

Application Guidelines for Admission Examination to
the Master's Program
Starting in October 2023 and April 2024

Special Selection for Foreign Students

2023

Graduate School of Bioresources, Mie University

1. Number of students to be enrolled

Major	Course	Laboratories	Number of students
Sustainable Resource Sciences	Agrobiology	Plant Molecular Genetics and Breeding, Crop Science, Horticultural Crop Physiology, Animal Production, Grassland and Animal Feed Production, Phytopathology, Insect Ecology,	A Few
	Forest Resources and Environmental Science	Forest Conservation Ecology, Forest Mycology, Soil Science and Plant Nutrition, Forest Environment and Sediment Control Engineering, Forest Engineering, Wood Science and Technology, Woody Biomass Science, Forest Planning for the Environment, Nature and Coexistence*	
	International Regional Resource Science	Sustainable Resource Economics, Farm Management and Rural Sociology, Economic System of Bioresources, Global Plant Resource Science, Global Resource Utilization Science	
Environmental Science and Technology	Sustainable Earth and Environmental Sciences	Atmosphere and Climate Dynamics, Meteorological Analysis and Prediction, Ocean Climate, Ocean and Climate Change, Future Earth, Earth System Evolution, Water Environment and Natural Disasters, Applied Environmental Studies	A Few
	Environment Oriented Information and System Engineering	Environmental Information and Technology, Productive Environment System, Environmental Control in Biology, Energy Utilization Engineering, Agricultural and Food Systems	
	Irrigation, Drainage and Reclamation Engineering	Applied Geomorphology, Soil Resources Engineering, Water Resource Engineering, Terrestrial Land and Water Engineering, Environmental Facilities Engineering, International Environment Conservation, Soil Physics and Hydrology, Vadose Zone Hydrology	
Life Sciences	Biochemistry and Biotechnology	Molecular and Cellular Biology, Molecular Bioinformatics, Biofunctional Chemistry, Medicinal Chemistry, Bioorganic Chemistry, Regulatory Biochemistry, Bioinformation and Food Engineering, Food Chemistry, Applied Microbial Genetics, Nutritional Chemistry, Fermentation Biology, Food Function*	A Few
	Marine Life Science and Molecular Chemistry	Marine Biochemistry, Utilization of Aquatic Bioresources, Molecular Chemistry and Aquatic Materials, Biophysical Science, Muscle Biology, Marine Microbiology, Quality in Marine Products, Marine Food Chemistry	
	Marine Biology	Biological Oceanography, Fish Physiology, Phycology, Shallow Sea Aquaculture, Fish Diseases, Fish Stock Enhancement, Marine Ecology, Aqua Genetics, Molecular Ecology of Aquatic Animals, Fish Population Dynamics, Fisheries Ethology, Applied Marine Informatics, Developmental and Metabolism Biology*	

*Cooperative Research Institutes

Note) Before making an application, please make sure to contact your planned supervising teacher or a supervising teacher of the field of education and research you are applying for in advance.

2. Schedule for the admission examination

【Starting in October2023】

	Application Period	Examination Date	Result Announcement Date
Schedule	<p>July 10 (Mon.), 2023 to July 14 (Fri.), 2023</p> <p>(It should be reached no later than July 14 by the postal mail)</p>	<p>August 22 (Tue.),2023</p> <p>(Occasional date: August 23 (Wed.), 2023)</p>	<p>September 15 (Fri.), 2023</p>
Notes	<p>Acceptance Hours: 9:00 a.m. to 5:00 p.m. (Applications via mail must arrive within the above period)</p>	<p>On the day of the entrance examination, make sure to bring your Ticket for Exam and enter the examination venue.</p>	<p>The examinees numbers of successful examinees will be posted in the entrance hall of the Graduate School of Bioresources around 10:00 a.m., and those who have passed will also be notified via mail.</p> <p>After results are announced, the examinees numbers of successful examinees will be posted on the website of Graduate School of Bioresources (http://www.bio.mie-u.ac.jp/).</p> <p>We will not respond to any inquiries via phone, etc. concerning the results.</p>

【Starting in April2024】

	Application Period	Examination Date	Result Announcement Date
First Recruitment	July 10 (Mon.), 2023to July 14 (Fri.), 2023 (It should be reached no later than July 14 by the postal mail)	August 22 (Tue.), 2023 (Occasional date: August 23 (Wed.),2023)	September 15 (Fri.), 2023
Second Recruitment	December 11 (Mon.), 2023to December 15 (Fri.), 2023 (It should be reached no later than December 15 by the postal mail)	January 16 (Tue.), 2024 (Occasional date: January 17 (Wed.),2024)	February 9 (Fri.), 2024
Notes	Acceptance Hours: 9:00 a.m. to 5:00 p.m. (Applications via mail must arrive within the above period)	On the day of the entrance examination, make sure to bring your Ticket for Exam and enter the examination venue.	The examinees numbers of successful examinees will be posted in the entrance hall of the Graduate School of Bioresources around 10:00 a.m., and those who have passed will also be notified via mail. After results are announced, the examinees numbers of successful examinees will be posted on the website of Graduate School of Bioresources (http://www.bio.mie-u.ac.jp/). We will not respond to any inquiries via phone, etc. concerning the results.

3. Selection Method

Students are selected for admission based on the comprehensive examination of academic achievement tests, application materials, and interview-based assessment.

Special Selection for Foreign Students

Subjects	Hours	Remarks
Foreign Language (Japanese or English)	10:30 a.m.-12:00 p.m.	Students may bring one (1) language dictionary. (Electronic dictionaries are not permitted.) For more details, please refer to "7. Notes" on page 13.
Interview	Starts at 1:00 p.m.	Students will be interviewed about their academic achievements, research performance, etc.

4. Applicant Eligibility

【Starting in October2023】

[Special selection for Foreign Students]

Non-Japanese nationals who possess the Japanese-language ability that is required for taking courses may apply, providing that one of the following requirements is met:

- (1) Applicant has graduated or expects to graduate by September 30, 2023 from a university, as stipulated in Article 83 of the School Education Act (Act No. 26 of 1947).
- (2) Applicant has been or expects to be awarded by September 30, 2023 a bachelor's degree, as stipulated in Article 104, paragraph 7 of the School Education Act.
 [Applicant has been or expects to be awarded a degree from the National Institution for Academic Degrees and Quality Enhancement of Higher Education.]
- (3) Applicant has completed or expects to complete by September 30, 2023 a 16-year school education program in a foreign country.
- (4) Applicant has completed or expects to complete by September 30, 2023 a 16-year school education program in Japan through a foreign school's distance-learning course.
- (5) Applicant has completed or expects to complete by September 30, 2023 a foreign university program in Japan that has been specified by Japan's minister of education, culture, sports, science, and technology. The program must have been offered by an educational facility that is operated as part of the foreign country in question's educational system (subject to the condition that students who are completing such a program are considered to have finished a 16-year school education program in the foreign country in question).
- (6) Applicant has been awarded or expects to be awarded by September 30, 2023 a degree that is equivalent to a bachelor's degree upon completion of a program that consists of at least 3 years of study at an overseas university or other overseas school. (This criterion is limited to those whose comprehensive situation with respect to educational and research activities has either received evaluation from a person who was authorized by that country's government or its related institutions or which has been separately designated as being equivalent to such by Japan's minister of education, culture, sports, science, and technology. This includes applicants who have completed distance learning programs at said overseas schools while living in Japan and those who have completed programs at educational institutions that are located in Japan, follow the same

education system as overseas schools, and have been specifically designated by the minister of education, culture, sports, science, and technology.)

(7) Applicant has completed or expects to complete by September 30, 2023 a specialized program at an advanced vocational school on or after the date specified by Japan’s minister of education, culture, sports, science, and technology. The program must also have been specified by the minister (and is subject to the following condition: the program must require at least 4 years to complete and must also satisfy other criteria as specified by the minister).

(8) Other persons deemed eligible by Japan’s minister of education, culture, sports, science, and technology may apply (see 1953 Notification No. 5, Ministry of Education, Science and Culture), providing they possess academic ability that is equivalent to that of a university graduate’s, as described below:

Applicant has completed/graduated from a long-term course of study at one of the following, as set forth in the former Universities Act: the former Higher Normal School, upper secondary school, advanced course, Higher Normal School, Women’s Higher Normal School, National Defense Academy of Japan, National Defense Medical College, National Fisheries University, Japan Coast Guard Academy, Meteorological College, or Polytechnic University.

(9) Applicant has been admitted to the graduate school under the provisions of Article 102, paragraph 2 of the School Education Act and has been deemed to possess academic ability that is well-suited to receiving graduate-level education at this school.

Applicant has been admitted to the graduate school by transfer from another graduate school at a different university and has been deemed to possess academic ability that is well-suited to receiving graduate-level education at this school.

(10) Applicant has been enrolled at the university for at least three years as of September 30, 2023 and has completed a 15-year course of study in a country other than Japan. This criterion includes applicants who have undertaken such study through a distance education program that was offered by a university that is located outside of Japan or at an educational facility in Japan that is run by a foreign school and is recognized by Japan’s minister of education, culture, sports, science, and technology. The course of study must have been completed after the offering school was recognized by the minister, and the applicant must be recognized by this graduate school as having an outstanding academic record.

(11) Applicants must be aged 22 or older by September 30, 2023 and must be recognized, through this school’s admissions eligibility screening, as possessing academic ability that is at least equal to that of a university graduates’.

Note 1) Applicants whose qualifications reflect (9), (10), or (11) must undergo application eligibility certification.

