

Recent activity of the International Geosphere-Biosphere Programme



Mitsuo Uematsu

Professor and Director, Center for International Collaboration

For over 20 years, the International Geosphere-Biosphere Programme (IGBP) has assembled overwhelming evidence of the unprecedented changes to Earth's most important biological, chemical, and physical processes. IGBP's sponsor, the International Council for Science (ICSU), recognizes that the international research community needs to fundamentally transform the way it defines and conducts research on global environmental change. In order to contribute to this transformation, the ICSU is developing an ambitious ten-year program of global sustainability research. The IGBP must move from research on global environmental change to research on global sustainability.

The IGBP contributed to developing the ICSU vision and Belmont Challenge (the latter led by the US National Science Foundation and the UK Natural Environment Research Council). From Japan, the Ministry of Education, Culture, Sports, Science, and Technology (MEXT) and Japan Science and Technology (JST) are involved in the Belmont Forum. These two complementary processes have laid down challenges to

the international research community in the coming decades. IGBP's specific niche lies in understanding the Earth's biogeochemical cycles and their interfaces with social systems. For 20 years, the IGBP has been bridging the gap between the natural and social science communities.

In this context, the ICSU appointed Dr. Mitsuo Uematsu to the IGBP Steering Committee(SC), and he attended the 26th SC-IGBP in Bethesda, Maryland, USA on 29-31 March 2011. A new chair-elect, James Syvitski, Professor of Community Surface Dynamics Modeling System, University of Colorado-Boulder (term commencing January 2012) was also introduced.

The science council of Japan leads the IGBP/WCRP national committee, which includes representatives of many of the core projects of WCRP and IGBP. As an SC member, he will interface with the national committee to keep it updated. There is a large gap between the international and national IGBP communities and a smaller gap between the international core project and national activities. Regional collaboration can be accomplished by establishing an Asian regional office of IGBP.

Contents

Recent activity of the International Geosphere-Biosphere Programme	..... 1
Participation in the 8 th Session of IOC WESTPAC	..... 2
A New Direction of Ocean Research in the Western Pacific	..... 2
Completion of the Multilateral Core University Program "Coastal Marine Science" (2001-2010)	..... 3
Asian CORE Program: Establishment of Research and Education Network on Coastal Marine Science in Southeast Asia	..... 4
IOC/WESTPAC 8th International Scientific Symposium	..... 5
JSPS Asian CORE Program	..... 6
The 3rd International Symposium of <i>Oryzias</i> Fish	..... 7
A New IODP Science Plan for 2013-2023	..... 8
Yutaka Michida elected IOC vice- chairperson	..... 8
Professor Emeritus Makoto Terazaki (1945-2011)	..... 9
List of Visiting Professors	..... 10
Visiting Professors' Reports	..... 11

Participation in the 8th Session of IOC WESTPAC

Yutaka Michida

Professor, Center for International Collaboration

From May 10 through 13, 2010, the 8th Session of the IOC Sub-commission for WESTPAC (IOC-WESTPAC-8) was held in Bali, Indonesia, in which Professor Michida of the Center for International Collaboration of AORI (CIC) participated as a member of the Japanese delegation, headed by Professor Fukuyo of the University of Tokyo. The IOC-WESTPAC has taken a leading role in promoting international cooperation and coordination of oceanographic activities since its establishment in 1979, with a particular focus on the Western Pacific region, as one of the primary subsidiary bodies of the IOC. The session adopted five recommendations to be considered

and approved by its governing body, IOC Assembly and/or Executive Council of IOC. The recommendations include establishing a UNESCO/IOC regional network of training and research centers on oceanography. There was intensive discussion regarding the program and the budget of WESTPAC for the next inter-sessional period, based on the evaluation and review of the ongoing and newly proposed research projects within the WESTPAC framework. As one of the members of the WESTPAC Advisory Group and Japanese delegation, Professor Michida made a significant contribution to the session's discussion.

“A New Direction of Ocean Research in the Western Pacific” -Past, Present, and Future of UNESCO/IOC/WESTPAC Activities for 50 Years and the JSPS Project “Coastal Marine Science”-

Shuhei Nishida

Professor, Center for International Collaboration

The above-mentioned conference was held from 26 to 29 October 2010 at the Atmosphere and Ocean Research Institute, the University of Tokyo. The conference celebrated the 50-year anniversary of the UNESCO/IOC (Intergovernmental Oceanographic Commission), synthesized the accomplishments of the Multilateral Core University Program “Coastal Marine Science (CMS)” of the Japan Society for the Promotion of Science (JSPS), and discussed directions for future research and education in the Asian Region (see next topic). The conference was co-sponsored by MEXT, the Oceanographic Society of Japan, the Ocean Alliance of the University of Tokyo, and Japan Agency for Marine-Earth Science and Technology, with special financial support from Horiba, Ltd.

A total of 52 scientists from seven Asian countries (Indonesia, Korea, Malaysia, the Philippines, Russia,

Thailand, and Vietnam) and 28 scientists from Japan participated in the conference. We were fortunate enough to have the participation and greetings of major delegates from IOC/WESTPAC represented by Dr. S.K. Byun, the Vice-Chairperson of IOC, and Dr. N.A.H. Mokhtar, the Vice-Chairperson of WESTPAC. During the conference, representative officials, principal investigators, and national coordinators of the collaborating countries presented the activities, accomplishments, and challenges of the IOC, WESTPAC, and CMS Project, with active and fruitful discussion ensuing. We also had a poster session presenting 68 papers from the CMS Project. The conference was closed with concluding remarks regarding the need for continued collaboration in working toward the successful implementation of a newly proposed project.

