Cluster 3 of COSMOS has had an action-packed first week! Dr. Pomeroy has been leading discussions regarding climate change and Dr. Lai has been taking students to examine marine biology. Mr. Matt Ruppel, a former COSMOS graduate student, and current teacher at High Tech High North County, is new as a COSMOS teacher fellow this year. Here are some student thoughts on week one!

“On the first morning, we were driven down to the Scripps Institute of Oceanography for a lecture by Dr. Lai about marine biology. We then went out onto a research pier where we observed bat rays and guitar fish swimming near the sea floor as well as an artificial tide pool ecosystem created on the pier, serving as a wonderful introduction to this aspect of our cluster topic.” – Rika Shukla

“Monday afternoon we headed to the lab and met Dr. Pomeroy. We learned about albedo by testing the reflectivity of white paper, black paper, aluminum foil and other surfaces.” – Tina Fann

“The discovery lecture by Professor Bewley on coordinated robotics was fascinating and informative! I had a wonderful time learning about the types of projects pursued in the various UCSD robotics labs, and was glad to see that it fostered and encouraged innovation and student-created projects like the MIB toy now on sale. I especially loved the flywheel-powered spherical vehicle. I’d love to learn more about it. In addition to the lab projects, he also covered some valuable advice about skills to seek out pre-college like familiarity with Linux, 3D CAD (computer-aided design), and basic coding.” – Barbara Garrison

“During the Science Communication period, we discussed, in Socratic Seminar format, the pros and cons of the Discovery Lecture we had just heard and then talked about the do’s and don’ts of any lecture or speech… Lastly, we discussed the ways people most efficiently learn (visually, through lecture, etc.). I personally look forward to learning more about science communication and implementing my new skills during my final project.” – Camille Rubel

“On Tuesday afternoon we got to choose our science project groups. There are six project groups with three to four people in each group. … Three of the groups will work on their project in the lab with Dr. Pomeroy while the other three groups will work with Dr. Lai at SIO.” – Carol Tsai

“On Wednesday we started off at SIO (Scripps Institute of Oceanography) and we got to explore the tide pools and all of its inhabitants, as well as enjoy some fun time in the waves before going back up to a very interesting lecture on ecosystems. In the lab, we experimented with Hooke’s Law and learned how the vibrational frequency of a spring is analogous to that of the vibration of atoms!” – Thomas Kim
Week 2 of COSMOS has been full of all types of excitement for Cluster 3! Besides our discussions of proper experimental design with complex environmental systems, we have also been engaging in deep discussions of ethical issues in science and continuing to explore various regions of our environment! We’ve all been having a great time so far, and I’m looking forward to more to come!

“On Wednesday, our first day of group projects, our cluster split into two groups, one going to Scripps Institute of Oceanography (SIO), while the other went to Dr. Pomeroy’s lab. Students at SIO got to experiment with shrimp and barnacles, while students at the lab were exposed to the different instruments they would be using. For my group, we got to work closely with one of our graduate Teacher Assistants, Marissa, who taught us about the FTIR instrument. This tool can help us determine the Global Warming Potential of different gases, and for fun, we used it to identify our thumb skin’s surface composition! Overall, it has been an exciting beginning to our projects, and I cannot wait to begin working on it! “ – Rachel Tham

“Monday was one of the most interesting days of COSMOS so far. We started off at SIO, where Dr. Lai was able to help teach us about phylogeny and pheneconomics by allowing us to observe different types of crabs, which included a full size Dungeness crab. We even got to dissect a crab to observe its organs and characteristics that allows it to survive in and out of water. Later that afternoon, we headed back to the lab where Skip lectured us on the formation of clouds. We did several fun labs to teach us about the effect aerosols have on cloud formation. Root beer made it all the better. ” – Cameron Nosrat

“On Tuesday morning, we all walked down to our second Discovery Lecture by Professor Elsa Cleland where we listened to her talk about her past experiences and studies. This lecture was interesting since it pertained to climate change, which made us a lot more intrigued, as the information related to what we’re learning in our classes. In the afternoon, we went our respective ways to work on our final group projects, where we continued to explore and understand each of our own topics with the help of our Cluster Assistants. ” – Cindy Li

“Friday at SIO, we went to the pier to measure the length of barnacles, and we each had to catch one shrimp or crab. After that, we each received a small lack crab in a bowl, and we had to fill it with either 100% salt water, 0 % salt water [100% fresh water], or 50% salt water, and 50 % fresh water. For the second half of the day, we went to Revelle College to receive a lecture about how to determine if something is a greenhouse gas from Professor ‘Skip’ Pomeroey.” – Sakshi Hegde