【Starting in April 2024】

[Special Selection for Foreign Students]

Non-Japanese nationals who possess the Japanese-language ability that is required for taking courses may apply, providing that one of the following requirements is met:

- (1) Applicant has graduated or expects to graduate by March 31, 2024 from a university, as stipulated in Article 83 of the School Education Act (Act No. 26 of 1947).
- (2) Applicant has been or expects to be awarded by March 31, 2024 a bachelor's degree, as stipulated in Article 104, paragraph 7 of the School Education Act.

[Applicant has been or expects to be awarded a degree from the National Institution for Academic Degrees
and Quality Enhancement of Higher Education.]

- (3) Applicant has completed or expects to complete by March 31, 2024 a 16-year school education program in a foreign country.
- (4) Applicant has completed or expects to complete by March 31, 2024 a 16-year school education program in Japan through a foreign school's distance-learning course.
- (5) Applicant has completed or expects to complete by March 31, 2024 a foreign university program in Japan that has been specified by Japan's minister of education, culture, sports, science, and technology. The program must have been offered by an educational facility that is operated as part of the foreign country in question's educational system (subject to the condition that students who are completing such a program are considered to have finished a 16-year school education program in the foreign country in question).
- (6) Applicant has been awarded or expects to be awarded by March 31, 2024a degree that is equivalent to a bachelor's degree upon completion of a program that consists of at least 3 years of study at an overseas university or other overseas school. (This criterion is limited to those whose comprehensive situation with respect to educational and research activities has either received evaluation from a person who was authorized by that country's government or its related institutions or which has been separately designated as being equivalent to such by Japan's minister of education, culture, sports, science, and technology. This includes applicants who have completed distance learning programs at said overseas schools while living in Japan and those who have completed programs at educational institutions that are located in Japan, follow the same education system as overseas schools, and have been specifically designated by the minister of education, culture, sports, science, and technology.)
- (7) Applicant has completed or expects to complete by March 31, 2024a specialized program at an advanced vocational school on or after the date specified by Japan's minister of education, culture, sports, science, and technology. The program must also have been specified by the minister (and is subject to the following condition: the program must require at least 4 years to complete and must also satisfy other criteria as specified by the minister).
- (8) Other persons deemed eligible by Japan's minister of education, culture, sports, science, and technology may apply (see 1953 Notification No. 5, Ministry of Education, Science and Culture), providing they possess academic ability that is equivalent to that of a university graduate's, as described below:

[Applicant has completed/graduated from a long-term course of study at one of the following, as set forth in the former Universities Act: the former Higher Normal School, upper secondary school, advanced course, Higher Normal School, Women's Higher Normal School, National Defense Academy of Japan, National Defense Medical College, National Fisheries University, Japan Coast Guard Academy, Meteorological College, or Polytechnic University.]

- (9) Applicant has been admitted to the graduate school under the provisions of Article 102, paragraph 2 of the School

Education Act and has been deemed to possess academic ability that is well-suited to receiving graduate-level education at this school.

Applicant has been admitted to the graduate school by transfer from another graduate school at a different university and has been deemed to possess academic ability that is well-suited to receiving graduate-level education at this school.

- (10) Applicant has been enrolled at the university for at least three years as of March 31, 2024 and has completed a 15-year course of study in a country other than Japan. This criterion includes applicants who have undertaken such study through a distance education program that was offered by a university that is located outside of Japan or at an educational facility in Japan that is run by a foreign school and is recognized by Japan's minister of education, culture, sports, science, and technology. The course of study must have been completed after the offering school was recognized by the minister, and the applicant must be recognized by this graduate school as having an outstanding academic record.
- (11) Applicants must be aged 22 or older by March 31, 2024 and must be recognized, through this school's admissions eligibility screening, as possessing academic ability that is at least equal to that of a university graduates'.

Note 1) Applicants whose qualifications reflect (9), (10), or (11) must undergo application eligibility certification.

5. Application forms, etc.

[Applicant eligibility]: Special selection for Foreign Students (1) to (8)

(1) Applicants are required to submit the following documents. Please download the application forms from the website of Graduate School of Bioresources, and print them with A4 size. Documents marked with ○ must be submitted by all applicants. Not all applicants will submit documents marked with △, so please read remarks carefully.

Application Forms	Remarks	Special Selection for Foreign Students
Application Form	【Designated Form】 Please write the required information on the form designated by the graduate school.	○
Photo Card and Ticket for Exam	【Designated Form】 Please attach a recent photograph taken within last three months.	○
CV	【Designated Form】 Please write the required information on the designated form. (Only for Foreign Students)	○
Certificate of (expected) Graduation	Certificate of (expected) graduation from undergraduate university. *Regular students who are now studying at the Faculty of Bioresources, Mie University, do not need to submit this. All others must apply.	△
Academic Transcript from Undergraduate University or School, etc.	Must be completely sealed by issuer.	○
Certificate of Degree, or Documents that Certify Expected Completion of Degree	Please submit the certificate of degree. Applicants who expect to be awarded a degree must submit a certificate of expected graduation such as a certificate of scheduled application for award of degree, or a certificate of expected completion.	○
Reason for Application	【Designated Form】 Using the form designated by the graduate school, describe why you want to be admitted, why you want to study, and do research at the Graduate School of Bioresources. Your purpose (plans) should be summarized in approximately 300 words if using English or 1,000 characters if using Japanese.	○
Summary of Research Achievements	*Regular students who are now studying at the Faculty of Bioresources, Mie University, do not need to submit this. All others must apply. Write your study topic on line 1 and your name on line 2. Please summarize your research achievements (or graduate thesis) using no more than one A4 page (approximately 300 words if using English or 1,000 characters if using Japanese; drawings, charts, etc., may also be included). Applicants who expect to graduate from a university other than the Faculty of Bioresources, Mie University and those who expect to be granted a degree from the National Institution for Academic Degrees and Quality Enhancement of Higher Education may describe the progress status of their researches.	△

Documentation of Research Achievements	Applicants who have authored works, academic papers, technical reports, presentations at academic meetings, patents, etc., should attach documentation indicating those. In case of collaborative research, applicants should attach materials that clearly state the portion of research for which they can be credited.	△
Stamped Self-addressed Envelope	On the envelope sized 240×332, write your name, address, and postal code, and affix postage worth 380 yen (express letter).	○
Admission Application Fee	Admission application fee: 30,000 yen (This is not required for government-financed foreign students.) 【Designated Form】 When making a transfer, please read 【Delivery method】 and 【Notes】 written on the payment slip. Affix the wire transfer confirmation form, which must bear the financial institution’s seal of receipt, to the application form’s “admission application payment receipt” field, and submit it along with the other application materials.	○
Admission Application Payment Receipt		
Health Certificate	【Designated Form】 Applicants who reside outside of Japan during the application period (including Japanese nationals) and will be coming to Japan to take the examination should submit a health certificate using the format prescribed by the graduate school. Details are available via the URLs below. URL (Japanese) : https://www.mie-u.ac.jp/exam/health/health2/index.html URL (English) : https://www.mie-u.ac.jp/exam/health/health3.html	△
Other	Foreign students must submit a copy of their visa and passport.	○

(2) Methods for applying: Send application forms by postal mail (registered express letter) or submit them in person.

(3) Address for the submission of mailed applications: Student Affairs Section, Graduate School of Bioresources, Mie University, 1577 Kurimamachiya-cho, Tsu City 514-8507, Mie, Japan, TEL +81-59- 231-9631

[Applicant eligibility]: Special Selection for Foreign Students (9) to (11)

(1) Applicants are required to submit the following documents. Please download the application forms from the website of Graduate School of Bioresources, and print them with A4 size. Documents marked with ○ must be submitted by all applicants. Not all applicants will submit documents marked with △, so please read remarks carefully.

Application Forms	Remarks	
Application Form	【Designated Form】 Please write the required information on the form designated by the graduate school.	○
Photo Card and Ticket for Exam	【Designated Form】 Please attach a recent photograph taken within last three months.	○
CV	【Designated Form】 Please write the required information on the designated form. (Only for Foreign Students)	○
Academic Transcript from Undergraduate University or School, etc.	Must be completely sealed by issuer.	○
Certificate of Enrollment	This is necessary for applicants who fall under the categories of special selection for foreign students (10) and are currently in school.	△
Course Guide from Undergraduate University (including List of Courses)	This is necessary for applicants who fall under the categories of special selection for foreign students (10).	△
Reason for Application	【Designated Form】 Using the form designated by the graduate school, describe why you want to be admitted, why you want to study, and do research at the Graduate School of Bioresources. Your purpose (plans) should be summarized in approximately 300 words if using English or 1,000 characters if using Japanese.	○
Summary of Research Achievements	* *Foreign Students applicants whose qualifications reflect (11) need to submit this. Write your study topic on line 1 and your name on line 2. Please summarize your research achievements (or graduate thesis) using no more than one A4 page (approximately 900 words if using English or 3,000 characters if using Japanese; drawings, charts, etc., may also be included).	△

Documentation of Research Achievements	Applicants who have authored works, academic papers, technical reports, presentations at academic meetings, patents, etc., should attach documentation indicating those. In the case of collaborative research, applicants should attach materials that clearly state the portion of research for which they can be credited.	△
Application Form for Qualification Certificate	Please submit application form for qualification certificate	○
Stamped Self-addressed Envelope	On the envelope sized 240×332, write your name, address, and postal code, and affix postage worth 380 yen (express letter).	○
Admission Application Fee	Admission application fee: 30,000 yen (This is not required for government-financed foreign students.) 【Designated Form】 When making a transfer, please read 【Delivery method】 and 【Notes】 written on the payment slip. Affix the wire transfer confirmation form, which must bear the financial institution’s seal of receipt, to the application form’s “admission application payment receipt” field, and submit it along with the other application materials.	○
Admission Application Payment Receipt		
Health Certificate	【Designated Form】 Applicants who reside outside of Japan during the application period (including Japanese nationals) and will be coming to Japan to take the examination should submit a health certificate using the format prescribed by the graduate school. Details are available via the URLs below. URL (Japanese) : http://www.mie-u.ac.jp/exam/health/health2/index.html URL (English) : http://www.mie-u.ac.jp/exam/health/health3.html	△
Other	Foreign students must submit a copy of their visa and passport.	○

(2) Methods for applying: Send application forms by postal mail (registered express letter) or submit them in person.

