued for a long time in various intensities. As a result characteristic ecosystems have been formed by the interaction between nature and human beings and/or by the coexistence of human beings and nature. This ecosystem is under the strong influence of human activities for survival, specifically in the forms of agriculture, forestry, fisheries and so on, and also including the villages, towns and cities that are human residential areas. The understanding of these ecosystems, which is one of the main subjects of this division, leads the solution of essence to the global environmental problems. Here we are trying to analyze of interactions between human activities and nature, and practicing the education and research to build up the coexistence system.

LABORATORY OF SATOYAMA RESOURCE CONSERVATION

Professor
SHIBATA, Shozo, D.Agr. (Kyoto Univ.), Nature Restoration and Bamboo Ecology
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Associate Professor
HASEGAWA, Hisashi, D.Agr. (Kyoto Univ.), Forestry/forest engineering
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At present Satoyama (village forests) are declining in value for use and are being neglected in many places. This laboratory designs courses and researches relating to the development of new methods for the utilization of Satoyama to coexist with it again. Satoyama also has been keeping peculiar ecosystems as the secondary nature by the interaction between human beings and nature. The researches to restore these ecosystems, to evaluate them from the view of regional characteristics by making up the inventory, and to develop the relationship to adjacent agricultural ecosystems and urban ecosystems and so on are also the important subjects.

LABORATORY OF HUMAN ECOSYSTEM CONSERVATION

Associate Professor
UMEMOTO, Shinya, D. Agr. (Kyoto Univ.), Weed Science and Economic Botany, Human Ecosystem, Plant Resource, Culture Conservation
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The earth may be divided into nature and human ecosystems. In this laboratory, discussions are regarding where, when and how the human ecosystem evolved from the natural ecosystem and how the human ecosystem should be managed, in relation to the conservation of a natural ecosystem. The vegetation evolution and domestication continuum from the wild to the weed, the encouraged, the semi-tamed to the tamed in human ecosystems of Asian civilization and regional cultures are also field-surveyed.

LABORATORY OF ESTUARINE ECOLOGY

Associate Professor
TAGAWA, Masatomo, D. Sc. (Univ. of Tokyo), Fish Physiology, Hormone, Fish Development
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Assistant Professor
NAKAYAMA, Kouji, D. Agr. (Kyoto Univ.), Molecular Genetics of Fish, Phylogeny, Molecular Ecology
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The main research subjects in our laboratory are the following: 1) The early life history of fish, especially flatfishes and seabass, pursued with the goal of elucidating possible mechanisms of early mortality by means of field observations and rearing experiments. 2) Fish systematics of Indo-Pacific species, focusing on phylogenetic relationships based on morphology, mtDNA, and patterns of geographical distribution. 3) Fish physiology in the early de-
developmental stages, focusing on hormones in eggs, metamorphosis, and osmoregulation.

LABORATORY OF COASTAL FISHERIES ECOLOGY
Professor
YAMASHITA, Yoh, D. Agr. (Univ. of Tokyo), Coastal Ecology, Ecophysiology, Nursery Habitats


Assistant Professor
Nakanishi, Asami, M. Agr. (Kyoto Univ.), Assistant Professor


Assistant Professor
Kai, Yoshiaki, D. Agr. (Kyoto Univ.) Systematics of Fishes, Phylogenetics, Taxonomy


Assistant Professor
Ueno, Masahiro, D. Agr. (Kyoto Univ.), Population Dynamics, Benthos Ecology

We study the population dynamics of major fisheries resources in the Western Wakasa Bay to understand the marine environmental structure and oceanographic fluctuation in coastal waters. Research subjects include phylogeny, life-history, behavior and ecology of marine animals based on both field and laboratory studies. Our goal is to elucidate the mechanism of their natural population fluctuation.

DIVISION OF BASIC MARINE BIOLOGY

This division carries out various aspects of research and education in basic biology such as taxonomy, evolutionary biology, developmental biology, physiological ecology and biogeography from the molecular level to the ecosystem level using mainly temperate marine invertebrates as materials. Moreover, through extension of research fields into the global scale from tropical to boreal regions, the division also covers biology that has applied aspects such as environmental and conservation biology as subjects of research and education.

