



# COSEE China Coordination Office (Xiamen) YEAR END REPORT

## 2012

*From the early discussions on outreach between Drs. Bob Chen and Minhan Dai to two planning workshops in 2010 involving universities all over China, and the hiring of a full time staffer in Xiamen at the end of 2011, COSEE China is no longer merely an idea but a reality. In our first year, the COSEE China Coordination Office (Xiamen) has conducted several successful outreach programs for the local community promoting general ocean literacy and highlighting some of the work being done by scientists at Xiamen University. This report discusses our achievements of the past year and our plans for the future as we continue to encourage China to "Think Blue."*



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Aquatic Sciences Eco-Learning Programme campers and staff. Using this facility and the live fish being sold at eateries around the island, Dr Min Liu (in hat on far right) introduced the topic of sustainable fisheries as well as basic animal behavior to the participants.

## MESSAGE FROM THE DIRECTOR



After several years of preparation, COSEE China has become a reality, emerging with a brand new face. In July 2012, my colleagues and I held our first aquatic sciences summer camp, letting us witness the significant strength of our branch in action. At the Xiamen University Ocean Sciences Open House, held on Nov 4, 2012, we shared in the great joy and enthusiasm of our visitors. Both of these successes were a wonderful surprise and exceeded our greatest expectations, giving us great confidence in the future of COSEE China. It is my sincerest hope that COSEE China continues this trend, becoming a highly efficient and active organization so that it can continue to build bridges between science and education, between academia and the public, for the purpose of enhancing our marine literacy.

Dr. Minhan Dai  
Chair Professor of Marine Biogeochemistry  
Director - State Key Lab of Marine Environmental Science (MEL)

## GREETINGS FROM THE CO-CHAIR



2012 was a celebratory year for the COSEE China Coordination Office (based out of Xiamen University). We received a special grant from the National Natural Science Foundation of China (NSF-C) and a grant from the Ocean Park Conservation Foundation of Hong Kong (OPCFHK) to initiate various outreach programs such as camps and public seminars on ocean sciences. We are exploring efficient education models through initiation, evaluation and improvement. Based on the platform of COSEE China, we are working together toward advancing ocean literacy.

Dr. Min Liu  
Associate Professor  
College of Ocean and Earth Science, Xiamen University



# A BRIEF HISTORY OF COSEE CHINA

The Centers for Ocean Sciences Education Excellence of China (COSEE China) is modeled after the successful COSEE Network in the United States. Convened by Drs. Robert Chen, Xuchen Wang, Minhan Dai, Wen Qing Cao, and Hui Wang Gao, two planning workshops were held on



*First COSEE China planning workshop.*

March 8-9 and August 13-15 of 2010 in Beijing and in Xiamen, sponsored by the US National Science Foundation (NSF), the China State Oceanic Administration (SOA), and the National Natural Science Foundation of China (NSFC). The ocean science education, outreach, and educational organization of the two countries were introduced and opportunities and challenges on establishing COSEE China were discussed. COSEE China was established shortly thereafter, with seven core universities involved in the partnership (Xiamen University, Ocean University of China, Peking University, Nanjing University, Tongji University, Zhejiang University, and China University of Geosciences (Beijing)). Headquarter responsibilities are shared between Xiamen University and Ocean University of China, who are responsible for the overall coordination of the network.



*"In the future, I think it would be worthy to expand this kind of eco-learning programme to other places in China. The target group for such ecological knowledge could be younger students because it will be much more effective and easier [for them] to accept basic concepts of ecology."*

~ Yuan Yuan Hong, Graduate Student  
Biological Sciences, The University of Hong Kong

## COSEE CHINA OBJECTIVES

- \* *To improve ocean literacy and awareness at the K-12, public, and university levels*
- \* *To foster relationships between ocean scientists and educators, both internationally and domestically*
- \* *To bring marine sciences to the forefront of national development strategies and promote its protection*