Completion of the Multilateral Core University Program “Coastal Marine Science” (2001-2010)

Shuhei Nishida

Professor, Center for International Collaboration

The 10-year Multilateral Core University Program “Coastal Marine Science,” supported by the JSPS and conducted by the Atmosphere and Ocean Research Institute, was accomplished through the collaboration of five Southeast Asian countries (Indonesia, Malaysia, the Philippines, Thailand, and Vietnam) and Japan. Upon completion of the project, we published the book *Coastal Marine Science in Southeast Asia – Synthesis Report of the Core University Program of the Japan Society for the Promotion of Science: Coastal Marine Science (2001-2010)* (edited by: S. Nishida, M.D. Fortes, and N. Miyazaki). The book is available upon request to S. Nishida, Center for International Collaboration, AORI; PDFs can be downloaded for free at: <http://www.terrpub.co.jp/e-library/nishida/index.html>.

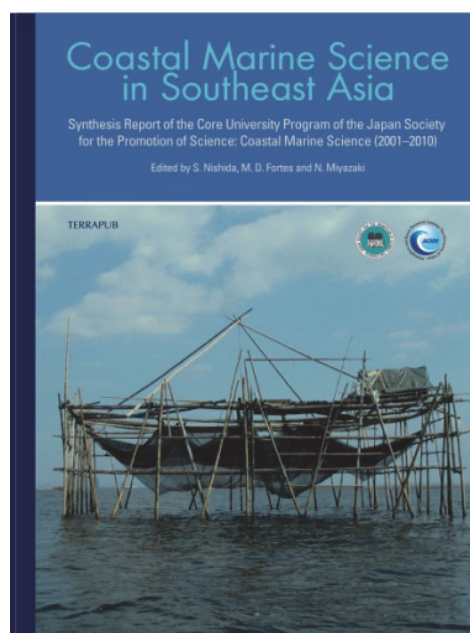
in the coastal marine environment and their ecological effect. Project 3 was composed of the following four groups: fish, benthos, seagrass/seaweeds, and plankton. A total of 222 foreign scientists and 104 Japanese scientists joined the program and worked together in such activities as collaborative field research, joint seminars, coordinators’ meetings, and workshops. In order to encourage young scientists, we also held training courses using field guides of fish, seagrasses, and benthos, and textbooks and analytical manuals, all of which had been compiled/published by project members. The activities of the four projects resulted in the publication of approximately 1300 peer-reviewed scientific papers and 170 articles in other forms.

Upon completion of the project, participants recognized the importance of continuing and enhancing this system of multilateral collaboration among these Asian countries, which is being realized with the new project in the Asian CORE Program (see next topic).



*Group photos from training courses (Plankton Group).
A, The Philippines; B, Vietnam; C, Malaysia;
D, Indonesia*

The program covered the following four subjects: Project 1: Water circulation and the process of material transport in the coastal areas and marginal seas of East and Southeast Asia; Project 2: Ecology and oceanography of harmful marine microalgae; Project 3: Biodiversity studies in the coastal waters of the East and Southeast Asia; and Project 4: Pollution from hazardous chemicals



Front cover of the synthesis book

Asian CORE Program: Establishment of Research and Education Network on Coastal Marine Science in Southeast Asia (ACORE-CMS: 2011-2015) Asian CORE

Shuhei Nishida

Professor, Center for International Collaboration

In light of the accomplishments and challenges from the Multilateral Core University Program “Coastal Marine Science (MCU-CMS),” the new project, adopted as a project of the Asian CORE Program of JSPS, intends to establish and enhance a network dedicated to research and education within the field of coastal marine science in Southeast Asia through the collaboration of scientists/researchers in six countries: Indonesia, Japan, Malaysia, the Philippines, Thailand, and Vietnam (Fig. 1). The project office at the Atmosphere and Ocean Research Institute, the University of Tokyo manages the whole project, while activities in each collaborating country are managed through communication among the national coordinators of the core institutions and other project members.

To address the major issues in coastal marine science in Southeast Asia, the project comprises the following seven research groups in three major topics: Physical Oceanography, Biodiversity (Harmful Algal Blooms, Plankton, Fishes, Benthos, and Macrophytes), and Pollution from Hazardous Chemicals. Each group comprises members from all collaborating countries and is led by a group leader, selected by agreement among project members on the basis of his or her performance during the MCU-CMS Program (2001-2010).

The project intends to enhance scientific research in two ways: (1) through research centering on the specific research groups and covering wide areas of Southeast Asia and (2) through integrative, multi-disciplinary research on whole ecosystems in specific sites. The project also intends to establish and then expand an integrative database specific to the coastal environment and biodiversity in Southeast Asia; this will be accomplished by compiling all relevant information from the project, literature, and data mining from unpublished

sources.

The project will hold international seminars/workshops each year in different countries to implement research plans, synthesize results, and provide opportunities for young researchers to take part in the research and discussions.

In addition, the education of young researchers is enhanced thorough the exchange of project members among collaborating countries, including inviting young researchers to Japan and expert members visiting collaborating countries to learn and/or educate about various advanced techniques of ecosystem research, such as satellite imagery, habitat mapping, pollutant analysis, and molecular genetics.

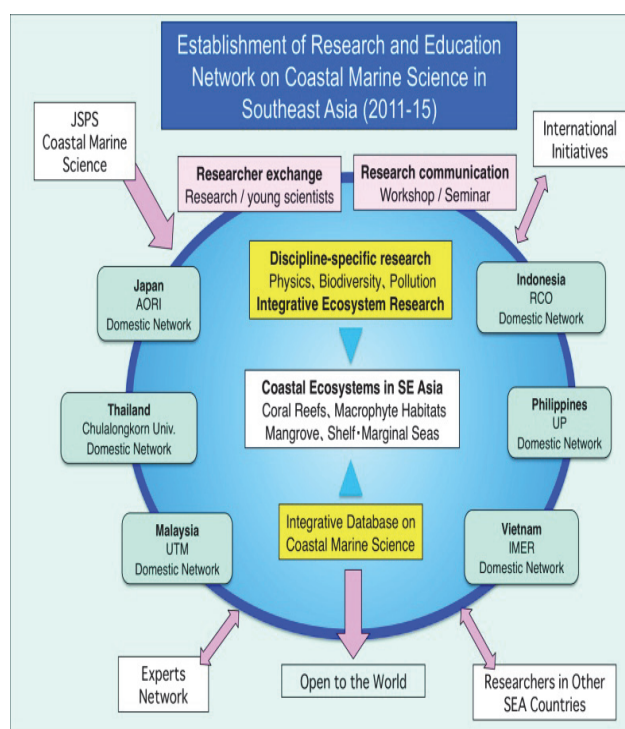


Fig.1 Structure of the ACORE-CMS Project

IOC/WESTPAC 8th International Scientific Symposium “Ocean Climate and Marine Ecosystems in the Western Pacific”