(3) Address for the submission of mailed applications: Student Affairs Section, Graduate School of Bioresources, Mie University, 1577 Kurimamachiya-cho, Tsu City 514-8507, Mie, Japan, TEL +81-59- 231-9631

6. Entrance Fee and Tuition

- (1) Entrance Fee 282,000 yen
- (2) Tuition 267,900 yen per semester (535,800 yen for the whole year)
(This is not required for government-financed foreign students.)

7. Notes

- (1) Incomplete and/or insufficient applications will not be subject to screening.
- (2) Any applicants who are found to have made false statements on the application will have their permission to enroll withdrawn, even if a positive admission decision has already been made.
- (3) The ticket for exam must be brought along with you on the examination day.

If you arrive late, i.e., after the examination has started, report to the proctor and follow their instructions.

For all exams, you will be considered late if you arrive 30 minutes or more after the exam has started. In such cases, tardiness revokes eligibility for that exam and any subsequent exams.

During exams, you are permitted to have the following items on your desk; ticket for exam, black pencil, black mechanical pencil, eraser, pencil sharpener, a dedicated timekeeping device (i.e., with no other function besides timekeeping), eyeglasses, eyedrops, and tissues (which have been removed from their packaging).

You may not use mobile phones, smartphones, wearable terminals, electronic devices such as calculators, etc.

For the foreign language examination (English or Japanese) that forms part of the special selection for foreign students, applicants may bring one language dictionary; however, electronic dictionaries are not permitted.

Outline of Departments, Courses and Laboratories

1. Department of Sustainable Resource Sciences

In Department of Sustainable Resource Sciences, we aim to educate people who can develop technology and research for the cyclic use of bioresources through efficient, environmentally-friendly methods and design a new society, building a harmonious recycling society.

To that end, we carry out research and education on the sustainable use of bioresources through a study of biological life systems, the environment they live in, and biodiversity. The department is made up of three courses: Agrobiology, which mainly conducts research and education on the use of bioresources such as food and useful materials, Forest Resources and Environmental Science, which mainly conducts research and education on methods for using forest resources and their diverse functions sustainably, and International Regional Resource Science, which conducts research and education on the use of bioresources from economic, management, social, and policy points of view. The details of the education and research provided by each course are as follows.

1-1 Agrobiology Course

Our course is intended to reveal the biological phenomena of plants, animals, and microorganisms at levels of molecules, cells, individuals, and populations. And further, we aim to contribute to improve the productivity of crops and livestock by in a sustainable way and to decrease losses during processes from cultivation to manufacturing. Students gain advanced knowledge and technologies of Agrobiology including plant genetics and breeding, crop science, physiology of horticultural crops, animal and feed production science, phytopathology, insect ecology and etc.

1-2 Forest Resources and Environmental Science Course

Forests are an enormous community which covers about 30 % of land and reach up to 90% biomass in the world. Thus, forests play important roles in maintaining global environments. Simultaneously, importance is focused on forests because of producing reusable resources. Furthermore, various ecosystem functions such as land and watershed conservations, regulating the meteorological environments and providing recreational activities are involved in forest environments. From these points, forests are indispensable to human life. For the purpose of making full use of various functions of forests as environmental and material resources, this course is intended to teach and research on comprehensive and professional theory and technology related to forests and forest production. These include such topics as ecology, botany, mycology, soil science, chemistry, physics, and information science.

1-3 International Regional Resource Science Course

International Regional Resource Science Course aims at producing leaders capable of finding solutions to challenges faced by rural communities where the majority of populations are engaged in the primary industry such as agriculture, forestry and fishery. Today, issues in rural communities are becoming increasingly complicated due to the rapid change in social structure and ongoing surge of globalization. Understanding and tackling these issues requires an integrated knowledge of natural and social sciences with an international perspective. Therefore, the course implements multidisciplinary education at the interface between natural (crop and livestock) and social (agricultural economics and business administration) sciences. Students enrolled will be provided with the latest information (domestic and international) of each discipline and more importantly several opportunities to integrate knowledge gained from the disciplines.

1-1 Agrobiology Course

Laboratories	Research Outline	Supervisors	E-mail address
Plant Molecular Genetics and Breeding	'Breeding' is based on the genetic modification of organisms for the purpose of selecting improved offspring. This laboratory conducts molecular genetic and genomic studies useful for plant breeding, particularly on the mechanisms of plant reproduction (i.e., pollination/fertilization, self-incompatibility, floral organ formation, etc.). We aim to elucidate molecular functions of genes important for plant breeding by using gene transfer and resultant transgenic plants.	Professor Kakeda Katsuyuki	kakeda@bio.mie-u.ac.jp
Crop Science	Our life depends on bioresources from agriculture, forestry and fisheries for a long time. Especially food crops and industrial crops are very important for quality life. We continue the researches on their growth habits, flowering and fruiting characteristics, yield, quality and utilization. We also try to develop sustainable and stable high yield culture systems and to modify cultural varieties. The target crops are rice plant, soybean, sweet potato and Iseimo (Chinese yam) etc. Our laboratory contribute to promote crop production in Mie area.	Professor Umezaki Teruhisa *1 Professor Nagasuga Kiyoshi Associate Professor Nagaya Yuichi	umezaki@bio.mie-u.ac.jp nkiyoshi@bio.mie-u.ac.jp nagaya@bio.mie-u.ac.jp
Horticultural Crop Physiology	To improve the quality and cultivation method in fruit trees and vegetables, investigations are in progress from cultural and physiological standpoints. In pomology field, studies on fruit growth and ripening are conducted in evergreenfruits, while stress physiology is analyzing in olericulture field by using tomato, cucumber and so on. Feedback of experimental results is also given to practical cultivation.	Professor Okuda Hitoshi Professor Nada Kazuyoshi	okudat@bio.mie-u.ac.jp nada@bio.mie-u.ac.jp
Animal Production	Livestock animals such as cattle, pig, and chicken provide meat, milk, and egg which are good protein source for human being. We focus on improving productivity of the livestock animals and reducing impact on environments by controlling endocrine action and gastro-intestinal microorganisms of the animals. Improving productivity will reduce amount of feed consumed and impact on environments.	Professor Matsui Hiroki Associate Professor Ban Tomomi	matsui@bio.mie-u.ac.jp tomomi@bio.mie-u.ac.jp
Grassland and Animal Feed Production	We have been studying the nutrient characteristics of feedstuffs including forages produced in temperate and tropical countries, and food-industrial by-products for ruminants.	Associate Professor Kondo Makoto	makok@bio.mie-u.ac.jp

*1 : Applicants who wish to conduct research under this supervisor should inform Student Affairs Section, Graduate School of Bioresources.

Laboratories	Research Outline	Supervisors	E-mail address
Phytopathology	<p>Accurate diagnosis of plant diseases, identification of causal organisms, and better understanding of epidemiology are essential for better control of plant diseases. The aim of education in this laboratory is to bring up prospective plant doctors who can make accurate diagnosis of plant diseases and guide farmers for control of the diseases. Research aims of laboratory staffs are taxonomy, diversity, phylogeny and evolution of plant pathogenic fungi using morphological and molecular methods.</p>	<p>Professor Nakashima Chiharu</p> <p>Associate Professor Shirouzu Takashi</p>	<p>chiharu@bio.mie-u.ac.jp</p> <p>shirouzu@bio.mie-u.ac.jp</p>
Insect Ecology	<p>We aim for pest managements in a way with low impact to the environment. Our interest also goes to conservation of insect communities, use of ecosystem services by insects in agriculture. Our current research themes are; 1) pollination biology of insects in agricultural ecosystems, 2) host range evolution of herbivorous invasive insects, 3) life history evolution of herbivores and their parasitoid wasps, 4) inter-specific relationship of two closely related Bactrocera fruit flies.</p>	<p>Professor Tsukada Morio</p>	<p>tsukada@bio.mie-u.ac.jp</p>

1-2 Forest Resources and Environmental Science Course

Laboratories	Research Outline	Supervisors	E-mail address
Forest Conservation Ecology	<p>Focusing on the forest tree species, that is the fundamental element of forest ecosystems, we explore the mechanisms that maintain ecosystems by monitoring the diversity and structure of natural forest communities and investigating the habitats of individual trees. Furthermore, We reveal the genetic diversity of forest tree species using DNA analysis.</p>	<p>Professor Kisanuki Hiromitsu</p> <p>Associate Professor Torimaru Takeshi</p>	<p>kis@bio.mie-u.ac.jp</p> <p>torimaru@bio.mie-u.ac.jp</p>
Forest Mycology	<p>In our laboratory, we are studying the species diversity and functional significance of microorganisms especially ones associated with woody and herbaceous plants, i.e. mycorrhizal fungi, bacteria and nematodes to unveil matter and energy flows and to conserve endangered plants in forest ecosystems. For this purpose, students will have expertise in comprehensive forest microbial ecology through field activity as well as laboratory works of isolation, microscopy and molecular analyses.</p>	<p>Professor Matsuda Yosuke</p> <p>Assistant Professor Kitagami Yudai</p>	<p>m-yosuke@bio.mie-u.ac.jp</p> <p>kitagami@bio.mie-u.ac.jp</p>
Soil Science and Plant Nutrition	<p>In our laboratory, we have acquired the techniques of chemically analyze for soil and plants, and are conducting research on the adaptation of plants to the growing soil and the mechanism of excess and deficiency for each element. In recent years, we have been conducting research on nickel-iron nutrition in serpentinite soil, which is characterized by oligotrophic and high metal. Now we have started analysis of plant specimens owned by museums and the like. , We are proceeding the construction of an "element accumulation database" for wild plants in Japan, using XRF analyze method and plant specimens of museums.</p>	<p>Associate Professor Mizuno Takafumi</p>	<p>tmizuno@bio.mie-u.ac.jp</p>
Torrent and Hillside Conservation Technology	<p>Sediment related disaster triggered by various factors, e.g., heavy rainfall, earthquake, or volcanic eruption causes serious damage to the society and human. In our research field, we have conducted researches elucidating mechanisms of sediment transport phenomena which lead to the disaster, for the purpose of disaster prevention and mitigation. We have also investigated forest environment changed by natural or artificial impacts, and tried to restore it properly in terms of disaster prevention and mitigation. We aim that outputs from those researches can be practically used in the societies in Japan and overseas to mitigate damages by sediment related disasters.</p>	<p>Associate Professor Numamoto Shinya</p>	<p>numamoto@bio.mie-u.ac.jp</p>