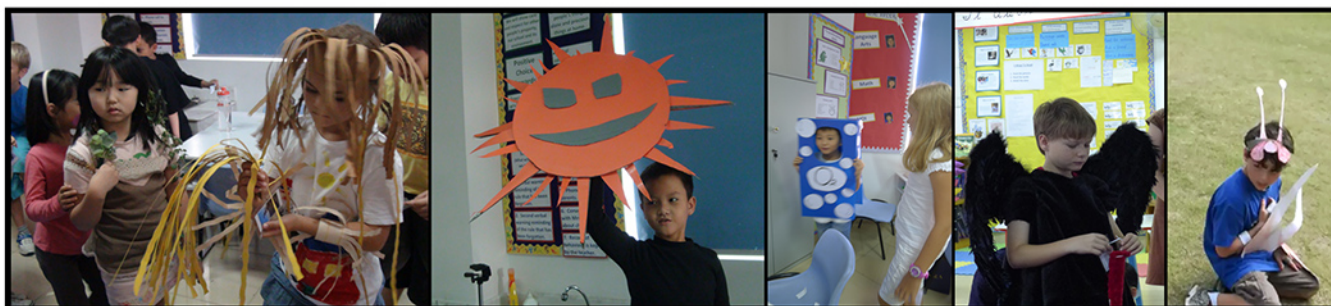


*Building up the team. Future camp counselors and COSEE volunteers receive training from education specialists in preparation for the Aquatic Sciences Eco-Learning Programme (see pg. 4).*



# XIAMEN INTERNATIONAL SCHOOL

Towards the end of 2011, an informal relationship was established between our office and teachers at Xiamen International School (XIS). After a few discussions, we were invited into their 3<sup>rd</sup> grade classrooms to present a special lesson on salt marshes, adapted from the 2009 Project WET Curriculum and Activity Guide. As this is an international school, the children come from very diverse backgrounds with varying levels of English; we worked closely with their teachers and utilized various methods such as discussion, role playing, drawing, and reflection to circumvent the language barriers and presented a fun and educational lesson on the salt marsh ecosystem. Even difficult concepts such as the role and importance of oxygen in such a system was grasped by the young participants.



*To engage the students, their teachers suggested they dress up like their assigned "characters" in the salt marsh. From the left: two invasive *Spartina alterniflora*, the sun, two oxygens, a water rail, and a fiddler crab.*

After this successful activity, we were invited back to speak on two occasions. The first was to members of the PTA and younger students for International Women's Day. While the theme was the connection between women and water around the globe, we looked at this as an opportunity to not only introduce our relatively new initiative to a wider Xiamen audience but also to emphasize the link between all aquatic systems and the connection we humans have to it.

The second speaking engagement occurred during the school's annual Global Awareness Day. The purpose of the event is to raise the students' awareness of the community in which they live and the issues around them, by hearing it from their own neighbors - local community members who are invited to speak. Since this year's theme was "water", we decided to focus on marine debris, a truly global concern as well as one which can empower the students. Small changes in their daily lives (i.e. using a reusable water bottle, bringing their own bags to shops) are tangible ways in which they can make a difference.



*Drawing a salt marsh and a post activity review with the teachers helps us ensure the students understood the concepts presented.*

*"The COSEE China outreach projects are essential because they provide the chance for students to learn knowledge about the environment."*

~ To Hang Siu, Graduate  
The University of Hong Kong



We hope to continue working with XIS in 2013 to develop even more marine based lessons for their students and perhaps engage them in our outreach activities as well.



# AQUATIC SCIENCES ECO-LEARNING PROGRAMME



At the end of July, we hosted a week-long day camp for area middle school students (aged 13-15). The brainchild of Samuel Wang, a University of Hong Kong graduate student and Xiamen University alumnus, this was the first time such a program was run in Xiamen (although they are fairly well-known abroad). Our office spearheaded the programme while graduate and undergraduate students from Xiamen University and the University of Hong Kong served as camp counselors. Each day, students were presented with a different aspect of the local aquatic ecosystem.