Shuhe Nishida

Professor, Center for International Collaboration

The Eighth International Scientific Symposium was held in Busan, Republic of Korea, 28-31 March 2011, co-sponsored by the Ministry of Land, Transportation and Maritime Affairs (MLTM) of the Republic of Korea and the IOC/WESTPAC. The symposium was designed to provide an interdisciplinary platform for marine scientists and local managers from the region to assess and prioritize emerging issues requiring scientific research, and catalyze international and cross-disciplinary collaboration to improve management practices and the sustainable development of ocean and coastal resources.

The symposium included eleven sessions, covering such key regional issues as anthropogenic impact, climate change, air-sea interaction, ocean acidification, and marine biodiversity and conservation. Eight side-workshops were also organized in parallel by respective WESTPAC projects and relevant partners, including Coastal and Marine Biodiversity and Conservation, Harmful Algal Blooms, Response of Marine Hazards to Climate Change, and Ocean Remote Sensing for Coastal Habitat Mapping.

About 500 delegates from 20 countries participated in the symposium, including 329 scientists. The rest were policymakers, representatives of non-governmental organizations, and noted scholars and public figures. From the Atmosphere and Ocean Research Institute,

Associate Professor T. Komatsu participated in the symposium as the convenor of the Habitat Mapping Workshop, and Professor S. Nishida as a member of the International Scientific Committee and chair of the Marine Diversity Conservation Session.

The symposium recognized that: (1) Oceans are threatened by escalating pollution, population, and coastal development of land; (2) global climate change is contributing to sea level rise, warming and acidification; and (3) marine biodiversity is falling, while occurrences of cyclones and storm surges are rising. The symposium recommended that in the future focus should be on the following subjects: an ocean observing system at the national and regional level; an ocean forecasting system; atmosphere and ocean circulation and sea-air interaction; coastal erosion and other coastal hazards, such as storm surge; biogeochemical cycles in the ocean; building marine ecosystem resilience; ecosystem restoration techniques/methods, such as mangrove rehabilitation; multi-disciplinary approaches to coral reef bleaching; harmful algae bloom; ocean acidification; and marine renewable energy.

The Executive Summary of the symposium is available at the website of IOC/WESTPAC (<http://westpac.unescobkk.org>).



Group photo at opening ceremony

JSPS Asian CORE Program:

“An Asian core formation of climate and environment research and education”

Masaaki Takahashi

*Professor, Department of Climate System Modeling,
Division of Climate System Research*

The purpose of the Asian CORE Program is to form a core in the East Asian region to conduct research and education on climate and environment modeling and data analysis both on a global scale and for the Asian region through the partnership among cooperating institutes in Japan and core/cooperating institutes in Korea, China, and Taiwan. The Asian CORE Program has continued for five years, from FY2007 to FY2011. To accomplish the Asian CORE Program, we conducted the following activities:

Promotion of Exchange through Workshops:

The University Allied Workshop on Climate and Environmental Studies for Global Sustainability (UAW) organized by groups from Japan, Korea, China, and Taiwan had been already implemented. The Asian CORE Program administered the fifth UAW that was held at Maihama, Chiba prefecture, from June 30 to July 4 in 2008. The number of total attendants was approximately 90, and the Asian CORE Program supported the lodging of 72 people (14 Japanese, 21 Korean, 18 Chinese, and 19 Taiwanese). The UAW had a great variety of climate issues, such as aerosol-cloud interaction, precipitation in monsoon regions, and monsoon dynamics.



UAW at Maihama in 2008

The sixth UAW was held in Korea from June 22 to 24 in 2009. The total number of attendants was 85, including

10 Japanese attendants. However, the UAW had grown so large and become so complicated that the organized committee decided to terminate the UAW and structure different ways, as the small-size workshops on special topics could be easily held anytime, anywhere.

Lectures and practices about the Nonhydrostatic Icosahedral Atmospheric Model (NICAM) will be held in February 2012 in collaboration with Virtual Laboratory, and foreign students from Korea, China, and Taiwan will be invited.

Research Promotion through Exchange of Researchers and Students:

Many foreign students and young scientists stayed at AORI, or domestic cooperating institutes, for a few months. They were eager to study climate issues, and said that this program was very useful for them.

FY2007: Three Korean students visited Center for Climate System Research (CCSR) and studied aerosol modeling, data analysis of aerosols, and analytic tools of aerosols. A Chinese student analyzed synoptic disturbances on an Asian subtropical jet at CCSR. Two Korean students visited one of the cooperating institutes, Hydrospheric Atmospheric Research Center, Nagoya University, and researched precipitation systems over the East China Sea.

FY2008: Four Korean students visited CCSR and studied cloud modeling, aerosol-cloud interaction, analytic tools of aerosols, and physical processes of heavy precipitation using a global climate model. A Chinese student studied aerosol modeling at CCSR.

FY2009: Three Korean and five Chinese students/researchers visited CCSR and researched climate. Their scientific fields were quite variable, such as aerosol cloud modeling studies, climate studies using a dynamic model, Asian monsoon system studies, and disturbances over the subtropical jet.