LABORATORY OF SYSTEMATICS AND TAXONOMY FOR MARINE ORGANISMS

Associate Professor

Kubota, Shin, D. Sc. (Hokkaido Univ.), Invertebrate Zoology: Systematics, Cnidaria, Ctenophora, Life History, Natural History


Kubota, S. (2000) Parallel, paedomorphic evolutionary processes
of the bivalve-inhabiting hydrozoans (Leptomedusae, Eireniidae) deduced from the morphology, life cycle and biogeography, with special reference to taxonomic treatment of Eugymnantheia. Sci. Mar. 64(Suppl. 1):241-247

Assistant Professor

YAMATO, Shigeyuki, D. Sc. (Hiroshima Univ.), Invertebrate Zoology; Taxonomy, Crustacea, Natural History


The main research subject of this laboratory is the systematics and taxonomy for marine organisms, which have been studied without interruption, since the Seto Marine Biological Laboratory was founded in 1922. Diversity of marine organisms is extremely high, and still remains to be studied. We aim at understanding comprehensively of this diversity, especially, on Cnidaria and Crustacea.

LABORATORY OF EVOLUTIONARY MORPHOLOGY OF MARINE ORGANISMS

Lecturer

MIYAZAKI, Katsumi, D. Sc. (Univ. of Tsukuba), Invertebrate Zoology; Comparative Morphology and Embryology


Assistant Professor

FUKAMI, Hironobu, D. Fish. (Tokyo Univ of Fisheries), Invertebrate Zoology; Evolution and Ecology of Cnidaria


The main research subject of this laboratory is comparative and evolutionary morphology and embryology of marine invertebrates especially arthropods. Traditional anatomical and histological as well as recently advanced molecular and biochemical methods are applied to the research. The laboratory also covers a wide range of fields of research related to the evolutionary morphology, e.g. taxonomy, ecology, and physiology.

LABORATORY OF MARINE BIODIVERSITY CONSERVATION BIOLOGY

Professor

SHIRAYAMA, Yoshiihisa, D. Sc. (Univ. of Tokyo), Marine Biology; Taxonomy and Ecology of Meiobenthos


To maintain marine organisms, it is necessary both to recognize its biodiversity and to understand how diversified fauna and flora will respond to the environmental fluctuation. For this purpose, it is prerequisite to monitor for a long-term the natural environment as well as the state and change of marine community. As a head quarter of an international field project named NaGISA (http://www.nagisa.com.org/), this division has carried out monitoring of benthic fauna in Hatake Jima Is. In addition, utilizing the aquarium facility, long-term experiments to find the impact of global environmental change on marine organisms have been performed.

NaGISA PROJECT

Program-Specific Assistant Professor

ISETO, Tohru, D.Sc. (Univ. of the Ryukyus), Invertebrate Zoology; Taxonomy of Entoprocta


The elucidation of biogeography of near shore benthic communities rests on the clarification of the scale(s) of variability and the establishment of a global baseline of coastal biodiversity. Discovering ‘where what lives’, ‘what lives where’ and how these change over time is vital to the current issues of habitat resilience, species invasion and climate change. By working across scientific and national boundaries to improve the current state of marine knowledge at all levels NaGISA is attempting to form a network from which answers to these (and many more) questions will come. By creating and promoting standardized methods (protocol handbook available, Kyoto University Press) that have been adopted by research groups around the world the project is set to complete a habitat specific, qualitative survey of the world’s ocean shores by 2010 and to repeat it over and over again during a 50-year time frame. As these global standards continue to be used to answer local questions NaGISA participants (researchers, managers and students) will be producing the worlds first ongoing
near shore habitat specific global census while playing the vital role of coastal community ambassadors, increasing marine awareness and improving the state of benthic taxonomy.

**DIVISION OF INTEGRATED COASTAL MANAGEMENT**

Coastal marine ecosystems in Japan have serious problems to sustain the system with diverse marine organisms. As results of human operation and economic activities, pollution, disappear of seagrass beds and tidal flats, disturbance of water and sand flow system, reclamation, dike construction, and so on are undergoing to ruin the ecosystems. These disasters on coastal marine ecosystems cause from some kinds of land use by human. This division addresses these problems with special focusing on the interactions between land and coastal marine ecosystems. Also we attempt to form well-designed agreements among local people to conservation of the ecosystem in the target watershed. Finally, we try to achieve wholesome integrated coastal management.