Topics were first introduced in the classroom by an expert in the field (usually a Xiamen University professor) and campers were then taken out into the field to see what they had just been taught. Specific tasks were set so that the subjects were reinforced and a reflection period back in the classroom promoted the retention and understanding of key concepts.

As this program was a first for both our staff and the greater Xiamen community, we limited participation to 31 campers and offered it free of charge, a situation made possible through a grant from Hong Kong's Ocean Park Conservation Foundation (Grant # OT02\_1213) and additional support from MEL. In addition to ensuring the safety of all participants, we felt that by limiting the number of students and having a ratio of roughly 2 campers to 1 counselor, we could provide the sort of individual attention that is simply unavailable in many public schools. While there were some concerns about how well the campers would take to being out in the field, these were largely unfounded. Even as the campers shrieked and cried "It's so dirty!" while crawling through the mangrove mud for example, their presentations and discussion during the reflection session showed that they not only enjoyed the experience but were also able to make the critical connection between themselves as being part of the environment as opposed to being detached from or superior to it. At the end of the week, the campers were sad to see it come to an end and were eager for more. We would like to make this an annual event, with several such camps occurring throughout the year complete with follow up programs (i.e. one day or weekend outings).



From the classroom to the field and back: here campers learn about mangroves from China Mangrove Conservation Network educators, explore an actual mangrove, and display their art made from debris collected while out in the field.



Even abstract concepts such as habitat destruction and fragmentation are easily grasped through hands on activities and games.



Campers presenting their findings after a day in an intertidal/rocky shore environment.





# AQUATIC SCIENCES ECO-LEARNING PROGRAMME

## ... IN THEIR OWN WORDS



*"This camp is good. I enjoy it. I learned about a lot of new species. It's cool!"*

~ Yu Qin Wang, 6<sup>th</sup> Grade  
Yan Wu Primary School  
Referring to Gulangyu's Underwater World.

*"It was a nice experience for both participants and counselors. Both learned something throughout [all the] activities. The students got more field experience [while] at the same time counselors could improve their communication skills."*



~ Chun Fai Lee, Graduate  
The University of Hong Kong

*"It was a very nice experience, from which I not only enjoyed myself very much with energetic young kids for five days, but also I enhanced my leadership, communication skills and knowledge. [To seed] environmental conservation in [the] young generation's mind and to see their behavior change made all hard work worthwhile."*

~ Sam Wang, PhD candidate  
Environmental Policy  
The University of Hong Kong



*"I believe overfishing affects the ecosystem. We must change this and maintain biodiversity and not destroy the integrity of the ecosystem. We must act sustainably."*

~ Rui Zhe Chen, 10<sup>th</sup> Grade  
Xiamen Foreign Language School

*"From today's activity, although I got really dirty, I also learned a lot. We need to protect the mangroves and not make it like what we saw today, all that trash all over."*

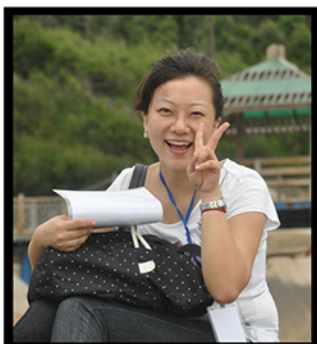
~ Shen Lin, 7<sup>th</sup> Grade  
No. 1 Middle School



*"The event was full of adventure and new ideas for all of us. I especially liked the activities after field visits where students expressed what they learned at the sites. Events like this help make kids aware of the state of our environment."*



~ Marie Louise Umuhire, Graduate student  
Marine Affairs, Xiamen University



*"I think the camp is an excellent way for those kids to develop their thoughts on the environment and ecosystem. It's a direct way to feel nature and gain knowledge. As a volunteer, I'm sure I also learned things from those students, such as their ideas and imaginings. From this activity, we used our passion and ability to teach and got much happiness and experience in return."*

~ Jiayin Xu, Graduate student  
Environmental Management  
Xiamen University





*"I learned a lot as a young marine scientist along with the campers. The part I liked the most was the field trip after the presentations [by experts] because it allows us to really fix [in our minds] what we had just learned."*

