

International Marine Biology Course (IMBC) 2024

September 20-29, 2024

In late September, the International Marine Biology Course (IMBC) 2024 was organized by the Marine Biological Station, Sado Island Center for Ecological Sustainability, Niigata University (SMBS). We provided an international hybrid practice course at SMBS from September 21st to 25th. IMBC2024 was supported by “Sakura Science Exchange Program” under a grant from the Japan Science and Technology Agency. We have invited four guest lecturers from Bangladesh, India, Malaysia and Japan for this course. Thirty-two students from Bangladesh, India, Malaysia, Viet Nam, Hong Kong and Japan have joined this in-person course. Moreover, as last year, we streamed some parts of the course for online participants. Thirty-four students and researchers from two countries have also joined online.

Number of participants

University	In-person		Online
	Student	Researcher	
Bangladesh			
Bangladesh Agricultural University (BAU)	2	1	4
Chattogram Veterinary and Animal Science University (CVASU)	5		12
Jashore University of Science and Technology (JUST)			1
India			
Cochin University of Science and Technology (CUSAT)	2	1	17
Malaysia			
Monash University Malaysia (MUM)	2	1	
Viet Nam			
Hanoi National University of Education (HNUE)	2		
Hong Kong			
The University of Hong Kong (HKU)	2		
Japan			
Niigata University (NU)	8		
Hokkaido University (HU)	1		
Iwate University (IU)	1		
The University of Tokyo (UT)	1		
Shizuoka University (SU)	1		
Osaka University (OU)	1		
Osaka Metropolitan University (OMU)			1
Total	28	4	34

The main objective of IMBC2024 was to study marine biodiversity and animal evolution as well as acquire some techniques for monitoring marine environments and ecosystems. To achieve this goal, we provided lectures, fieldwork and lab work utilizing the beautiful and well-preserved coastline of Sado Island. Because this course was held as a hybrid for in-person and online participants, some activities for the in-person course were also broadcast. The list of the activities in this program was as follows:

- Six lectures in different fields of marine and aquatic biology
(Three of them were broadcasted online)
- Artificial fertilization and observation of early development of sea urchin
(Broadcasted online)
- Animal sampling by snorkeling at a rocky shore
- Animal sampling at a wharf
- Plankton and benthos sampling using a research vessel IBIS II
- Classification, observation, biological drawing, group/individual discussion and presentation about collected marine animals
(Part of the classification and observation were broadcasted online)
- Observing bioluminescence of sea fireflies.
- Visiting world heritages site “Sado Gold Mine” and geosite “Meotoiwa”.
- Visiting Niigata City Aquarium “Marinepia Nihonkai”
- Research presentation at ICNS2024 held at Ikarashi Campus, Niigata University

Although it was a terrible stormy week, every in-person participant safely gathered at the Ryotsu ferry terminal on September 21st. After moving to SMBS, we started the first day of this course with in-person and online participants. Following opening remarks and self-introduction, SMBS staff presented two lectures about the marine environment of the Japan Sea and the taxonomic classification of marine animals. After the lectures, we held an ice-breaking dinner for in-person course participants.



Opening remark of the hybrid course



Ice-breaking dinner

The second day started with a lecture by Prof. A. A. Mohamed Hatha (CUSAT, India) for the in-person participants. He talked about his practical research on the restoration of degraded ecosystems. After the lecture, we performed artificial spawning and fertilization of Japanese purple sea urchin (*Heliocidaris crassispina*) ahead of the original schedule because animal sampling by snorkeling was unfortunately postponed due to the sea conditions. Each participant made sea urchin release its eggs or sperms by injecting potassium chloride solution and tried artificial fertilization by themselves. They observed the early events of fertilization and embryo development under microscopes.

After lunch, Prof. Satoshi Awata (OMU, Japan) lectured about the diversity of intra- and interspecific interaction in fishes. Next, we held an animal sampling for the in-person course at a wharf of the Tassha Port just in front of SMBS. Participants collected many animals with hand nets, such as fish, shrimps, and snails. Concurrently, we demonstrated and broadcasted artificial fertilization of sea urchins for the online course. After the animal sampling, SMBS staff lectured about the characteristics of typical phyla in marine animals for both courses. Then, participants in the in-person course tried to classify these marine animals, which they collected in each phylum. After dinner, Prof. Md. Shahjahan (BAU, Bangladesh) lectured about the impact of environmental stress on fish due to climate change. Then, SMBS staff explained the rules of biological drawing and group presentation on the fourth day. Students were divided into four groups and discussed which phylum they chose and presented.