Laboratories	Research Outline	Supervisors	E-mail address
Forest Engineering	In our country, about 70% of country areas are the forest. It is important resources for our daily living, and habitation of the creature. For sustainable forest management, using techniques of forest utilization and forest information science, we study "operating system to reduce production costs", and "clarifications on long-term changes in the wide area of forest".	Professor Ishikawa Tomoaki* ¹ Associate Professor Itaya Akemi	tomo@bio.mie-u.ac.jp itaya@bio.mie-u.ac.jp
Wood Science and Technology	Wood has long been important in our daily lives with its use as a building material, in furniture, and as part of other commodities. It is a permanently utilizable material that is naturally derived and generated daily through photosynthesis. The hollow fibrous structure of wood confers various properties to it. For example, wood is lightweight yet strong, it offers high heat insulation, and it has a significant ability to adjust to humidity. The major research goals of our laboratory are to [1] apply theoretical knowledge to the effective utilization of wood, [2] propose technological applications for wood in residences, and [3] quantify the public benefit of wood utilization in modern society.	Professor Nakai Takahisa Associate Professor Fuchigami Yuki Assistant Professor Uchisako Takayuki	jaja@bio.mie-u.ac.jp fuchigami@bio.mie-u.ac.jp uchisako@bio.mie-u.ac.jp
Wood Chemistry and Technology	Wood is a sustainable renewable resource and a lignocellulosic material composed of cellulose, hemicellulose, lignin and extractives. Aiming to utilize all components, our laboratory conducts [1] wood component separation technologies [2] conversion and utilization of cellulose and lignin, [3] development of functional bio-fiber or biomass materials. Herbaceous lignocellulosic biomass like bamboo, sugarcane bagasse and sorghum stalk is also subject of our research.	Professor Nonaka Hiroshi Assistant Professor Tokunaga Yuki	nonaka@bio.mie-u.ac.jp tokunaga@bio.mie-u.ac.jp
Forest Planning for the Environment	In our laboratory, methods to manage forests are studied along with evaluation of forest functions, in consideration of the conservation of forest ecosystems and biodiversity. Using the latest measurement technology, we conduct continuous research on individual trees and forest populations to evaluate the environmental response of forests and other terrestrial ecosystems to develop forest management planning methods. We are also working on issues ranging from local to global matters with the aim of "sustainable forest management."	Professor Matsumura Naoto* ¹ Associate Professor Matsuo Naoko	nma@bio.mie-u.ac.jp naoko@bio.mie-u.ac.jp

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(Forestry and Forest Products Research Institute (FFPRI))

Laboratories	Research Outline	Supervisors	E-mail address
Wood Science and Technology (FFPRI)	<p>Our laboratory targets production forests that have reached the logging season. Using the latest equipment, we identify the species of woods, drying, cutting and processing woods, which are necessary for effective utilization of woods. We also research the amenity of people who are living in wooden houses based on affective engineering, develop wood building materials in consideration of the use of Japanese hardwoods and aiming to create a society using wood.</p>	<p>Collaborative Professor Abe Hisashi*²</p> <p>Collaborative Associate Professor Sugiyama Masaki*²</p> <p>Collaborative Associate Professor Toba Keisuke*²</p> <p>Collaborative Associate Professor Fujimoto Kiyohiko*²</p>	
Nature and Coexistence	<p>This laboratory aims to study and educate on the theory and techniques to develop human activities while maintaining healthy natural environment, and to provide related capacity building.</p> <p>As a member of graduate school, this laboratory addresses problems such as forest degradation and ecosystem fragmentation as well as issues such as conservation of biodiversity and natural environment to reveal the desirable relationship between nature and human society, targeting neighborhood forests, mountains close to rural residences (Satoyama) or forests in the suburbs.</p>	<p>Collaborative Professor Kanzaki Natsumi*²</p>	

* 2 : Applicants who wish to conduct research under this supervisor should inform Professor Naoto Matsumura, Laboratory of Forest Planning for the Environment. (nma@bio.mie-u.ac.jp)

1-3 International Regional Resource Science Course

Laboratories	Research Outline	Supervisors	E-mail address
Sustainable Resource Economics	<p>In these days of changing agricultural, food and trade environments and policies, agricultural producers are facing necessity of strengthen their competitiveness by reducing production costs, producing highly value-added and differentiated agricultural products, and corresponding to new agricultural technologies. Our research and education mainly focus on finding the way of supporting such producers by elucidating consumer demand for agricultural and food products and evaluating impacts of policies and programs using the analytical frameworks of economics, econometrics (or statistics) and the marketing research, and by drawing evidence-based policy recommendations.</p>	Associate Professor Nakajima Toru	nakajima@bio.mie-u.ac.jp
Farm Management and Rural Sociology	<p>Our main methodology is farm business management and rural sociology based on field research. We have strong interest on family farming because Japanese agriculture is still on the process to reform from small family farming to large scale business farming. We are looking for the rural social system that harmonize business and self-sufficient farming, accumulation of field by farming company and protection of small part-time farming, efficient production and environment friendly farming; the goal is expand rural economy to overcome low income level in rural area.</p> <p>Our study keywords are family farming, farm business development, sustainability of rural economy and many types of farmers, and alternative system to market oriented economy.</p>	Associate Professor Nonaka Akihisa	akinonaka@bio.mie-u.ac.jp
Economic System of Bioresources	<p>The ocean provides various ecological goods and services required by humanity to survive and live comfortably. It not only supplies seafood, but maintains an appropriate environment. For the sustained and efficient use of fishery resources, we are investigating the state of their management, organization and regulations at each stage of production, distribution, and consumption. Our purpose in conducting research and education is to construct sustainable seafood production and distribution systems.</p>	Professor Qingxiu Chang	chang@bio.mie-u.ac.jp
Global Plant Resource Science	<p>The global plant resource science is a field of science that studies plant species grown as resources somewhere in the world from various points of view. Plants for food including animal feed, industrial material and energy source are within the target. The focus of our laboratory is to develop the cultivation technique, particularly the ones to increase production under various environmental conditions and to improve quality of end product.</p>	Professor Sekiya Nobuhito	sekiya@bio.mie-u.ac.jp

Laboratories	Research Outline	Supervisors	E-mail address
Global Resource Utilization Science	Recent over-exploitation in agriculture cause grassland use and livestock production system problem in the world. Our research topics are understanding plant-animal-soil relationships on grazing ecosystems, and feed, nutrition, healthy and behavioral science of ruminants to establish sustainable grassland use and livestock production system.	Associate Professor Yoshihara Yu	yoshihara@bio.mie-u.ac.jp

2. Department of Environmental Science and Technology

In Department of Environmental Science and Technology, we aim for the construction of a sustainable biological production system in which human activities and biological systems are in harmony while preserving and restoring, and understanding, the environment of the global biosphere which is made up of all the diverse ecologies. To that end, we carry out research and education, rooted in basic science, in fields such as meteorology, environmental science, and ecology, looking at global ecological systems with its complex interactions among the land, sea, and sky, and applied technology, in a field of environmental and agricultural engineering to achieve a better and more sustainable future for all. This department is made up of three courses: Sustainable Earth and Environmental Sciences, which looks at the fields of geoscience; Environment Oriented Information and System Engineering, which uses instrumentation, control and systems engineering of environmental information, with a core of information processing technology based on knowledge of bioecology, as its methods; and Irrigation, Drainage and Reclamation Engineering, which is designed for the protection of rural villages and farmland where humans are directly connected with the workings of nature as well as their sustainable use as sound, healthy places for material circulation. The details of the education and research provided by each course are as follows.

2-1 Sustainable Earth and Environmental Sciences Course

Changes in the earth's environment such as climate changes and abnormal weather work in concert with ecological environmental systems and earth systems that are made up of the atmosphere, the oceans, the soils, plants, the hydrosphere, the ecosphere, and the activities of humans and other animals. We conduct research on the basic structures, change processes, symbiotic relationships, and interactions that make up these systems, such as the evolution of the earth, climate and terroir, conservation of the global environment, the physiological ecology and ecological harmonization of flora and fauna, and human activities, all with reference to observation, measurement, experimentation, investigation, remote sensing, and numerical analysis. We provide education and research to train people who can use the new scientific knowledge gained from this research and the thinking and practical skills learned through research to contribute to the creation of the next-generation culture and construct a sustainable society.

2-2 Environment Oriented Information and System Engineering Course

In order to allow humans to develop sustainably while coexisting with other organisms and preserving the environment, our course uses systems engineering as a method for education and research related to complex systems, the control of production systems, and the measurement of environmental information with a core of information processing technology, building on knowledge of bioecology. In other words, we offer research and education on symbiotic technology and plants that are related to environmental improvement. In addition, we carry out research and education on applied technology such as the production and processing of bioresources using low environmental load technologies through precise management.