~ Marine Rosine Mugeni, Graduate Student  
Marine Affairs, Xiamen University

*"On the 4<sup>th</sup> day we went to Wu Yuan Wan wetland and saw many kinds of birds. I learned that the birds need people to protect them because when we have [built] many shops or listen to loud music or [make] loud sharp sounds it will also destroy their living environment and make them endangered."*



~ Xiao Ni Chen, 7<sup>th</sup> Grade  
No. 1 Middle School



*"Since my major is marine sciences, I have learned many things about the importance of marine protection and I know [that] education is one of the most efficient ways to achieve that. So that's why I love this summer camp and I believe what COSEE China is doing will make a difference."*

~ Qin Guo, Sophomore  
Marine Physics, Xiamen University



"Team Coral" - campers and counselors

Above: A camper and a counselor explore the intertidal zone.  
Below: End of camp skits. Each team performed a skit highlighting what they had learned over the 5 days.

Making art out of debris collected in the mangroves.



From left: "Photographer and camera." This activity allows each student to see through the other's eyes; Observing fish behavior at Gulangyu Underwater World.



Bird watching in Wu Yuan Wan Wetland Park.



# OCEAN SCIENCES OPEN HOUSE

November 4<sup>th</sup> saw us open the doors of the Ocean building to the public with the first ever large-scale Open House focusing on ocean sciences at the university. Entitled "The Ocean and Me", the idea behind the event was simple: introduce the greater Xiamen public to the wonders of the ocean that surrounds them. Such events are widespread abroad and indeed the inspiration for our Open House was the University of Delaware's annual Coast Day. However, such events of this scale and variety are not that common in mainland China.

Students, labs, and faculty from the State Key Laboratory of Marine Environmental Science (MEL), the College of Ocean and Earth Sciences (COE), and the College of the Environment and Ecology (CEE) were invited to showcase their research or a topic of interest. There was only one design criteria - their booths had to have an interactive component. In addition to the themed booths, certain labs offered guided tours given by their students, thus allowing the public even further into the researcher's world. A mini-museum of selected fish, coral, and shell specimens was set up in one area and coloring and make-your-own-origami-sea-creature stations were set up for the younger guests. Food, face painting, and a variety of short films rounded out the day.



Advertising for the event was designed by one of our fantastic undergraduate volunteers, Chang Li.



From top:  
Visiting the  
OCG lab;  
Testing for  
nutrient  
loading in  
estuarine  
systems;  
Making  
origami  
octopuses;  
Learning  
about  
over-fishing.

Roughly 600 visitors came through our doors during the 5 hour event with many arriving before the official opening and watching as we set up. The majority of visitors were families with children ranging in age from the infant all the way up to middle and high school students; in fact many were former campers from our Aquatic Sciences Eco-Learning Programme who were eager to join us again. Feedback forms were handed out to each visitor and based on these and the subsequent phone calls we received, the event was an unqualified success with many Xiamenites saying they wished we could host such open houses weekly or monthly. Funding support from MEL allowed us to keep costs to a minimum for the public (only a nominal fee was charged for food). The event was also highly gratifying to faculty and staff who not only had a chance to highlight their research but were delighted by the interest children showed in such difficult topics such as ocean acidification, marine chemistry, and the role of plankton in the marine ecosystem as well as impressed by their questions and insight. This will definitely become an annual event and hopefully one of the crowning jewels of the greater Xiamen cultural scene.