**Program-Specific Professor**

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**Program-Specific Associate Professor**

SATO, Masayuki, D. Econ. (Kyoto Univ.), Environmental Economics,
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Chief, Associate Professor
SHIBA, Masami, D.Agr. (Kyoto Univ.), Forest Resource and Environmental Management Planning

Ashii research forest (total area: 4,186ha) is located in the northeastern border part of Kyoto Prefecture and stretches 6km east to west and 7km north to south in a rectangular shape. The area is characterized by high relief with altitudes ranging from 355 to 959m above the sea level and encompasses the headwater zones of Yura River flowing into Wakasa bay, the Sea of Japan. According to the recent meteorological observation records, mean annual temperature is 13.1°C and mean annual precipitation is 2,333mm respectively. There is a heavy snowfall ranging from 1 to 3m in winter seasons.

This region is situated in the transition part between temperate deciduous forest zone where the main species are Aesculus turbinata and Pterocarya rhoifolia in the lower valley sites, Fagus japonica and Quercus crispula in the upper slope above 600m, and Cryptomeria japonica, Clethra barbinervis and Ilex pedunculosa in the ridge portions above 700m, and warm temperate forest zone where the main species are Quercus salicina and Quercus sessilifolia under 600m altitude.

Dispersed various sizes of post-harvest units with coniferous plantation (approximate area: 250ha) and second-growth stands (approximate area: 1,200ha) now exist on the landscape previously dominated by extensive old natural forests.

The main subjects of study in the natural forest research area focus on the ecosystem, stand dynamics and regeneration of natural mixed forests. While in the forest management research area, the forest productivity, silvicultural treatment techniques of the plantation and young secondary mixed forest are mainly studied.

Further the influence of heavy snowfall on the tree growth and of the bear damage to conifers are investigated in both research area.

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Chief, Associate Professor
ANDO, Makoto, D.Agr. (Kyoto Univ.), Forest Ecology

This forest is composed of two parts, Shibecha (1,447ha) and Shiranuka (880ha). These forests are located in the eastern part of Hokkaido Prefecture and are situated close to three national parks: Akan, Shiretoko, and Kushiro-Shitsugun. The climate is greatly influenced by the Pacific Ocean. Consequently it is characterized by sea fog and cloudy weather in summer, and cold (min. temp. – 30°C) and dry winter. The annual mean temperature and the annual precipitation are 5.7°C and 1,157mm in Shibecha, and 7.3°C and 1,318mm in Shiranuka respectively.

Three quarters of Shibecha forest is covered with natural deciduous broad-leaved trees and the rest is artificial forests, such as Larix kaempferi. Though the vegetation type is secondary forest, it is of great value since very few natural forests remain in the Konsen district. Shiranuka forest is mostly natural mixed stands with conifers and deciduous broad-leaved trees.

The main subjects of research are the stand dynamics of natural forests and the improvement of silvicultural techniques. Field practice for students involving the classification of vegetation in the eastern part of Hokkaido, methods of thinning, and investigation of the structure of snow and ice is available three times a year, during summer and winter.

WAKAYAMA FOREST RESEARCH STATION
76 Kamiyukawa, Aridagawa-cho, Aida-gun, Wakayama,
This forest is located in the central part of the Kii Peninsula. Most of this area has a steep mountainous topography and there are some waterfalls. The total area is 842ha, and more than half is covered by plantations of Cryptomeria japonica and Chamaecyparis obtusa. In natural forest areas, Abies firma and Tsuga sieboldii are dominant. In the deciduous broad-leaved forests located over 950m above see level, Fagus crenata is observed. The annual mean temperature is 12.4°C and the annual precipitation is 2,622mm.

The subject of research focuses on the sustainable forest management of plantation forests; sustained yield management planning, site preparation and silvicultural practices, timber harvesting and road network planning, and operational efficiency and product utilization. In addition to these, the ecological biodiversity studies on the stand dynamics of natural forest, the ecosystem reserves program and the watershed management are made in this forest.

FIELD STATION

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Chief, Professor
SHIBATA, Shozo, D.Agr. (Kyoto Univ.), Nature Restoration and Bamboo Ecology
Assistant Professor
SAKIMOTO, Michinori, D.Agr. (Kyoto Univ.), Forest Ecology : Tree Behavior Ecology and Eco-morphology

This forest, located in the suburbs of Kyoto City, about 5km north-west-north of the University campus, is convenient for research and education. The total area is 47ha, half of which is covered with secondary forest composed mainly of Chamaecyparis obtusa and deciduous tree species. There are some arboretum of indigenous and foreign tree species, and nurseries.