2-3 Irrigation, Drainage and Reclamation Engineering Course

In this course, we provide education and research with the goal of creating a rich rural environment as place for sound, healthy material circulation, preserving the rural regions where agriculture is practiced. Specifically, we carry out research and education on the appropriate and sustainable use of water, soil, and space in rural areas where the workings of nature and humans directly interact, planning and conservation for rural environments, development and management of rural areas and facilities, the effective use of regional resources, the theories and technologies required for preventing or mitigating natural disasters and recovering from them, investigation and analysis of overland and subsurface flows, and explanations and forecasts for the flow of water, chemicals, heat, and gas in rural areas.

2-1 Sustainable Earth and Environmental Sciences Course

Laboratories	Research Outline	Supervisors	E-mail address
<p style="text-align: center;">Atmosphere and Climate Dynamics</p>	<p>The primary aim of our education and research is to analyze and understand, at both the global and the regional scales, the mechanism and the dynamics of the changes in the global climate and ecosystem, as well as the mutual interrelationships among them.</p> <p>GIS, field observation and satellite data are intensively utilized.</p> <p>The fingerprints of these changes are observed through such phenomena as extreme weathers (El Niño, storms), drought, air and water pollution related eco-climatic problems (global warming, ozone depletion, acid rains), and changes in the land covers (tropical rainforests destruction, desertification). We especially emphasize on the role and influence of the human as part of the global ecosystem.</p> <p>This makes it possible to obtain a deep understanding of his actions, and to devise and implement ways and means for sustainable solution to the problems.</p>	<p>Professor Tachibana Yoshihiro</p>	<p>tachi@bio.mie-u.ac.jp</p>
<p style="text-align: center;">Meteorological Analysis and Prediction</p>	<p>Weather and climate have substantial influence on our society and economy. This is why various types of weather forecasts are provided, ranging from several-hour forecast to seasonal prediction. Those forecasts, however, have not yet been fully utilized by society. Everyday, a lot of meteorological data including observation and numerical simulation output are produced for the sake of providing weather forecasts. By analyzing those data, we are aimed at improving weather prediction skill through deeper understanding of meteorological phenomena, and also at finding a way to make weather forecast more useful for society.</p>	<p>Associate Professor Nishii Kazuaki</p>	<p>nishii@bio.mie-u.ac.jp</p>

Laboratories	Research Outline	Supervisors	E-mail address
Ocean Climate	<p>According to the increase of greenhouse gas in the atmosphere such as carbon dioxide, it is suspected that global warming would be proceed and abnormal weather would be frequently occurred. Abnormal ocean conditions such as decrease of the Arctic sea ice or the temperature rise in the deep seas, would be occurred in the global ocean, too. In our ocean climate laboratory, concerned researches on the global ocean climate variability and global ocean circulation change are carried out through the global analysis of sea level change and water temperature. For the researches, in-situ oceanographic observation and analysis are also carried out by our training ship "Seisui-Maru" of Mie University. Further numerical model experiment on the ocean circulation, and re-analysis of the archived oceanographic data in the JODC are also tried. Let's start to study the global ocean climate change with us for the sustainable ocean and earth.</p>	Associate Professor Yamada Fukuji	fyamada@bio.mie-u.ac.jp
Ocean and Climate Change	<p>Ocean covers the approximately 70% of Earth's surface and plays a vital role in changing weather and climate by providing a huge amount of heat and water vapor. It is also important source of food supply for an ongoing population explosion. Based on physical oceanography and dynamic meteorology, this laboratory covers studies on roles of ocean in Earth's climate and ecosystems, with synergy of remote-sensing techniques, numerical simulations, in-situ observations.</p>	Associate Professor Manda Atsuyoshi	am@bio.mie-u.ac.jp
Future Earth* ³	<p>Science and their community should substantially change their disciplines and attitude to cope with environmental issues under Global climate change. We need sincere reflection on past scientific collaboration, then encourage trans-disciplinary approaches to address multi-dimensional changes in humanosphere in coming decades. This laboratory covers sustainability and resilience concepts from local to global environmental issues based on multiple earth science knowledge, such as climatology, geomorphology, plant ecology, glaciology, etc., with combining detailed field works and upscaling techniques using remote sensing and GIS. We also aims for social inclusion to extend our scientific knowledge to the community.</p>		

* 3 : Applicants who wish to enroll in this laboratory should inform Student Affairs Section, Graduate School of Bioresources.

Laboratories	Research Outline	Supervisors	E-mail address
Sustainable Earth System	<p>Research subjects of this laboratory are (a) the past and (b) the future of the earth. (a) Knowledge of the past earth environment is needed to be understanding nature of material and energy circulation in our planet For understanding of the past earth, we investigate marine and land sediment and sedimentary rocks by the several methods: geology, environmental geology, sedimentology, geochemistry, and geochronology. Especially, we develop and apply original processing and instrument of non-destructive scanning technology called “ TATSCAN”. (b) For predicting and planning of our future of the earth, it is necessary to investigated sustainable development not only for natural environment but also for human society. We investigate future model of self-sustainable social system especially based on renewable energy such as, solar, wind, water, and biomass.</p>	Professor Sakamoto Tatsuhiko	tats@bio.mie-u.ac.jp
Water Environment and Natural Disasters	<p>Water often presents a threat to humankind, but is often regarded as a resource. From the former viewpoint, we study and educate students about natural disaster science, especially the science of water-related disasters. From the latter viewpoint, we study and educate students about water resources and water environment engineering. For each hydrological process, we specifically examine precipitation and flooding, especially statistic and stochastic analyses of precipitation and flood. Research areas we treat are hydraulic engineering, river engineering, hydrology, meteorology, and seismology.</p>	Professor Kuzuha Yasuhisa	kuzuha@bio.mie-u.ac.jp
Applied Environmental Studies	<p>Our laboratory aims to create the society where people could have the feel of freedom, safety and welfare. We evaluate different aspects of the world. For example, Riding a motorcycle has both aspects of pleasure and danger. Improving the regional environment sometimes leads to deterioration of the global environment. We study the sustainable regional managing method based on the evaluations. We utilize landscape characters because they reflect the underlying geology, soils, topography, land cover, hydrology, historic and cultural development and climatic considerations. We want to provide a more harmonious link between man and the natural world with them.</p>	Professor Ohno Ken ^{*1}	oono@bio.mie-u.ac.jp

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2-2 Environment Oriented Information and System Engineering Course

Laboratories	Research Outline	Supervisors	E-mail address
Environmental Information and Technology	The purpose of our research is to contribute to the achievement of Japanese smart agriculture, and the increased biomass utilization by using engineering approach. Especially, we are actively involved in education and research related to the traveling performance of agri-vehicle, the agricultural information system and the distribution system. We also focus on education and research associated with torrefaction and biodiesel.	Professor Fukushima Takashi Assistant Professor Takisawa Kenji	t-fuku@bio.mie-u.ac.jp takisawa-k@bio.mie-u.ac.jp
Productive Environment System	The performance of machinery and equipment systems related to biological production, industrial production, the environment, etc. are analyzed using information engineering and system engineering. The condition monitoring and diagnostic methods of machinery systems for environment-friendly, safe and secure, new diagnostic technologies for biological materials and foods based on optical characteristics, and intelligent robot system are educated and studied by introducing advanced technology.	Professor Jinyama Ho* ¹ Associate Professor Suzuki Tetsuhito	chen@bio.mie-u.ac.jp t-suzuki@bio.mie-u.ac.jp
Environmental Control in Biology* ³	First step of our research is understanding the information about bioresource production involving with living things, environment, and people. With controlling these knowledge, the technology and theories are studied how to organize the bioresource production system most appropriately such as plant factories.		
Energy Utilization Engineering	The purpose of our research is to utilize renewable biological resources and to automate and improve the efficiency of food production systems. We educate and research the theory and technology on the development of biodegradable biomass materials using plant biomass, the improvement of running performance of off-road vehicles, the automation of food production systems, and the optimization of agricultural machinery for effective use of energy.	Professor Xiu Lun Wang	wang@bio.mie-u.ac.jp
Agricultural and Food Systems	The focus of our education and research field is on food system defined as the aggregate of food-related processes involving food producing, harvesting, processing, packaging, transporting, marketing, consuming, disposing of food. Education and basic and applied research for sustainable food system, smart food system, agricultural robot, and information technology for monitoring the quality of agricultural and marine products and food are carried out in this field.	Professor Morio Yoshinari Assistant Professor Naito Hirota	morio@bio.mie-u.ac.jp naito@bio.mie-u.ac.jp

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2-3 Irrigation, Drainage and Reclamation Engineering Course

Laboratories	Research Outline	Supervisors	E-mail address
<p style="text-align: center;">Applied Geomorphology</p>	<p>Today, many of the sensitive young people who live in an urban area take a lively interest in rural area. They move to the rural area for their livelihood and a good life. On the other hand, some human activities in rural area have been decreasing. It is deeply concerned about that it brings to decline multifunction in rural area, which are mitigation of soil erosion, groundwater storage and so on. In this laboratory, we are studying about policies for sustainable live and livelihood in the rural area, which are sustainable agriculture, food keeping for living and building a self-production system of energy. We research and educate a skill of social planning and technology in sight of water, farmland and energy in rural area.</p>	<p style="text-align: center;">Associate Professor Morimoto Hidetsugu</p>	<p style="text-align: center;">morimoto@bio.mie-u.ac.jp</p>
<p style="text-align: center;">Soil Resources Engineering</p>	<p>Soil resources are useful for our life. However, it sometimes causes serious disasters. Our laboratory study about disaster prevention of ground because of keeping safety and suitable life. Research topics are evaluating physical and mechanical property of soil and the characteristics of interaction problem between soil and structure. Main research projects in our laboratory are shown below;</p> <p>1) We developed light weight new Jack to use for lift-up procedure of ground anchor structure (SAAM system). SAAM system is possible to evaluate the healthiness of ground anchor.</p> <p>2) We developed ground improved machine with gravel column (ECOGEO). ECOGEO is possible to apply improvement of bearing capacity and drainage in the ground.</p> <p>3) We research on improvement and maintenance of old ponds.</p> <p>4) We evaluate shear band propagation in the ground using FE analysis and model test.</p>	<p style="text-align: center;">Professor Sakai Toshinori *1</p> <p style="text-align: center;">Assistant Professor Tanaka Yoshikazu</p>	<p style="text-align: center;">sakai@bio.mie-u.ac.jp</p> <p style="text-align: center;">ytanaka@bio.mie-u.ac.jp</p>