FY2010: A Korean student and three Chinese students visited AORI and researched aerosol-cloud interaction modeling, data analysis of aerosols, and analysis of

synoptic disturbances on an Asian subtropical jet. A Chinese student visited one of the cooperating Institutes, the Center for Environmental Remote Sensing, Chiba University, and did aerosol analysis using Sky-net flux data. An AORI student visited one of the foreign cooperating institutes, the National Central University in Taiwan to research initial conditions of typhoons.

FY2011: Two Chinese students visited AORI to research the climate dynamics of Arctic Oscillation and intra-seasonal oscillation over the South China Sea. A Chinese associate professor is visiting AORI to study analysis of synoptic disturbances.

Others:

In FY2007, the Asian CORE Program invited 10 researchers to the 6th International Symposium on Asian Monsoon System (ISAM6)/the 9th Workshop on East Asian Climate (EAC9) held in Fukuoka, and two Chinese professors lectured at CCSR on the climate dynamics of

Asian monsoon. A Korean professor lectured at CCSR on microphysics and the boundary layer process. In FY2009, a CCSR student attended the Asia Oceania Geosciences Society's 2009 meeting in Singapore. In FY2010, the program invited five Chinese researchers to the Asian Monsoon Years 2007-2012 DATA Workshop, five Chinese to the Paleoclimate Modelling Intercomparison Project Phase 3 Workshop, and an AORI student attended the 16th CERE International Symposium on Climate Change Studies, through the activities of SKYNET and the Virtual Laboratory for Climate Diagnostics. In FY2011, a professor of AORI attended the ABC Modeling and Impact Workshop held in Seoul.

If you are interested in these activities of the Asian CORE Program, please see HP, <http://www.prime-intl.co.jp/jsps/2007.html>

Finally, the coordinator acknowledges all cooperating professors and researchers.

The 3rd International Symposium of *Oryzias* Fish

Koji Inoue

Associate Professor,

Department of Marine Bioscience and Center for International Collaboration

The Japanese medaka (*Oryzias latipes*), a popular fish as an experimental animal, has 20 or more related species of the same genus. Most of these species are small and easily cultured as Japanese medaka; however, each species has different characteristics in various body systems, such as environmental adaptation system, immune system, and sex-determination system. Thus, these species offer unique opportunities for comparative studies. To promote the research of the *Oryzias* species, we have held international symposia biyearly since 2007, and the 3rd Symposium was held on November 10–11, 2011, at University Putra Malaysia (UPM) in Selangor, Malaysia. Nearly 50 scientists and students from six countries participated although some Thai scientists could not come due to the flood at the time. Reflecting on the location of the venue, 7 of the 17 presentations were studies of local species in Malaysia, such as the Javanese medaka *O. javanicus*. I hope that research using local *Oryzias* species will further increase in the future. During the symposium, there was also a field trip to the Kuala Selangor Nature Park; in the protected area of the park,

we could see a mangrove ecosystem, including wild monkeys, birds, insects, mudskippers, and the Indian medaka *O. dancena*. We would like to express our sincere thanks to Professor Ahmad Ismail, the chairman of the symposium, and members of the local organizing committee for putting the symposium together.



Speakers and staff of the symposium

A New IODP Science Plan for 2013-2023

Jin-Oh PARK

Associate Professor,

Department of Ocean Floor Geoscience and Center for International Collaboration

The Integrated Ocean Drilling Program (IODP) for 2003-2013 is an international marine research program that explores Earth's history and structure as recorded in seafloor sediment and rocks; in addition, the IODP monitors subseafloor environments. The IODP builds upon the earlier successes of the Deep Sea Drilling Project (DSDP) and Ocean Drilling Program (ODP), which revolutionized our view of Earth's history and global processes through ocean basin exploration.

As a successor program of the current IODP, a new International Ocean Discovery Program is currently being planned by 24 nations and is scheduled to launch in October 2013 and to last for 10 years. This new international scientific ocean drilling program will bring together researchers from the earth, ocean atmospheric, and life sciences with a common goal of understanding the Earth's past, present, and future. To achieve its aims, the program will draw on information from beneath the ocean floor, brought to the surface by ocean coring

technologies and borehole observatories. The program's science plan for 2013-2023, "Illuminating Earth's Past, Present, and Future," addresses pressing scientific priorities and social concerns with four themes: Climate and Ocean Change, Biosphere Frontiers, Earth Connections, and Earth in Motion. The scientific goals of the plan require access to two permanent drilling platforms, the U.S.-supplied JOIDES Resolution and the Japanese riser-vessel Chikyu, and the option to charter mission-specific platforms for operations in environments where specialized platforms are required.

Meanwhile, U.S. National Science Foundation (NSF) officials recently notified the community that the United States would be leaving the IODP when the program expires in September 2013. Therefore, the IODP community is currently facing a situation of having to develop a new model for international collaboration of scientific drilling. For more details, see [http:// www.iodp.org/](http://www.iodp.org/)

Yutaka Michida elected IOC vice- chairperson

During the 26th session of the IOC Assembly, held in UNESCO headquarters in Paris, the Japanese delegation of oceanography, headed by Professor Toshio Yamagata, from the University of Tokyo, and a member of the Japanese National Commission for UNESCO, participated in the discussion. The election of officials took place during the Assembly, and Professor Yutaka Michida, from the Atmosphere and Ocean Research Institute, The University of Tokyo, was elected as one of the incoming vice-chairpersons. The last vice-chairperson from Japan was Ken Sugawara, a professor emeritus of the University of Nagoya, who was elected 40 years ago in 1971. The term of office of Yutaka Michida, as vice-chairperson, will be for two years, until the end of the next Assembly in 2013.

The IOC was founded in 1960 as an institution with functional autonomy, within UNESCO, in order to develop international co-operation and coordination in the field of oceanography. Currently, the activities of the IOC have transcended the field of ocean research, and now include coastal area management, health of the ocean, research of climate change and variability, ocean services, and capacity building.