Artificial fertilization of sea urchin



Animal sampling at the Tassha Port

On the third day, we went to the animal sampling by snorkeling at the rocky shore. Before entering the sea, SMBS staff explained the equipment and how to collect animals hidden in seaweed or under the rocks. Thus, even beginners in snorkeling also enjoyed the beautiful sea and collected a variety of benthic animals such as sea slugs, hermit crabs, brittle stars, ribbon worms, etc... In the afternoon, we briefly lectured about the animals newly found, and then students made a biological drawing, which they used for the group presentation. After the practice, participants visited the Sado Gold Mine, which has been registered as a World Cultural

Heritage site this summer, and some sites on the west coastline of Sado Island (Sotokaifu). Through this experience, participants realized how the geographical features of Sado are diverse. After dinner, Dr. Tomoko Soga (MOM, Malaysia) lectured about the exploration of neural circuits related to social stress in fish. At the end of the day, we observed a bioluminescence of sea fireflies (*Vargula hilgendorffi*). The blue illumination was so fantastic!



Animal sampling by snorkeling



View of Meoto-iwa Geosite

The fourth day was the final day of the activity at SMBS. We carried out the plankton sampling in the morning using the research vessel IBIS II. Participants threw the plankton net and collected small animals drifting under the water. We also tried to measure water transparency. Students were surprised at how clear the water was. After going back to the SMBS, we observed the collected plankton under the microscopes. Then, students finish the preparation of each presentation. They researched and discussed their selected phylum very well. In the afternoon, we held the group presentation to ensure the achievement of this practice course. Every presentation was excellent drawings and well-organized! Last night at SMBS, we had a BBQ party to celebrate the success of this course.



Group presentation



BBQ party

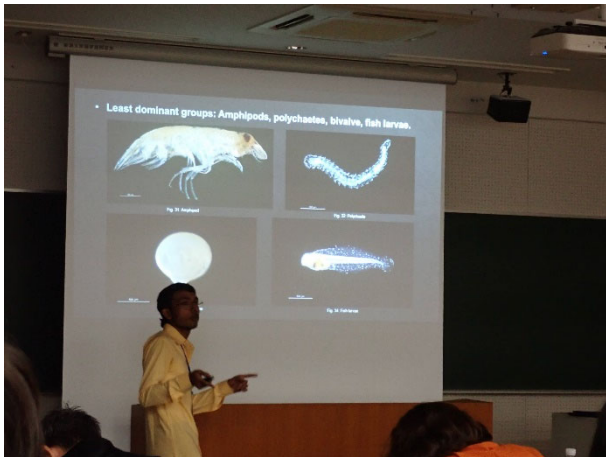
On the fifth day morning, we closed the practical course at SMBS. Then we moved to the Rotsu ferry terminal and dismiss the participants of Japanese university students. After moved to Niigata city, we visited Niigata City Aquarium “Marinepia Japan Sea”. Participants might study diversity of the marine ecosystems along Japan.



Group photo taken in front of SMBS on September 25

From September 26th to 28th, the 5th International Congress on Natural Sciences with Sisterhood Universities (ICNS2024) was held at the Ikarashi Campus of Niigata University. More than 120 researchers and students came from overseas to this meeting, and participants of IMBC2024 also attended. Prof. Hatha gave a plenary talk as an invited speaker, and others presented their research. A banquet and a city excursion tour were held after the daytime session. Participants experienced the local foods and learned about the history and culture of Niigata. During these three days, participants learned about life science and deepened exchanges across the research fields.

After participants had returned to their countries, we held a post-exchange meeting on November 8th. Participants caught up with each other and talked about how to use the experience in this course in their future research activities. A guest speaker, Mr. Taiga Kobayashi (OMU, Japan), talked about self-consciousness and meta-cognition in fish evidenced by the mirror self-recognition. Then, three intern students staying at SMBS presented their achievements.



Oral presentation



Group photo at ICNS2024

Through this five-day practical course and three-day congress, participants learned about the diversity and evolution of marine animals, understood the impact of climate change on aquaculture, and experienced some techniques for assessing marine ecosystems. Moreover, students made strong friendships across borders. We hope all the participants enjoyed this course and will continue to communicate with each other. We would also be happy if online participants could realize this course's attractiveness and look forward to seeing you in the next course. SMBS will continue to hold the international course in the future. We hope participants will use this experience for their future lives and research, and we will have a chance to meet again!