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Laboratories	Research Outline	Supervisors	E-mail address
Water Resources Engineering	<p>We are aiming to develop the conservation and recycling technology of sustainable water resources that can answer the continuing needs of the society on the basis of a quantitative grasp of the hydrological impacts including evapotranspiration and rainfall during the hydrologic process of the natural world studied mainly from the agricultural sector. To be specific, through the proposal related to the design of water storage facilities, water transmission and delivrage facilities with attention paid to water quality problems such as eutrophication, etc., the proposals about environment improvement and research while paying attention to the ecosystem of the water environment, and proposals for measurement technology and facility design for contributing to watershed flood control in rural areas, the educational research also containing the evaluation method itself will be conducted based on the results above.</p>	<p>Associate Professor Kondo Masaaki</p> <p>Assistant Professor Ito Ryoei</p>	<p>kondo-m@bio.mie-u.ac.jp</p> <p>itou-r@bio.mie-u.ac.jp</p>
Terrestrial Land and Water Engineering* ³	<p>We will intend education and research on development of engineering management technologies for farmland soil, improvement technologies for soil degradation, international technical cooperation and others. In particular, we will intend education and research on various problems in agricultural and rural areas, NOGYO-DOBOKU (Irrigation, Drainage and Rural Engineering) as a countermeasure, land-use planning, agricultural and rural development, farmland conservation and others.</p>		
Construction Materials and Environmental Works	<p>Agricultural facilities such as dams, headworks and canals are facing various problems due to intensifying natural disasters and aging of the facilities. Advanced maintenance methods for agricultural facilities are being sought with the rapid advances in information technology. To solve these challenges, we promote practical education and research into the safety and maintenance inspection methods and appropriate new reconstruction methods in the construction and maintenance of agricultural facilities, using techniques such as materials testing, model testing, surveys and numerical analysis.</p>	<p>Professor Okajima Kenji</p>	<p>okajima@bio.mie-u.ac.jp</p>

* 3 : Applicants who wish to enroll in this laboratory should inform Student Affairs Section, Graduate School of Bioresources.

Laboratories	Research Outline	Supervisors	E-mail address
International Environment Conservation	<p>International Environment Conservation Laboratory (IECL) deals with geotechnique, construction materials, water and environment in Rural Engineering. The mission of IECL is to protect nature and its biodiversity for the benefit of humanity by development of new construction material and technology using recycle and waste aggregate from agricultural and engineering industries. The aim is to achieving the improvement and conservation of local/regional environment and resources as well as solid waste management and recycling. Approaches are concerned with the basic and applied works based on physical and numerical analyses, field investigations and experimentations. For example, construction materials, soil and water conservation, environment protection, recycling and reusing solid wastes, slope stability, ground improvement, composite materials, soil-structure interactions, composite foundation for solar support system, are the current key research topics of IECL. Moreover, to figure out the optimal condition of environment conservation and recycling system, and to develop models for materials and disaster prevention, applications of Finite Element Method (FEM) are also used as important tools.</p> <p>Keywords:Environment,Geotechnique, Construction Materials, Water, Waste Aggregate, Recycling</p>	Professor Hossain Zakaria	zakaria@bio.mie-u.ac.jp
Vadose Zone Hydrology	<p>Soils are among the most complex systems found in nature where physical, chemical, and biological processes taking place simultaneously. Water and energy balance through the soils, especially in cryosphere, strongly affects not only local agriculture but also global climatic changes.</p> <p>Vadose zone hydrology and soil physics is concerned with the application of physical principles to characterization of soil properties and to understanding of processes occurring in this life-supporting thin crust of the Earth surface.</p>	Professor Watanabe Kunio	kunio@bio.mie-u.ac.jp
Soil Physics and Hydrology	<p>The vadose zone, also termed the unsaturated zone, is a soil layer from the surface to the position of the groundwater, generally corresponding to the plant root zone. Unsaturated water flow, solute, heat, and gas transport with the carbon and nitrogen cycling in the vadose zone are experimentally and numerically studied. Field and laboratory experiments are conducted to intensively monitor water flow and solute transport. Numerical simulation models are developed to predict water, heat, and chemical transport with plant root uptake in a soil including nitrogen components in a solution phase and carbon dioxide in a gas phase as a result of degradation of organic matters. Furthermore, the chemical transport model is applied to predict cesium transport in agricultural fields of Fukushima area.</p>	Professor Toride Nobuo Associate Professor Sakai Masaru	ntoride@bio.mie-u.ac.jp sakai-m@bio.mie-u.ac.jp

3. Department of Life Sciences

Department of Life Sciences aims to build the basic scientific theories related to the life sciences overall as well as a field of study related to the development, conservation, and management of marine bioresources, and to instruct the students through the practical education. Therefore, in this department, we carry out research and education in order to allow individual students to learn the research skills required for research in the life sciences, as well as to understand basic theory related to the life phenomena of bioresources at the ecosystem, community, population, individual, organ, cell, and molecular levels. The department is made up of three courses: Biochemistry and Biotechnology, which seeks to clarify the structure and functions of the systems and molecules of life phenomena through research strategies related to bioscience and biotechnology, and apply them to the development of functional molecules and foods, or to environmental technologies; Marine Life Science and Molecular Chemistry, which aims to explain the marine biological functions of marine life on a chemical level and contribute to the effective use of marine bioresources, and Marine Biology, which seeks to understand life in the hydrosphere, including fresh water areas, and the workings of these life forms on a range of scales, from molecular to ecological. The details of the education and research provided by each course are as follows.

3-1 Biochemistry and Biotechnology Course

Our goal is the effective use of bioresources over a wide area that includes foods, health, drugs, lifestyle, and the environment. Using the strategy of bioscience and biotechnology, we look at the diverse systems of life phenomena, whether animal, plant, or microorganism, as well as their molecular structures and functions of the materials that these organisms produce. Our aim is to establish theories and skills for applying these results to the development of new functional molecules and foods, and environmental technologies. To that end, we carry out specialist research and education from the perspectives of chemistry, biochemistry, molecular biology, and bioengineering, with a focus on research into structures and functions of new functional materials, the genetic expression mechanisms of animals and microorganisms, bio-information sensing and processing technologies, and the development of technologies for using unutilized bioresources.

3-2 Marine Life Science and Molecular Chemistry Course

Along with providing explanations for the marine biological functions on a chemical level, we also aim to effectively utilize marine bioresources such as seafood, algae, marine microorganisms, etc., and to integrate biological information through analysis and isolation of their components. In addition, we use these as materials to create functional food resources, cosmetics, etc. through biochemical and genetic engineering techniques. In our course, we provide research and education on biochemistry, molecular biology, and the analytical techniques. Furthermore, we carry out research and education so that students can learn and master abilities to handle these techniques into practice.

3-3 Marine Biology Course

In our course, we make researches about marine life on a range of scales, from cellular and individual to biotic communities and ecosystems. Our research fields cover all marine environments, including fresh water, but with an emphasis on the oceans. The subject of research consists of different biology with plankton, algae, crustaceans, shellfish, finfish, and marine mammals. We conduct research and education on understanding the workings of each of these life forms at the genetic, cellular, individual, and community levels, as well as on methods for preserving ecosystems and biodiversity and on the sustainable use of marine life. We also aim to enrich human life through the appropriate management of marine life as resources, effective aquaculture methods, and ICTs for fisheries.

3-1 Biochemistry and Biotechnology Course

Laboratories	Research Outline	Supervisors	E-mail address
Molecular and Cellular Biology	<p>By using biochemical and molecular & cellular biological techniques, we perform fundamental researches on roles of chromatin modifications in the control mechanism of life phenomena to happen at a cell level, e.g., DNA replication, transcription, DNA damage & repair, genome instability, and cell differentiation in animal cells. On the other hand, we aim at applying knowledge provided by these to the field over many divergences of bioscience and its related research area. In addition, we also devote to a study on action and utilization of vitamins and various functional ingredients derived from food.</p>	Associate professor Takebayashi Shin-ichiro	stake@bio.mie-u.ac.jp
Molecular Bioinformatics	<p>Current research projects of this laboratory are as follows: (1) genomic-scale analysis of bacterial gene and protein expression, (2) analysis of protein structure and function, (3) lignocellulosic biorefinery using <i>Clostridium</i> species, and (4) application of microbial calorimetry to the food science and the soil science.</p>	Associate professor Miyake Hideo	miyake@bio.mie-u.ac.jp
Biofunctional Chemistry	<p>Molecular interaction and/or recognition play an important role generally in the crucial situation for biological process. Our laboratory is focusing such molecular recognition from a viewpoint of organic chemistry. The host-cell recognition of bacteriophage and epidemic penetration of medical drugs are investigated for development of new drugs and functional material. In those studies, phages, bacterial cell, and animal skin are studied using methods of decompositional manner degrading organic molecules that function there. Application researches for developing a new method for organic synthesis of materials for drugs and exploring substances account for palatability of beverage are also our interest.</p>	Professor Inagaki Minoru	inagaki@bio.mie-u.ac.jp
Medicinal Chemistry	<p>This laboratory is focusing on 3D structure of drug molecule to develop more effective drugs with few side-effects. Molecular modeling, organic synthesis, biological evaluation, and 3D structural analysis of bioactive peptides are performed to optimize its 3D structure. These experiences help students to learn organic, biological, analytical, and computational chemistries, which are necessary for drug development.</p>	Associate professor Masuda Yuichi	masuda@bio.mie-u.ac.jp