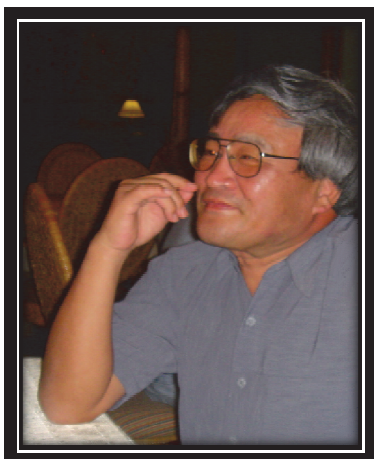
Yutaka Michida took part in developing various programmes promoted by the IOC, including the



Prof. Michida (left) with IOC chair, Dr. Byun

International Oceanographic Data and Information Exchange (IODE) and the regional body of the Western Pacific (WESTPAC). He has connections with many IOC members, since 20 years ago when he served as an official of the Japan Coast Guard. After moving to the University of Tokyo in 2000, he participated in the Assembly and Executive Council meeting of IOC every year as a member of the Japanese delegation. He has contributed to many activities at IOC meetings, participating in the resolutions committee and serving as an active and leading member of the IODE and WESTPAC and many other expert meetings.

Professor Emeritus Makoto Terazaki (1945-2011)



Prof. Terazaki relaxed after the reception of the National coordinators' meeting of the JSPS Multilateral Core University Program "Coastal Marine Science" at Palawan Is., the Philippines in 2004.

Makoto Terazaki, the former director of the Ocean Research Institute (2005-2007) and former director of the Center for International Cooperation and the Center for International Coastal Research Center, ORI, the University of Tokyo, passed away from a cerebral infarction on August 4, 2011, at the age of 66. His career of studying the "Ecology of Chaetognatha" spanned more than 40 years. His scientific accomplishments were highly praised, and he received the Japanese-French Oceanographic Society (JFOS) Award in 2001.

Dr. Terazaki served as the president of the Plankton Society of Japan, the vice president of the Oceanographic Society of Japan, and held many other important positions in national academic activities, in addition to his enthusiastically administering the Ocean Research Institute as its director.

He spent a lot of effort establishing the Center for International Cooperation at the ORI in 1994. He was a strong driving force in developing the JSPS Multilateral Core University Program with Southeast Asian countries. He also served as a leader of the delegation of the Japanese government for the Intergovernmental Oceanographic Commission of UNESCO for many years. He was helpful, friendly, and cheerful, as well as an excellent scientist. He was very popular and made those around him happy. His wonderful personality will remain in the memories of everyone who knew him.

Although we knew of his academic accomplishments, we were surprised to discover his contribution to the Japan Amateur Boxing Federation as a vice president. He participated in the Beijing 2008 Olympic games as a member of the Japanese delegation. We believe he is the first and only man in the world to serve on both the Intergovernmental Oceanographic Commission (IOC) and the International Olympic Committee (IOC).

We are reminded of his favorite phrase: "Mountains: Even in a protracted struggle, are as dignified as mountains." Dr. Makoto Terazaki was the right person in the right place at the right time. He will be sorely missed.

Makoto Terazaki: A Dear Friend

Miguel D. Fortes, PhD

Professor, Marine Science Institute CS, University of the Philippines

Sorrow fills my heart whenever I remember Makoto-san's passing. It is a sorrow that is deep and personal. Our lives will be empty in the areas brightened and made shining for us by a man we will miss greatly. There are only a handful of people who come into our world and touch our lives in a special way. Some of them are just flickers of light during a long life, while others are consistent glows for years. For me, Makoto-san was a consistent glow. He was a colleague who was so passionate in the science he professed. Most of all, he was a dear and personal friend for close to 20 years. Allow me to say more of him not as a scientist par excellence, but as a friend. I would like these few words to celebrate his life!

Unexpectedly perhaps of a Japanese, Makoto-san was genuinely warm and delightfully humorous. His charming personality always shines through and his dry sense of

humor kept people around him laughing long after the punch line was delivered. With his boyish looks and eyes always smiling, he never forgot to share joy with others. Indeed, Makoto-san was a man who gave. While he gave much to his work, he gave as much to his family and friends. In the years I knew him, the character of the life he lived might be summed up in a few words: he was sincere, he was earnest, he was loyal. Makoto-san had a great intellect and a big heart. He was truly a beautiful person inside and out.

We all know that his passing will not only leave a void in marine science (and in boxing!), but in the hearts of all those who knew him. Our sorrow is lessened only slightly with the comforting thought that we had the privilege to know a vibrant and brilliant man and a dear friend –Makoto Terazaki.