The main subjects of study are the afforestation and the breeding of foreign species. Many tree species are gathered by the exchange of tree seeds with over 100 biological institutes around the world and over 800 tree species are growing at present. 80 species of the genus Pinus, 70 species of the subfamily Bambusoideae and 80 species of the genus Rhododendron have been collected. Recently, study of the management of devastated urban forests has been started.

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Chief, Lecturer
NAKASHIMA, Tadashi, D.Agr. (Kyoto Univ.), Forest Conservation and Natural Disasters in Mountain Regions

This forest is located in Shunan City, 5km from the coast of the Seto Inland Sea and its total area is 42ha. Half of this area is covered with plantations of mainly Chamaecyparis obtusa and the other half is secondary forest of broad-leaved trees.

Principal research efforts involve the breeding and growing tests. Also carried out are the silvicultural study on Chamaecyparis obtusa stands, the study on material cycling in these stands and the ecological study of natural forest succession.

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HASEGAWA, Hisashi, D.Agr. (Kyoto Univ.), Forestry/forest engineering

This station is composed of a nursery (0.3ha) and an arboretum (0.7ha) on the northern campus of the University. The main study is the experimental cultivation of native and foreign trees. Many researchers and students utilize the Experimental Nursery for their investigations and fieldwork.

KII-OISHIMA RESEARCH STATION
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Chief, Associate Professor
UMEOMOTO, Shinya, D. Agr. (Kyoto Univ.), Weed Science and Economic Botany

The station was originated in 1937 as the Oshima Warm Temperate Flora Station, re-funded in 1967 and re-built as one of the FSERC in 2003 on Kii-oishima Island off the southernmost part of Honshu. The station occupies about 12 hectares of the Island in warm temperate climate with a high precipitation. Half of the site is covered by evergreen broad-leaved trees and plants from various habitats, consisting 135 families and 760 species. In these circumstances, Camelliaceae and other plant families introduced are also conserved. Undergraduate students attend pocket seminars, lectures and fundamental field works of the forest-human habitation-marine science, biota survey and human ecosystem conservation.
invertebrates and algae, (2) laboratory studies on the early life stages of fishes to understand development, behavior, endocrinology, physiology, growth and survival, (3) studies on technology for aquaculture and stock enhancement of commercially important fishes (4) studies on coastal oceanography, (5) taxonomic research of fishes from the Indo-Pacific region. A current important subject is the elucidation of the effects of terrestrial areas including forests, agricultural fields and towns on the biodiversity and biological productivity in coastal waters. Field work is conducted using the research vessel “Ryokuyo Maru” (18 t). Establishment of the Aquatic Natural Museum in 1984, which houses the second largest collection of fish specimens in Japan, has accelerated our taxonomic work.

The number of researchers working at the station has increased in recent years, exceeding 6800 person-days in the fiscal year 2007. The researchers include students and staff from Kyoto University and other universities in Japan as well as graduate students and visiting scientists from many countries such as the USA, Canada, China, Korea, India, Bangladesh, Philippine, Taiwan, Spain and Argentina. Dormitory accommodation is available for visiting scientists and students.

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Lecturer
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Assistant Professors
YAMATO, Shigeyuki, D. Sc. (Hiroshima Univ.), Invertebrate Zoology; Taxonomy
FUKAMI, Hironobu, D. Fish. (Tokyo Univ. of Fisheries), Invertebrate Zoology; Evolution and Ecology of Cnidaria
Program-Specific Assistant Professor
ISETO, Tohru, D.Sc. (Univ. of the Ryukyus), Invertebrate Zoology; Taxonomy of Entoprocta

The Laboratory is situated on the southwest coast of Kii Peninsula, about 234 km from Kyoto. It was founded in 1922 as a field station to provide marine course for students and facility for visiting researchers. The Laboratory also accepts graduate students of the Graduate School of Science. The Laboratory provides accommodation and scientific equipments, e.g. research vessel and microscopes, to these students and visiting scientists. It also maintains an aquarium that is open to the public. The library of the Laboratory has one of the most comprehensive collections in the country regarding the marine biology. The Laboratory mainly has carried out researches on the natural history, e.g. taxonomy and ecology of marine organisms, particularly meiofauna, coelenterates, mollusks, annelids, arthropods and fishes. Recently, interests are expanded into studies on marine biodiversity and evolution of these organisms, using electron microscopy and molecular biological techniques.
http://www.seto.kais.kyoto-u.ac.jp/