“Wednesday, we went to SIO and learned about the fish that we will be dissecting next class. Then, we went to the pier and collected more barnacle samples for our study on their average size. Then, we went to the lab and listened to a lecture about aerosols before doing two labs relating to organic chemistry about secondary aerosol production the oxidation of organic molecules. Overall, the labs were challenging, but in the end they were very informative and helped us have a deeper understanding as to what goes on in our atmosphere.” – Ingrid Spielbauer
It’s hard to believe that we are already wrapping up week 3 of COSMOS! In the last week, students have completed writing an essay exploring ethical issues in climate and the environment, attended many fascinating lectures by our amazing professors, and worked hard on their individual research projects!

“It was interesting to see how the fish hatchery helped breed and release Sea Basses. We also saw the tags they put in the fish to track where they go and their survival rate.” – Layly Roodsari

“Oh Friday, we visited the lagoon. There were small crabs and snails that lived in the mud, which differed in shape in comparison to the crabs and snails at the tidepools.” – Emily Meier

“We started off Monday morning by going down to SIO. As usual, Dr. Lai had a surprise for each of us – a cockroach (in a plastic box)! We learned more about evolution and the tetrapod. Later, we went to a nearby building that housed many sea creatures such as shrimp, sea urchins, fish, sharks, and clams. Our experience was definitely “hands-on” as we were able to touch starfish, sea cumbers, and more. In the afternoon at our climate change class, Professor Pomeroy gave us a brief lecture on ocean acidification. We then did a lab on measuring the pH of a liquid that represented the marine buffer system. It was fascinating to watch the beaker turn from yellow (neutral) to basic (blue). Afterwards, we had a special guest lecturer who talked to us about conditions on Mars and the importance of isotopes in discovering more about a plant’s history and predicting future conditions. She even brought in samples of a meteorite and soil from Mars for us to hold.” – Angela Huang

“This Wednesday, the first thing we did was visit the Birch Aquarium at Scripps Institute of Oceanography. There were many marine animals including seahorses, jellyfishes, leopard sharks, and even a sea turtle! One specific exhibit focused on global climate change and global warming. Immediately after visiting the aquarium, we went back to the classroom and dissected mice and frogs and learned about their evolution. In the afternoon, we visited the California Center for Algae Biotechnology and learned about biodiesel energy where researchers harvest lipids from algae to produce energy. It was definitely one of the best field trips so far.” – Amber Chau
As hard as it is to believe, COSMOS has come to a close! We have had a super fun last week as students have been finishing their research projects and preparing for their presentations. It has been such an honor to work with such a wonderful, hardworking group of students this summer. Thanks to everyone who has made it possible for them to attend COSMOS and have this experience. I am so excited to see all the wonderful things that the future holds! Below you will see some of the final comments from the students about their experiences in Week 4.

“We started off Thursday morning with a cluster discovery lecture to learn about what the other clusters do. After that, the cluster split up in two to work on our projects. Half of us went to NSB and half of us went to SIO. My group and I went to SIO and measured the ammonium concentration excreted from the shrimps we experimented on.” – Eunice Kan

“On Friday, we learned about amphibians and reptiles in Lai’s class; we even got hands-on experience with turtles and a giant tortoise! The turtles were wild little critters. Then, we went out to Scripps Pier, where we took water samples and studied seawater properties at different depths. We also found an octopus in the trough, whom we named Rover. After lunch at 64 Degrees, we went up to Skip’s lab and measured the alkalinity of seawater samples via titrations and an Excel program. Friday was a good day.” – Yash Maniyar

“For Monday’s class, we went down to SIO and learned more about the rocky intertidal ecosystems from Dr. Lai. After learning about the biodiversity of the rocky intertidal, we explored the actual tide pools at the beach and looked at the organisms and marine life there. After lunch, we went to NSB to work more on our final projects.” – Michael Chen

“It’s fascinating how the research process seems almost endless. As soon as one set of data is complete, new observations can be made, and other ideas are always postulated.” – Carson Jones

“Wednesday was a really fun day in class. We took notes on osmolarity and how marine organisms regulate their reactions to water salinity, which I thought was really interesting. After that, we had a fun review quiz, in which the class was called upon to answer questions in hopes of winning cool or quirky gifts from Lai.

We wrapped it all up with a tour of the Pelagic Invertebrate Collection, a small museum housing thousands of different organisms. It was a great way to kick off our day and to wrap up or time in class at SIO.” – Evan Jones