List of Visiting Professors

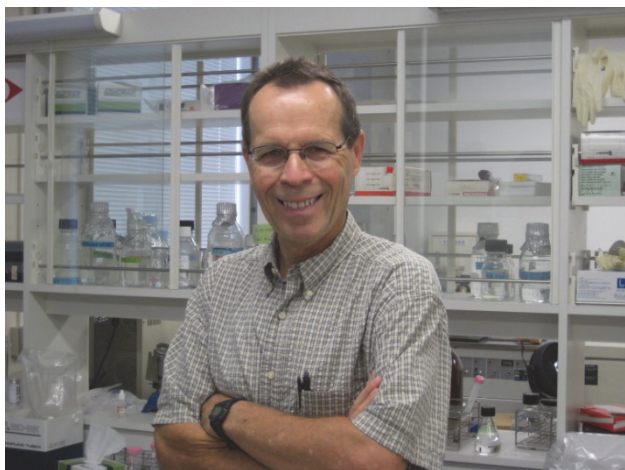
Name	Country	Length of stay	Subject for study
Sang-Jin KIM	Korea	2010.06.21-2010.08.17 2011.03.02-2011.03.31	<ul style="list-style-type: none"> • Comparison for the contribution of organic nano particles to pelagic and deep-sea microorganisms as an energy source and their biochemical composition. • Isolation and characterization of uncultivated marine microorganisms • Community structure of free-living ultra micro bacteria in marine environments.
Ravi BHUSHAN	India	2010.10.01-2010.11.30	Geochemical cycles as inferred from natural radionuclides Th-230 and Pa-231 in the ocean
Christopher Alan LORETZ	U.S.A	2010.05.20-2010.08.19	Experimental studies on the molecular physiology and evolutionary developmental history of extracellular calcium-sensing receptors, with particular emphasis on the biology of calcium sensing in aquatic vertebrates.
William L. MILLER, JR.	U.S.A	2010.11.15- 2011.12.18 2011.03.09-2011.03.17	Examining the long-term temporal and spatial patterns between surface ocean photochemistry and lower atmospheric measurements of aerosols and trace gases: a joint US/Japan SOLAS project.
Tony ROBINET	France	2010.06.11-2010.07.10 2011.02.01-2011.03.31	Taxonomic description of mesopelagic fish larvae assemblage in the Western Indian Ocean and the set-up for “Eel Exhibition 2011”
Christian RUTZ	Germany	2010.12.20-2011.02.07	Ecological and behavioural research of streaked shearwaters, using animal-borne video cameras
Yuan WANG	China	2010.06.21-2010.09.19	Environmental pollution of heavy metals in the coastal waters in China
Yuqing WANG	Australia	2010.04.01-2010.06.30	Improvements of NIACAM physics and analysis of tropical cyclones simulated in NIACAM
Badarinath VS KANDALAM	India	2010.07.01-2010.09.30	Studies on atmospheric aerosols using multi-satellite data sets and ground based measurements
Pascal YIOU	France	2010.11.01-2011.01.31	Research on the statistical features of the atmospheric circulation and some climate extremes
Masa KAGEYAMA	France	2010.11.01-2011.01.31	Glacial climat, sensitivity to ice-sheets and greenhouse gas concentrarions and to the state of the Atlantic Meridional Overturning Circulation

* Visiting professors' reports of Division of Climate System Research are included in the CCSR NEWS.

Visiting Professors' Reports

Christopher A. Loretz

*Associate Professor,
Department of Biological Sciences
State University of New York at Buffalo, U.S.A*



My selection to be a Visiting Professor at AORI in summer 2010 was a distinct honor, and moreover was a remarkable experience through the extraordinary opportunities that it afforded to me. For the three months from mid-May through mid-August, I conducted collaborative laboratory research with my colleagues Professor Yoshio Takei and Dr. Susumu Hyodo in the Laboratory of Physiology in the Department of Marine Biosciences. Although I have enjoyed long and fruitful professional scientific relationships with Professor Takei and Dr. Hyodo, the continuous three-month tenure under the visiting professorship permitted a depth and intensity of collegial interaction that could not have been achieved otherwise. Our extended in-person collaboration research and discussions were most rewarding, and enjoyable.

My research work focused on the biology of the extracellular calcium-sensing receptor (CaSR). This receptor protein is critically important in the homeostatic regulation of the calcium ion concentration in body fluids of all vertebrate animals (those animals with a backbone). A shared interest in the biological mechanisms and evolution of salt and water balance in fishes forms a strong linkage between the AORI Laboratory of Physiology and my laboratory at the University at Buffalo. At the same time, our respective strengths in molecular

biology and membrane transport are complementary. In practical terms, because of my collaborative visits to AORI, I am able to conduct experiments and achieve a scientific productivity that would otherwise be impossible. My 2010 summer research work comprised two aspects. First, based on our expectation that CaSR plays an important role in regulating calcium storage in bone mineral, we explored by molecular biological and microscopic techniques the expression pattern of the CaSR protein in fish skeleton. And, second, we conducted phylogenetic analyses to reveal the evolutionary history of the CaSR that, interestingly, is seen only in vertebrate animals. In this context, our studies on fishes may yield important clues to the early evolution of the receptor. Regarding our phylogenetic analyses, I was very fortunate to meet and discuss my work with Professor Mutsumi Nishida, who was at that time Director of AORI. On a more practical scale, our collaborative research-based contributions to a better understanding of homeostatic mechanisms in the fishes (including the regulation of calcium ion) can have direct benefits to aquaculture and mariculture of economically-important food fishes such as eel and tilapia. And the biological understanding of adaptive mechanisms in aquatic organisms carries even more importance under the threat of changes in global climate and ocean systems.

I presented results of our collaborative AORI summer project in spring of 2011 at the Experimental Biology meeting in the U.S., in Washington, D.C. For those readers who are interested, the abstract is available on-line (at : http://www.fasebj.org/cgi/content/meeting_abstract/25/1_MeetingAbstracts/1048.1), with a full publication now in preparation. Interestingly, one of the co-authors of the Experimental Biology report, my graduate student Ms. Amanda Herberger, was a 2009 JSPS-NSF Summer Program research fellow at ORI in Nakano. Just as my first research experience in Japan at ORI in 1980 was supported by my postdoctoral research mentor, I hope to pass on my excitement for international collaboration to the next generation of scientists.

Having spent many summers at the ORI in Nakano, the 2010 research season brought the added excitement of a new campus and a modern spacious building. Bigger labs, efficient workspaces, and a move for the Laboratory of Physiology from the basement to the third floor all

contributed to the high spirits of AORI faculty, staff and students at the Kashiwa Campus. And, from my observations, there continues to be a strong sense of community in the organizational fabric at AORI. The facilities are simply first-rate, as is the quality of the research work across fields of scientific study. I learn something new with every visit to AORI. The techniques that I carry home to my laboratory at the University at Buffalo extend the reach of my AORI experience.

An important part of the intellectual program of my visiting professorship was the opportunity to meet and speak with faculty, staff and students in a variety of contexts. I especially enjoyed chatting with the Japanese graduate students about their projects, assisting in manuscript review and editing, and answering their questions about academic life in the U.S. I gave some lectures at AORI on my personal research in the field of calcium homeostasis, and I made seminar presentations during my site visits to other institutions. In order to meet new Japanese colleagues and to refresh older scientific friendships and acquaintances, I traveled to The University of Tokyo Hongo Campus, Tsukuba University, Jichi Medical University (Utsunomiya), and National

Institute of Basic Biology (Okazaki). Altogether, these various interactions were always stimulating, and generated new ideas for future work, too.