# OCEAN SCIENCES OPEN HOUSE

## ... IN THEIR OWN WORDS

*"The Open House was a success. We could share our knowledge of the ocean with the citizenry and spark the interest of children which made us feel enriched. We hope to take part in future events!"*



~ Dr. Min Lu, College of the Environment and Ecology, Experimental Teaching Center

*"Their [visitors] curiosity and concern made me feel I'm doing a meaningful thing and I'll keep going."*

~ Chushu Liu, Sophomore Physical Oceanography Xiamen University



*"The Open House is an activity that educates both adults and children on what we are working for, what the environment is facing and what we all need to do. I think it is a far-reaching activity which is worth our hard work."*

~ Shuqi Lin, Sophomore Marine Physics, Xiamen University



*"I think the Open House was a big success. Many [families] came. . . The children were very happy to learn [about] the ocean. And I learned many things too."*

~ Qing Chen, Sophomore Marine Biotechnology Xiamen University

*"It is an honour for me to participate in the first Open House. Each volunteer was involved. . . heart and soul and on the day shared their ocean knowledge with each visitor. All of us - children, adults, seniors, volunteers - benefited. I think it was a wonderful day that I enjoyed."*



~ Lin Fan, Sophomore Marine Chemistry, Xiamen University



*"The Open House provided a way to show the general public the importance of the marine environment and research, giving them a chance to get involved. This type of science educational activity should be repeated as increased understanding can stimulate and encourage environmental protection."*

~ Dr. Shuh-Ji Kao, Nitrogen Group College of Ocean and Earth Science



*"The line of kids and parents must have been at least 100 deep at one point. They were all waiting to get their faces or hands painted . . . and there were a handful of university volunteers that kept their heads down for the better part of 5 hours trying their best to draw them. My favorite was a shy 3 year old that pointed to a shark with big teeth and sat patient and nervous while I painted it on her hand. The crowd was enthused and, from what I saw, all the other activities for kids were equally as crowded."*

*Xiamen is a seaside port and it's particularly important for the people who live here to be conscious of what surrounds them. I'm a teacher at a public high school and educational opportunities like this are rather rare. I look forward to working with COSEE on whatever future activities they may plan for the community."*

~ Sara Borey English Teacher No.1 High School



*"I wanted to get ocean science knowledge. It's more than I expected!"*



*"I loved the experiments and that I could do it by myself (with assistance from the staff). It was an interesting and interactive experience."*



*"The scientists/volunteers [were] very friendly and answered all my questions."*



*"I liked the specimens in the mini museum and the interactive experiments and microscopes."*



*"Hope to see more about ocean observation technology and anything [to do] with ocean engineering."*



*"If there is an activity next year, I would love to come again!"*



# PRESENTATIONS, WORKSHOPS, AND SEMINARS

~ 2011 ~

## NOVEMBER

Guest speaker. "Invasion - The 'New' Threat to Biodiversity." TAECO Seminar Series.  
Xiamen, China.

~ 2012 ~

## FEBRUARY

Poster. "COSEE China: Encouraging China to 'Think Blue'." Ocean Sciences Meeting,  
Salt Lake City, Utah, USA

## MARCH

Guest speaker on women and water. Xiamen International School PTSA, Xiamen,  
China

Presentation. "Encouraging China to 'Think Blue'." 4<sup>th</sup> UCAS Symposium, Xiamen  
University, China

Presentation on conservation, outreach, and learning and communication.  
Introduction to Marine Sciences, Marine Sciences International Class, Xiamen  
University, China

## APRIL

Guest speaker. "Marine Debris." Xiamen International School Global Awareness Day,  
Xiamen China

## MAY

Guest speaker. "Marine Debris." Academic Student Union of the College of Ocean  
and Earth Sciences, Xiamen University, China

## JULY

Workshop. "The Ins and Outs of Outreach." MEL's annual summer school, Xiamen  
University, China

## OCTOBER

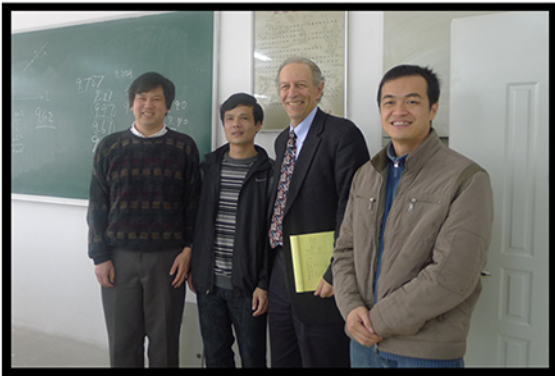
Presentation. "One Year Out and Still 'Thinking Blue'." China Ecology Association's  
Marine Ecology Commission Annual Meeting, Guangdong Ocean University,  
Zhanjiang, Guangdong, China