Laboratories	Research Outline	Supervisors	E-mail address
Bioorganic Chemistry	Our focus is to maintaining the life activity of human being or the other organism. We intend to clarify the chemical structure of endogenous or exogenous bioorganic materials and to make clear the mechanism of expression and regulation of various functions using its bioorganic materials. The results are applied to control the activity of human being or the other organism.	Associate Professor Katsuzaki Hirotake Associate Professor Okazaki Yozo	katsuzak@bio.mie-u.ac.jp yozo.okazaki@bio.mie-u.ac.jp
Bio-regulatory Chemistry	Bio-phenomenon is done by significant dynamic changes in the chemical reactions and molecular interactions. In our education and research division, we organic-chemically and bio-chemically research the regulation mechanism of molecule bio-systems as a basic study, and subsequently develop some novel diagnosis materials and medicines for life innovation and human health care as an applied study.	Professor Teranishi Katsunori	teranisi@bio.mie-u.ac.jp
Bioinformation and Food Engineering	In order to take full advantage of bioinformation such as structure, shape, color, taste and functions of foods and agricultural products on food production, processing and logistics, we perform the education and researches on biochemical and food engineering by analyzing bioinformation at molecular, cellular and individual levels. We conduct researches and professional education relating to bioprocesses in the fields of food production and agricultural sector, and apply multiband optical sensing methods to getting quantitative and kinetic grasps of various kinds of bioinformation which appears due to the metabolism.	Professor Hashimoto Atsushi	hasimoto@bio.mie-u.ac.jp
Food Chemistry	The laboratory of Food Chemistry studies structure, properties, and analytical methods of food compounds and food-related enzymes. Also, we work on the development of technologies to produce novel or valuable food compounds using enzymes or microorganisms, and the effective use of regional resources. The main subject of the laboratory is carbohydrates such as polysaccharides and oligosaccharides and their related enzymes.	Associate Professor Isono Naoto Associate Professor Mishima Takashi	isono@bio.mie-u.ac.jp mishima@bio.mie-u.ac.jp

Laboratories	Research Outline	Supervisors	E-mail address
Applied Microbial Genetics	Genetic engineering is a technology that has the potential to produce more useful microorganisms for bio-industry. One of the targets of our research is molecular breeding of microorganisms that are able to degrade complex plant cell wall fibers and produce biofuels. Degradation of plant cell wall requires many cellulolytic enzymes. Therefore, engineering of metabolic pathway and transcriptional mechanism is required for breeding microorganisms that can convert biomass to bioenergy efficiently. We are focusing on molecular genetics of anaerobic bacteria and filamentous fungi.	Professor Kimura Tetsuya Assistant Professor Kunitake Emi	t-kimura@bio.mie-u.ac.jp kunitake@bio.mie-u.ac.jp
Nutritional Chemistry	We study the response of the living body for food at levels of individual, tissue, cell, molecule and gene. Especially, we purify some functional components from unutilized resources obtained from the animals and plants and the microorganisms and analyze their structures and clarify the action mechanisms of those components using the techniques of animal experiment and the cell culture to make use of them for health promotion and the prevention and the improvement of the lifestyle-related disease. Our main research projects are study on functionality of the soybean fermented food, effect of food components for animal models for eye diseases, modulation of bone metabolism by food components, the study about the anti-allergy components from food using mouse models of asthma, and the study about the functions of the nucleolus protein.	Associate Professor Nishio Masahiro Assistant Professor Kuriya Kenji	nishio@bio.mie-u.ac.jp kuriya@bio.mie-u.ac.jp
Fermentation Biology	Alcohol beverages, traditional foods, such as natto and tsukemono, and yogurts are produced with microbial fermentation. Our laboratory is interested in microorganisms involved in fermentations for food productions and chemicals. We educate on microbiology, microbial genetics, metabolism, molecular biology and recombinant DNA technology. We strive to give the student the opportunity to develop the skills and fundamental knowledge to become an independent investigator in academia or industry.	Professor Karita Shuichi* ¹ Associate Professor Umekawa Midori	karita@bio.mie-u.ac.jp midoriumekawa@bio.mie-u.ac.jp

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Laboratories	Research Outline	Supervisors	E-mail address
Food Function	In addition to nutritional supply (primary function) and palatability (secondary function), foods also have a physiological function (tertiary function) that maintains and promotes health. Currently, research on foods and ingredients having functions progresses, forming a functional food market. In this research field, we focus on tertiary functions of foods, discuss the components responsible for it, discuss methods to evaluate function, production / processing, functional food market and others. We also discuss the significance of specific functional materials such as polyphenols, functional carbohydrates, amino acids, antioxidant substances in living bodies.	Collaborative Professor Ozeki Makoto* ² Collaborative Professor Ishihara Noriyuki* ² Collaborative Associate Professor Kobayashi Junya* ²	

*2 : Applicants who wish to conduct research under this supervisor should inform Professor Associate Professor Nishio Masahiro, Laboratory of Nutritional Chemistry (nishio@bio.mie-u.ac.jp).

3-2 Marine Life Science and Molecular Chemistry Course

Laboratories	Research Outline	Supervisors	E-mail address
Marine Biochemistry	<p>In the special environment of the sea, marine organisms involve novel constituents and engage in their interesting biological phenomena. Especially attention to marine macroalgae and mollusks, we survey the algal/mollusk compounds which contribute to the maintenance of human health by investigating their functional effectiveness and intracellular dynamics. In addition, we intend to elucidate the molecular mechanisms for morphological and developmental characteristics, response and adaptation to fluctuating environmental conditions, and phenotypic expression of industrially useful varieties in marine macroalgae and mollusks using their genomic information. Our purposes on education and research result in obtaining the wide knowledge and experimental technique to students, and in contributing to highly effective utilization, sustainable and stable production, and conservation of biodiversity of marine bioresources.</p>	<p>Professor Kakinuma Makoto</p> <p>Assistant Professor Igarashi Yoji</p>	<p>kakinuma@bio.mie-u.ac.jp</p> <p>igarashi@bio.mie-u.ac.jp</p>
Utilization of Aquatic Bioresources	<p>Our laboratory is mainly focussing on fish and algae that we analyze their available products and those who are developed by unused bioresources in the aquatic field. Moreover, we study on the theory and technologies not only with genetic bioengineering for breed improvements in fish, but also with synthetic biology on bacterial biosynthesis. Furthermore, by analyzing the interaction and relationship of molecular levels between chemical compounds and their biological effects, we aim to elucidate and educate synthetic biology and biotechnologies for mechanisms of molecular interactions from a cell level to a whole body level.</p>	<p>Professor Tamaru Yutaka</p>	<p>ytamaru@bio.mie-u.ac.jp</p>
Molecular Chemistry and Aquatic Materials	<p>A variety of organisms have been inhabiting the hydrosphere. Our laboratory investigates functional ingredients in aquatic organisms that contribute to beauty (whitening, photo-aging, etc.) and the prevention and/or improvement of lifestyle related diseases (cancer, osteoporosis, allergy, etc.), and elucidate its mechanism based on scientific evidence. In addition, in order to expedite the development of functional cosmetics and foods, we have been engaging in the development of new evaluation system for screening of functional ingredients by using noncoding RNA and exosome secreted from cells. In this way, our laboratory educate you from the view point of cell biology, experimental animal science, and nutrition for the purpose of material development that contributed to the improvement of “Quality of Life”.</p>	<p>Associate Professor Itoh Tomohiro</p>	<p>titoh@bio.mie-u.ac.jp</p>

Laboratories	Research Outline	Supervisors	E-mail address
Biophysical Science	<p>Aquatic organisms are adapted to an extremely wide range of environments. Physicochemical properties of the biomolecules that work in the tissues and organs of aquatic organisms are significantly different from those of terrestrial animals and plants. We are mainly targeting the muscles of aquatic animals, and are studying to clarify their molecular mechanism of muscle contraction from the viewpoint of comparative physiology and comparative biochemistry. The results obtained are useful not only for accumulating biological knowledge, but also for maintaining the quality of seafood and developing processing technology. In this research field, we will conduct education and research on food science based on the characteristics of aquatic organisms.</p>	Professor Ooi Atsushi	ooi@bio.mie-u.ac.jp
Marine Biotechnology	<p>Figures and functions of aquatic organisms extremely differs from those of land-dwelling creatures. Aquatic organisms have acclimated themselves to the aquatic environment and their genes have produced various proteins that give abilities to live in the aquatic environment. Our laboratory is studying on functions of muscle proteins of aquatic creatures such as sharks that have urea in muscle and bivalves of which muscle can maintain the tension for a long period without energy consumption.</p>	Professor Funabara Daisuke Assistant Professor Mizutani Yukino	funabara@bio.mie-u.ac.jp mizutani@bio.mie-u.ac.jp
Marine Microbiology	<p>Microorganisms such as bacteria, true fungi, and unicellular algae, are one of useful marine resources. We have so far searched and isolated unique and useful microorganisms in marine environments. We have investigated biochemical, physiological, and ecological properties of these microorganisms to produce chemicals and bioenergy. In addition, it is imperative to control harmful microorganisms such as food-poisoning bacteria in food-manufacturing factories. We have also investigated the optimization of cleaning and disinfecting operations of food-processing equipment from interfacial aspects.</p>	Professor Fukuzaki Satoshi Associate Professor Tanaka Reiji	satoshi_fukuzaki@bio.mie-u.ac.jp tanakar@bio.mie-u.ac.jp
Quality in Marine Products	<p>Our laboratory aims to improve understanding of marine product constituents such as enzymes, blood components, glycoproteins and oligosaccharides that have effects on its quality and hygiene. Our specific interests are reactions of these components that occur in marine products during storage and processing, and how they could be controlled for quality improvement.</p> <p>Recent research topics are as follows: (1) Comparative pharmacology of fish drugs in cultured fish. (2) Study on glycoproteins of fish red blood cell membranes. (3) Exploring novel biocatalysts from marine bioresources for high value-added chemicals production and developing their application for marine products.</p>	Professor Aoki Takahiko Associate Professor Okazaki Fumiyoshi	aoki@bio.mie-u.ac.jp okazaki@bio.mie-u.ac.jp