I am thankful for the support provided to me through the AORI Center for International Collaboration. I appreciate their confidence and trust. The knowledgeable and kind staff in the AORI main office and at the International Lodge Office were very helpful to me, also. They made the visit seem very easy, and allowed me to set my mind to the scientific research activities. Finally, I thank and extend heartfelt best wishes to the many wonderful colleagues and friends that I have met during my time at AORI, and who worked so hard to make visit a success, and I look forward to welcoming Japanese researchers in my Buffalo laboratory.

Special note: The extraordinary earthquake and tsunami events of March 2011, through the devastation of the International Coastal Research Center in Otsuchi especially, reached AORI strongly in both scientific and personal ways. I wish to express my heartfelt concern for those affected, and my sincere hopes for recovery and healing.

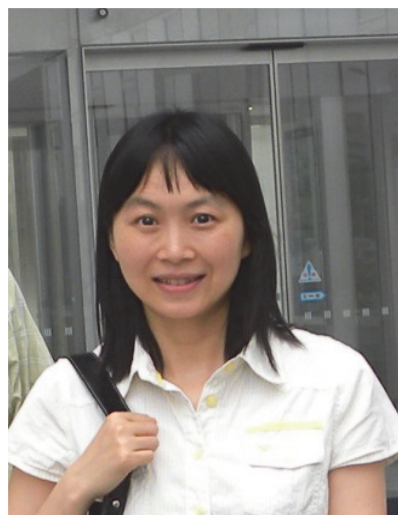
Yuan Wang

Associate Professor

Dalian Ocean University, China

I mainly engage in molecular ecology research, especially the molecular ecotoxic effects of heavy metals and persistent organic pollutants (POP) on marine organisms. Heavy metals and POP are often observed to accumulate at excessive qualities in a wide range of marine organisms, which may consequently cause a variety of biological problems such as morphological abnormalities, neurophysiological disturbances, genetic alteration of cells (mutation), teratogenesis and carcinogenesis. The embryo–larval bioassays, in particular with sea urchins, have been used as sensitive, simple, and reliable tools for assessing and monitoring marine pollution in recent years. I am now undertaking a research project funded by the National Natural Science Fund of People's Republic of China (NSFC) to investigate the mechanisms underlying the toxicity of organotin compounds to sea urchin embryos and larvae.

Tributyltin (TBT) component, a highly toxic organotin compound, is often found in ports and their adjacent



sediments. TBT has been reported to cause imposex in the females of over 150 species of marine mollusks, or can even result in recruitment failure and population decline in the worst cases. Furthermore, environmental stresses due to pollution can also cause molecular problems in aquatic organisms such as increased synthesis of secondary metabolites and signaling molecules, ion fluxes, oxidative bursts, and changes in the transcription of an

array of genes. Despite the recent accumulating literature of the TBT toxic effects (e.g. acute, chronic toxic effects and estrogenic effects) on aquatic organisms such as plankton, algae, fish and birds, molecular mechanisms of the exposed organisms in response to TBT toxicity is still relatively less investigated. With an aim of investigating the molecular mechanisms of microalgae in response to TBT stress, I come to the International Coastal Research Center (ICRC), AORI of the University of Tokyo, to conduct cooperative research with the scientists here. ICRC is world-ratified for its perfect equipment, excellent faculty and academic work. I am lucky to work here for three months. In the toxicity tests, I use green alga *Chlamydomonas* as test organisms to look at how TBT exposures affect the cell redox state, cell signals and mitochondrial phosphorylation protein profile of the *Chlamydomonas*. Judging from what I have got from the tests so far, I suppose that the biological endpoints of the green alga examined in the tests have the potential, as effective bioindicators, for evaluating the toxicity of TBT to aquatic environment.

During my stay here, I can freely talk with the local people as well as the staff and students in the centre. This not only improves my academic research work but also gives me the opportunity to have a better understanding of Japanese culture, customs and the people. I am really touched by the wonderful wishes, beautiful flower, kindness, and friendship the local people generously offered me. Heading with Mr. Takahashi, the staffs of Coastal Promotion Bureau in Kamaishi, give me so many unforgettable surprises and joys.

I greatly appreciate Prof. Nishida and Prof. Otake, for inviting and hosting me as a visiting associate professor to work here. I particularly express my thanks to Prof. Michida, who goes through the details to arrange my life and work here. I am also grateful to Mr. Ohkoshi, Prof. Sato, Dr. Fukuda, Mr. Omori, Ms. Iwama, Mr. Fujiwara and other persons and students, not listed all here. Your kind help brings me numerous joys and happiness. These fine memories in Otsuchi will remain fresh forever in my life.

Ravi Bhushan

Scientist, Geosciences Division

Physical Research Laboratory, India

It was a pleasure working as visiting professor at Atmospheric and Ocean Research Institute, University of Tokyo during October-November, 2010. I am highly indebted to my host Prof. T Gamo, a meticulous and accomplished scientist, who was kind enough to provide me this opportunity. The scientific ambience of AORI was perfect for me to realise some of my research plans. During my stay my wife, daughter and my mother too joined me for about a month, which made my stay further enjoyable.

The weekly seminars of the Department of Marine Inorganic Chemistry, AORI were very interesting and I learnt lot about the group's scientific programme. I too had the pleasant opportunity of delivering two scientific talks in this forum. My discussions with Prof. Obata on salient developments of GEOTRACES protocol for sampling and measurements were very beneficial. I spent significant part of my time at AORI on writing scientific papers. Additionally, I visited Institute of Chemical

Research, Kyoto University, where I was invited by Prof. Sohrin and delivered an invited talk on GEOTRACES perspectives in Indian Ocean. I had the pleasure of spending productive moments of my stay at AORI in the visiting scientist room of Prof. M. Uematsu, whose pleasant nature and fruitful discussions kept me motivated. Discussions with various faculties and students from the department were my source of inspiration.