From left: Vera Shi speaking on marine debris to the Academic Student Union of the College of Ocean and Earth Sciences; Summer school students taking part in "The Ins and Outs of Outreach" workshop; Sophomore Lu Han presenting on COSEE China at the China Ecology Association's Marine Ecology Commission Annual Meeting.



# FACULTY PROFESSIONAL DEVELOPMENT



Dr. Bob Chen (far left) and Dr. Arthur Eisenkraft (3<sup>rd</sup> from left) with Keji High School faculty.

As COSEE China is modeled after the COSEE Network in the United States, one of our long standing goals is to build international collaborations between researchers and educators. Thus on March 2-3, COSEE Drs. Bob Chen and Arthur Eisenkraft, both experienced outreach and education specialists from the University of Massachusetts, Boston, conducted faculty professional development workshops for instructors at Xiamen University and at Keji Science and Technology High School. Eighteen high school teachers and 25 Xiamen University faculty and graduate students participated in the two workshops. Upon arriving in

Xiamen, the two visited the high school and sat in and observed the physics classes. Although classes were taught in Chinese, the guests had no difficulties understanding them. During the training workshop, Dr. Eisenkraft invited teachers to teach the class "the size of atom" and conducted a "Pendulum Lab", demonstrating his interactive teaching style with the Inquiry and 7E instructional model. Dr. Chen briefed teachers on Ocean Literacy and its Seven Essential Principles. Differences in education were compared between China and the US. Teachers were very interested and amazed by the interaction in the workshop and expressed an interest in applying such methods their classes. We would like move forward and hold more workshops of this kind, to encourage interactive and inquiry based teaching and to bridge the gap between research and education

*"I think COSEE China is meaningful. It not only provides expert knowledge and promotes environmental protection, but it encourages teambuilding and [the participant's] creativity."*

~ Chun Jin Liang, Sophomore  
Marine Biology, Xiamen University



# FUNDING

Funding for our various projects this year has come primarily from Hong Kong's Ocean Park Conservation Foundation (Grant # OT02\_1213) and MEL. At the end of 2012 we received notification that our grant application to the National Natural Science Foundation China (NSF-C) was approved (#41240036). We would like to thank each of these funding agencies for their support and are looking forward to conducting even more programs in 2013!





# UNDERGRADUATE DEVELOPMENT PROGRAM

Successful environmental educational programs require a lot of man hours from a lot of dedicated individuals. This is especially true in China where such programs are a completely new concept - to researchers, the public, and funding agencies alike. Thus, there are some unique challenges associated with bringing the COSEE concept to China.

In order to meet these challenges, fulfill part of our objectives, and stay within budget, we've begun to develop a team of undergraduate volunteers to fulfill the many roles needed for our various programs. It started unconsciously with the Aquatic Sciences Eco-Learning Programme, where twenty freshmen, all from the Marine Sciences International Class, answered our call for volunteer counselors (in addition to a host of graduate students). After undergoing training with a knowledgeable environmental educator, it quickly became apparent that these students not only had the time to devote to such programs but were keen to learn new things, contribute their own ideas, try new methods, and above all, share their excitement about the ocean with others. We then called upon them for the Ocean Sciences Open House and again we were not disappointed as they designed booths on marine acoustics and marine biodiversity and the threats to, acted as guides and interpreters in the mini-museum, served as face painters and origami instructors, and proactively filled in wherever there was a need.



Some of our undergraduate volunteers during a training workshop. In this "charades" like exercise, each student is a character in a specific ecosystem within a specific scenario. Other workshop participants have to guess their characters and the situation.