Laboratories	Research Outline	Supervisors	E-mail address
Marine Food Chemistry	<p>In the laboratory of marine food chemistry, it is engaged in the following research topics:</p> <ol style="list-style-type: none"> 1. Study on search for novel physiological active substances from marine resources. 2. Studies on production of rare sugars from seaweed polysaccharides and evaluation of their physiological functions. 3. Studies on structural analysis and physiological functions of seaweed polyphenols (phlorotannins). 4. Study on development of method for quantitative analysis of marine physiological active substance using mass spectrometer (e.g., LC-MS, GC-MS) 5. Study on biorefinery using marine resources. 	Associate Professor Shibata Toshiyuki	shibata@bio.mie-u.ac.jp

3-3 Marine Biology Course

Laboratories	Research Outline	Supervisors	E-mail address
Biological Oceanography	Plankton is an important organism supporting aquatic ecosystem from its bottom on the trophic levels as a primary producer. In our laboratory, we research mainly about the relationship between population dynamics of phytoplankton and environmental conditions, and about the export of organic matter in the marine ecosystem, from the viewpoints of biological and chemical oceanography. Furthermore, to reveal the physiology and ecology of marine harmful microalgae, such as causative species of red tides killing fishes, and/or as toxic species causing toxification of bivalves (scallops and clams, etc.), we also have conducted related experiments and field survey.	Professor Ishikawa Akira Assistant Professor Taguchi Kazunori* ¹	ishikawa@bio.mie-u.ac.jp tag@bio.mie-u.ac.jp
Fish Physiology	The objectives of education and research in this laboratory are to clarify the principles of physiological and ethological functions related to sensory organs in aquatic organisms. The potential knowledge obtained from these studies is to be applied for rising and controlling valuable aquatic bio-resources with particular attention not only to high productivity but also to the protection of the environment involved.	Professor Kohbara Jun* ¹ Associate Professor Miyazaki Taeko	kohbara@bio.mie-u.ac.jp taeko@bio.mie-u.ac.jp
Phycology	We study the ecology and physiology of seaweeds and seagrasses, which are very important primary producer in the coastal ecosystem. Our laboratory focuses on the roles and the functions of seaweed and seagrass communities in the coastal ecosystems, the restoration of seaweed beds from barren grounds (ground devoid of seaweed beds) and the development of aquaculture techniques of seaweeds. We conduct field surveys and laboratory culture experiments to elucidate the factors affecting the seaweeds growth and reproduction, such as water temperature, light intensity, wavelength of light, nutrients, and density of herbivores. We conduct research and education on the conservation of coastal environment with reference to seaweed and seagrass communities.	Associate Professor Kurashima Akira	kurasima@bio.mie-u.ac.jp

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Laboratories	Research Outline	Supervisors	E-mail address
Shallow Sea Aquaculture	Shallow water zones in the sea are main fields for bioproduction processes in marine ecosystems utilizing solar energy. Our laboratory's aim is to elucidate the physiology, ecology, and growth mechanisms of a wide variety of aquatic organisms inhabiting shallow water areas, and to effectively utilize shallow water areas as a place for food production using their high productivity. To solve various problems that hinder their sustainable development, our laboratory works on various topics related to the following keywords: fishery, aquaculture, aquatic bioresources, regulatory biology, larviculture feeds, and so on.	Professor Matsuda Hirokazu Professor Tsutsui Naoaki Assistant Professor Yamamoto Kosuke	hmatsuda@bio.mie-u.ac.jp tsu2@bio.mie-u.ac.jp y-kosuke@bio.mie-u.ac.jp
Fish Diseases	This field conducts educational and research activities on solutions to disease problems in cultured and wild fishes using advanced technologies. We aim at investigating the causes of emerging diseases, defining the causative agents, and establishing diagnostic and preventive measures followed by formulating control strategies for the disease prevention, as well as understanding the agents and diseases. Our activities can be used to improve technology for stable supply of safe and quality fishery products.	Professor Isshiki Tadashi	isshiki@bio.mie-u.ac.jp
Fish Stock Enhancement	The course addresses the biodiversity, phylogeny, systematics, fauna, and life history (reproduction, growth, feeding habits, etc.) of fishes and other aquatic vertebrates, from the perspectives of ichthyology, animal ecology and reproductive physiology, with the goal of accumulating basic biological information necessary for conserving the biodiversity and enhancing the populations of these aquatic animals.	Professor Yoshioka Motoi* ¹ Professor Morisaka Tadamichi Associate Professor Yodo Taiga Associate Professor Funasaka Noriko	motoi@bio.mie-u.ac.jp chaka@bio.mie-u.ac.jp tyodo@bio.mie-u.ac.jp funasaka@bio.mie-u.ac.jp
Marine Ecology	Seacoasts are important place supporting and raising a great variety of life. Our laboratory focuses on the ecology of organisms in seacoasts (tidal flat, sandy shore, salt marsh, estuarine and seagrass bed). We are interested in the life history and population dynamics of endangered and introduced species, and the development of new approaches to conservation.	Professor Kimura Taeko	k-taeko@bio.mie-u.ac.jp
Aqua Genetics	Aiming for efficient aquaculture and sustainable use of fishery resources, our laboratory works on education and research related to development, genetic breeding, and ecology of aquatic invertebrates such as commercially important bivalves. The present themes are 1) development of breeding technology of pearl oyster and analysis of microstructure of pearl, 2) Development, evolution and reproduction of androgenetic Corbicula clam, 3) Feeding ecology and digestive mechanisms of small herbivorous marine invertebrates.	Professor Komaru Akira* ¹ Assistant Professor Houki Shouji	komaru@bio.mie-u.ac.jp houki@bio.mie-u.ac.jp

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Laboratories	Research Outline	Supervisors	E-mail address
Molecular Ecology of Aquatic Animals	<p>Laboratory of Molecular Ecology of Aquatic Animals performs researches for the elucidation of mysteries in biodiversities in aquatic animals (ecology, morphology and behavior) and their histories (evolution and adaptation), with the usage of DNA information in vertebrates (mainly fin fishes) and molluscs. Its academic fields are as follows.</p> <p>1)Analysis of evolution and adaptation in aquatic animals 2)Analysis of the mechanism in the invasion success of exotic species 3)Gathering information for the conservation of endangered species 4)Development of breeding techniques of aquatic animals, using the molecular information</p>	Professor Kawamura Kouichi	kawa-k@bio.mie-u.ac.jp
Fish Population Dynamics	<p>We teach and study population dynamics and their application to the management and conservation of aquatic animal populations. The subjects of our study include (1) assessment and management of fish populations and (2) mathematical modeling of the population dynamics of aquatic bioresources.</p>	Professor Harada Yasushi* ¹ Associate Professor Kanaiwa Minoru	harada@bio.mie-u.ac.jp kanaiwa@bio.mie-u.ac.jp
Fisheries Ethology	<p>Based on environmental observations, our aim is to clarify relationships between behavioral ecology and environmental variables. More specifically, we develop devices and methodologies to measure behaviors of fish and crustaceans. We also examine ways of reproducing realistic habitats in the laboratory to enable analysis of periodicity of behavior, performance evaluation of sensory organs, and by such evaluations assess the adaptability of organisms to environmental change. We educate and research efficient and sustainable fishing methods in order to optimize usage of aquatic resources.</p>	Associate Professor Morikawa Yoshitaka	morikawa@bio.mie-u.ac.jp
Applied Marine Informatics	<p>Our laboratory is dedicated to the education and research of utilizing Information and Communication Technologies (ICTs) and Internet of Marine Things (IoMT) in conjunction with big data analytics to promote sustainable fishing practices and environmental conservation in coastal areas. Our research centers on themes of digital transformation (DX) within the fisheries and oceanic environments, including the implementation of ICTs and IoMT for monitoring marine resources and utilizing measurement technologies to gauge environmental factors such as water quality, waves, currents, and bathymetries - all of which are essential components of the coastal fisheries.</p>	Associate Professor Okabe Takumi	okabe@bio.mie-u.ac.jp

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(Fisheries Technology Institute, Japan Fisheries Research and Education Agency)

Laboratories	Research Outline	Supervisors	E-mail address
Developmental and Metabolism Biology	To establish an efficient and sustainable aquaculture system, we elucidate mechanisms of development, reproduction and metabolism of aquatic organisms using molecular techniques. We also develop new techniques for reproduction and breeding using genomic information and cell engineering methods. Improving fish feed to product healthy fish is also our goal.	Collaborative Professor Okamoto Hiroyuki Collaborative Professor Matsumoto Toshie Collaborative Associate Professor Murashita Koji	hiokamot@affrc.go.jp mtosie@fra.affrc.go.jp kojim@affrc.go.jp