



COSMOS UC San Diego

California State Summer School for Mathematics and Science 

A RESIDENTIAL ACADEMIC EXPERIENCE FOR TALENTED HIGH SCHOOL STUDENTS AT UC SAN DIEGO

Week 3 Newsletter



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CLOSING DAY!

On Saturday, August 5th, students will present their final projects. Please plan to arrive at **8:30am to Warren Mall**. You will be escorted to your student's cluster project location where presentations will be from 9-10:15 am. Following the presentations will be the COSMOS Awards Ceremony at 10:30am at the Price Center Ballroom. Students will be presented with their Completion Certificates and special awards. We encourage friends and family to come see all of the hard work that the student have been putting in during their month at COSMOS!

After the Awards Ceremony, we ask that families start heading back to the Eleanor Roosevelt College (ERC) residential halls to pick up their belongings and check-out. This means that all students should be packed prior to the Research Expo and have their keys and meal cards ready to be turned in. If your student has lost their key(s), it is a \$155 expense per set of keys and this must be paid at the time of check-out if not before. Broken keys are free to replace.

Families should park at the Gilman Parking structure near the Price Center. **Do not use the 9500 Gilman Dr. address in your navigation system-it will take you to our central mail processing!** Families can park in Gilman for the Research Expo and Awards Ceremony then drive to the Pangea Parking Structure to pick-up their student's belongings and check-out. All students **MUST** be checked out by 1pm.



Closing Day Driving Directions



Getting to GILMAN PARKING STRUCTURE

1. Exit La Jolla Village Drive from the I-5 S and head west to turn onto La Jolla Village Drive.
2. Turn right onto Villa La Jolla Drive.
3. Continue straight past Gilman Drive into Gilman Parking structure.

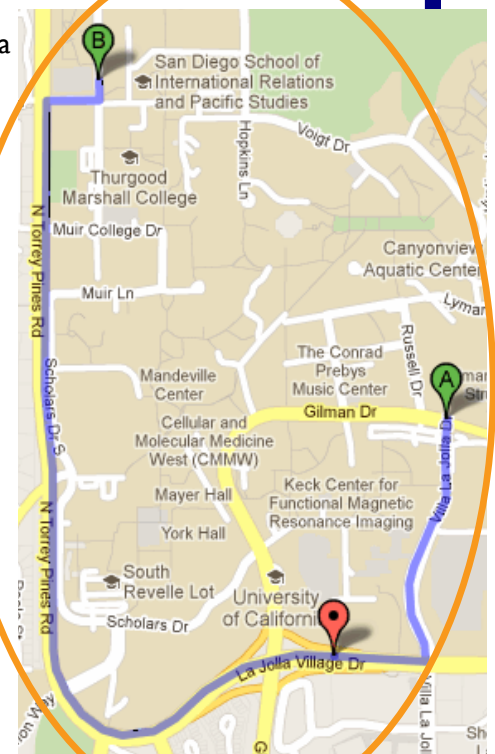
(Walking) From GILMAN PARKING STRUCTURE to WARREN MALL

1. Head NORTH from the Gilman Parking Structure on Russell Lane. Look for COSMOS signs that will be along the way to Warren Mall from Gilman parking structure.
2. Continue Past Matthews Ln. Walk Straight.
3. Turn Left upon arriving in Warren Mall.
4. Closing Ceremony will take place in Warren Mall, directly in front of

(Driving) From GILMAN PARKING STRUCTURE to PANGEA PARKING LOT

1. Head South on Villa La Jolla Drive.
2. Turn right onto La Jolla Village Drive
3. Continue straight onto N Torrey Pines Road.
4. Turn right onto Pangea Drive.
5. Pangea Parking lot will be on your left.

*NOTE: Parking is free on weekends unless otherwise noted.

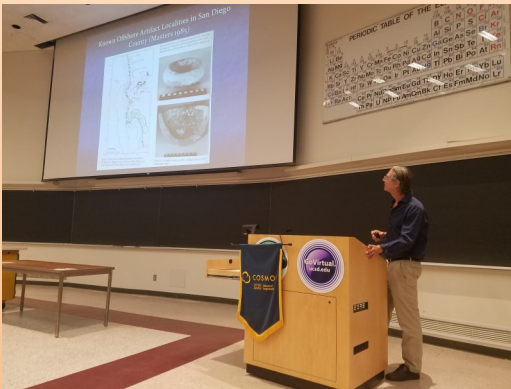


DISCOVERY LECTURE SERIES

Our third discovery lecture this week was by Dr. John Hildebrand from the Scripps Institution of Oceanography. Dr. Hildebrand received a B.S. in physics and electrical engineering from UCSD and a Ph.D. in applied physics from Stanford University. He held a research position at SIO before joining the Scripps faculty. His talk was titled "Offshore Archaeology in Southern CA."

Dr. Hildebrand started off by describing the various archaeological finds in southern CA since the 1950's after people began to embrace the use of scientific diving. Artifacts such as stone bowls and tools were discovered that gave us a better understanding of when the first civilizations populated our region of the world. He went over an article in the journal Nature titled "[A 130,000 yr-old archaeological site in southern CA.](#)" While no skeletal remains were found at the site, various tools and other bone fragments suggest that human life may have arrived earlier than predicted.