Aquatic Sciences Eco-Learning Programme counselors along with COSEE China (Xiamen) co-chair Dr. Min Liu (far right), development coordinator Emily King (back row, 2<sup>nd</sup> from left), and MEL secretary Vera Shi (back row, 6<sup>th</sup> from left).

Building off this base, in 2013 we hope to provide another training for these students to further develop their skills as environmental educators. We will continue to develop them as COSEE volunteers by having them present on our activities at various conferences and symposia. New volunteers will be recruited from the incoming Marine Sciences International Class and paired with our current group. In the long run we hope to establish a self-perpetuating and permanent base of trained volunteer educators here in Xiamen. Too often, undergraduates are overlooked, as lacking experience or knowledge in the field. However, we have found that what they might lack in "book smarts" they more than make up for with passion and zeal - two things that can't be taught.



*"I'm so proud of what we did in the past year. We provided the citizens [with] an opportunity to get more knowledge about the ocean. It was exhausting but such a pleasure when people, especially the curious children showed love and concern [towards] the ocean and endangered animals. I hope that we can organize more activities to help people know more and do better."*

~ Lu Han, Sophomore  
Physical Oceanography, Xiamen University



# FIELD DAY ABOARD THE R/V OCEAN II



Towards the end of the year, and as a follow up to our Aquatic Sciences Eco-Learning Programme, we held a field day aboard the COE's research vessel, the Ocean II. Twenty middle school students (many of whom had joined us for our summer program) took part in this one day outing which introduced them to the basics of ocean chemistry and marine biology.

Sailing conditions were less than favourable and many participants discovered a propensity towards seasickness that grey, December morning. However, neither the cold nor nausea dampened their spirits as we sailed around Xiamen, from the "open ocean" towards the mouth of the Jiulong River, stopping at 3 sites to collect water and plankton samples.

Dr. Yi Hua Cai and graduate student Xue Tie Lei provided the expertise in ocean chemistry and taught the students how to determine the salinity, density, pH, temperature, and phosphate levels for each sample. On board group discussions lead by Dr. Cai helped clarify the potentially difficult concepts for the young participants.



Clockwise from upper left: Dr. Min Liu teaches a student how to measure salinity and density; Dr. Yi Hua Cai explains the relevance of phosphate in the ocean system; Students collecting plankton samples; Dr. Dong Hui Guo showing students some of the plankton they collected earlier in the day.

In the afternoon, the students returned to the Ocean Building where they were able to examine their plankton samples under the microscope, guided by Dr. Dong Hui Guo and graduate student Jing He. The budding scientists quickly became skilled at spotting the various species of zoo- and phytoplankton found in the local waters.

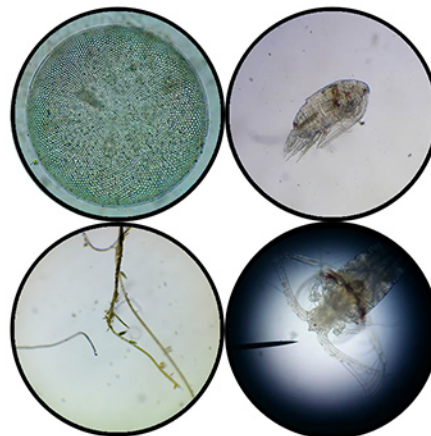
Being able to utilize resources such as the Ocean II allows us to provide unique educational experiences that most students would never have. We plan to host more excursions such as this in 2013 and hope to broaden our scope as we continue to encourage Xiamenites to "Think Blue."



~ Chang Li, Sophomore  
Marine Biology  
Xiamen University

*"As a volunteer, I learnt a lot [beyond the] books and promoted my strengths. There were many middle and primary school students joining the COSEE China projects. They got knowledge while enjoying themselves and realized the importance of protecting the ocean [and] the environment, so that they can build a better world in the future. This is very meaningful."*

Some of the plankton observed by the students. Clockwise from upper left: *Coscinodiscus subtilis*; *Paracalanus aculeata* larva; unknown species of chlorophyta; *Centropages tenuiremis* larva.





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