The new campus of AORI at Kashiwanoha is a very quiet and beautiful location and the surrounding township was an ideal place to live. A couple of month stay at Kashiwanoha gave us a glimpse of the lifestyle and culture of Japan. Because of its planned buildings, the clean broad roads and the bustling Lalaport mall, Kashiwanoha remains embedded in our minds. Kashiwanoha reflected the modern face of Japan. How nice and friendly the people were. A cheerful smile and a wave from Japanese would immediately make you feel at home. During the weekends, we happened to visit a few places like the capital city of Tokyo, Kyoto the old capital, the legendary Asakusa temple, the Imperial Palace, Mt. Fuji, Kamakura, Yokohama, Hakone and quite a few monasteries. The natural beauty of Mt. Fuji was breathtaking. The serenity of the Pagodas and the beauty

of the monastery gardens were worth watching. Inside the monastery gardens one felt as if we have gone thousand years back in time. The wedding and the birthday ceremonies at the Pagoda gardens reflected the rich, ancient and elaborate culture of Japan, not to mention the beautiful costumes and the aroma of delicious Japanese food.

I would like to thank the University of Tokyo and in particular Prof. T Gamo, my host, for providing me this opportunity to visit AORI. The pleasant and caring nature

of Prof. Gamo would always remain fresh in my memory who took very good care of me. I would also like to thank students and colleagues of Prof. Gamo who made my visit so comfortable and enjoyable at AORI. I look forward for very fruitful future collaborations with Prof. Gamo and his colleagues in GEOTRACES programme, a major international oceanographic initiative. And last but not the least, I shall always look forward for my next visit to Japan, a country with rich culture, utmost technology and warm and friendly people.

William L. Miller, JR.

Professor, University of Georgia, U.S.A

First and most importantly, I would like to express my deepest gratitude to my host and good friend, Professor Mitsuo Uematsu, who, along with all his colleagues and students, showed me exceptional hospitality during my visit to the new Atmosphere and Ocean Research Institute on the Kashiwa Campus of the University of Tokyo. Dr. Narita was especially good at helping me understand the small details for travel and local activities that made my visit so smooth. Because of a busy schedule, my visit took place in two parts; first during most of November 2010 and second in the spring of 2011. My research interests in marine photochemistry and ocean-atmosphere interactions allowed a platform for a wonderful series of exchanges with AORI researchers and other Japanese scientists. Participating in Dr. Uematsu's group meetings as they prepared for the Fall AGU meeting in San Francisco and helping to edit publications for Hiroshi and Jinyoung were great learning experiences for me. I now know much more about new methods for chemical analysis of atmospheric aerosols from marine environments and have seen novel data that argues the importance of these aerosols to marine nutrient and biogeochemical cycles. My stay was very productive from a personal scientific perspective.

My short visit was also full of opportunities to experience science and life Japan. Early in my fall visit, I had the honor to speak to the Japan Society of Atmospheric Chemistry Annual Meeting, visiting Metropolitan University in Tokyo and learning many new things about Japanese science. Later in my visit, I travelled to Nagasaki and participated in the Joint 5th Workshop on Asian Dust and Ocean EcoSystem



(ADOES) with Asian SOLAS/WESTPAC/METMOP/SALSA. Here I met new colleagues and helped to liaise with the international SOLAS office, writing a report of the workshop for the SOLAS newsletter. Our local host, Shigenobu Takeda, a friend from his collaboration with the Canadian SOLAS program, arranged enjoyable tours of this wonderful city for our group and later, shared with me the best sushi & sashimi experience of my life. I discovered the complexity of the Tokyo subway systems, visited many sites in the city, took hundreds of pictures, and shopped at LaLa Port. I discovered new Japanese food, learned the proper manners to drink sake, had a bottle of shochu with my name on it, and greatly enjoyed the pleasant autumn days and colorful scenery of Japan by walking in the Kashiwanoha Park. The giant swan boats, the golden ginkgoes and the simple activities of families in the park provided a wonderful and peaceful contrast to the busy streets of Tokyo.

My return visit in the spring was very different. I arrived with excitement to return to my “home away from home” in the Kashiwa Guest House and to see my Japanese friends once again. The very next day, March 11, I was working on the 7th floor of AORI when the devastating Great Eastern Japan earthquake struck. Having no previous personal experience with anything but tremors, I first wondered if this was normal for Japan. As the quake progressed, I made my way to the door of my office. In the hall I saw the faces of my 7th floor colleagues and quickly realized that this was spectacularly NOT normal. Once the shaking stopped, and the people had spilled out of the buildings to the open spaces outside, I joined everyone as the news of what had happened began to flow to the many cell phones. Over the next week, I shared in the horrible news of the tsunami in the north and the Fukushima power plant. I will always feel deeply impressed by the incredible dignity, calm, and resolve with which the Japanese people mobilized the response to these horrible events over the coming days.

For me, participating in the minor inconveniences of

power outages and the scarcity of some foods around Kashiwa was a good thing that allowed me to feel I was, in some small way, helping in the response to the disaster as part of the AORI community. Through it all, my friends Uematsu-sensei, his colleagues, staff and students in the Center for International Collaboration were the very best of hosts. While busy with important things stemming from the earthquake, they still went to great trouble to ensure that I understood any new news, felt safe and continued to work at AORI as long as I wanted to stay. In the end, with some sadness, I left Japan two days earlier than planned. I rode to the bus to Narita airport looking out the window and thinking of the cherry blossoms that were just starting to appear on the trees. I knew that the earthquake and tsunami would not keep the beauty of the cherry blossoms from coming in the spring and, in the same way that the horrible disaster and loss of life would bring out the kind and compassionate spirit of the Japanese people. My visits to Japan have deeply affected me and I cannot thank everyone enough. I wish to return soon.

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