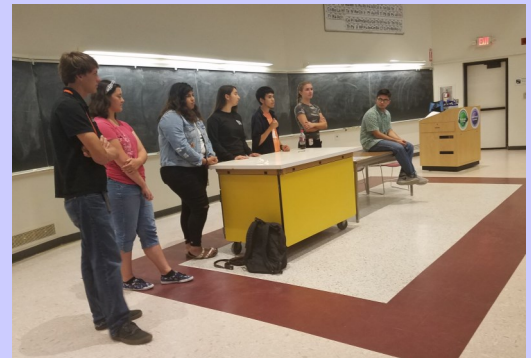
He also went over how much our San Diego beaches have changed in the last several decades due to fluctuations in temperature and rising sea levels. This also affects the amount of sand on some of San Diego's beaches. The San Diego County government actually digs up sand offshore and replenishes some of the beaches lacking in sand since it is a very popular tourist destination. Dr. Hildebrand described the dredging process, the barge, and then the sand discharge at the receiver sites, or the beaches. They also engage in archaeological monitoring since the sand comes from multiple locations and may contain other objects that are not native to the region. The students asked really great questions and were very interested in the techniques used to date bones and artifacts found.



STEM PANEL

COSMOS' annual STEM Panel consists of a Q & A with our current COSMOS participants and our COSMOS Alumni. Participants have the opportunity to ask questions about STEM internships to life living on campus. The overarching theme this year was time management, internships, and the process of selecting a major. Students seemed concerned about balancing school, work, and personal life. They were put at ease when the COSMOS Alumni ensured them when they find an organizing system that works for them, everything is possible. The COSMOS Alumni provided useful advice from their personal experiences that allowed them to complete their first years in college and advance in

their second; sitting in front of the class during lecture, visiting the professor's office hours, getting involved during in the discussion groups, writing down due dates, spending some time alone to decompress and relax, and starting early with internships.



COSMOS Alums

David Bryce Borders Ava Scally,
Jennifer Cano, Lily Demangos, Kritin
Karkare, Christi McKnight, Brian Hanst

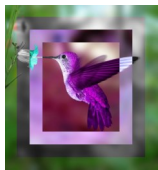
RESIDENTIAL LIFE

Three weeks down...one more week to go. Week 3 was another week of exciting programs. We started the week off by having our annual Casino Night in collaboration with one of our teacher fellows. The students had an amazing time! We also had a raffle with the grand prize being a cart ride to class. In addition, the RAs put on a variety of programs including Capture the Flag (and I'm happy to report there were no injuries), DIY Ramen, Spa Night, Friendship Bracelet Making, and a discussion on Healthy Relationships. This weekend we will be doing community service in the La Jolla area. Some kids will help out at the garden at ERC, some will go to a local food bank, and some will go to La Jolla Shores and help clean the beach. We hope this will be a positive and rewarding experience for all the kids.



Balboa Park Scavenger Hunt



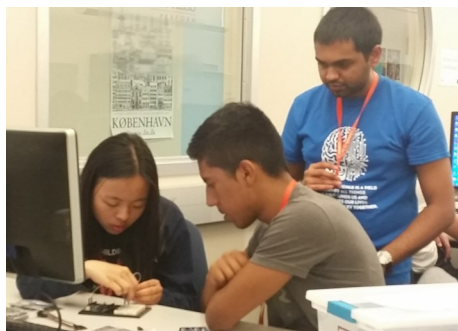


CLUSTER 1: COMPUTERS IN EVERYDAY LIFE



Cluster 1

Late last week, our guest lecturer was Christine Alvarado from the CSE department. She told us about picobots – simulated robots that are programmed using state machines. It can only sense things directly to the north, east, west and south. Therefore it's coded by sequences which identify where it can and cannot move in those four directions. We got an opportunity to program the picobots through various mazes.



On Monday, we started the day with a panel consisting of a Jessica, a PhD student in oceanography (Scripps Institute of Oceanography) and Elise, an aerospace engineer from Quartus. Both use robotics and computer science in their research. Jessica deploys robots into the ocean to collect data. Elise has worked on several projects at Quartus including: building finite element models and analysis, the biggest plane ever built and the James Webb Space Telescope. Then after the panel, we heard from Julian McAuley, from the CSE department. He shared his work in data mining and data science. Data mining and science builds models to help us understand data in order to gain insights and make predictions. The rating system on Amazon.com is one example of an application of data science. Amazon.com recommends products it believes people will be interested in. Some insights that can be gained from this are how opinions are influenced by factors such as time, gender,

age and location.

On Monday afternoon, we presented our image processing projects. Holly and Lauren earned the Faculty Choice Award for their "Filters" project. Clean and Ivan earned the "People's Choice Award" for their "Superhero Cityscape" project. Please see our blog for everyone's project and presentations. The images that you'll see aren't Photoshopped. We programmed the image manipulation in Jython.

This week began to work with Arduinos. After going through some tutorials so we can learn how to wire and program our circuits in C using push buttons, speakers, temperature sensors and servos to name a few. It was exciting to see our circuits working!



Wednesday morning started with some of the students from the Explorers for Engineering (E4E) lab came to talk about their projects. Curt (our faculty) and Ryan Kastner (who spoke to us earlier) are co-directors of E4E. We got to see the actual work they are doing with a system which has a sensor to monitor the health of mangrove trees from above, radio collar trackers, and 3-D reconstructions using cheaper ways than the traditional LIDAR—just to name a few! The students gave us great insight to their experience and projects. They also gave us great advice – don't be afraid, meet your professors, communicate with others to network and become a tutor – teaching someone else is

a great way to learn something (even better) for yourself.

In the afternoon, began our clock Arduino project. We became adept at circuits and now could combine many different parts into our project. Our clock project will allow us to be creative on how we can communicate the time as well as design a unique alarm clock. Each team has a different idea on how to make their alarm clock. It's been a challenge, but a lot of fun and one we are facing head-on. We'll present our clocks on Thursday or Friday.

We asked if we could have a tour of the Supercomputer Center and on Wednesday after class, we had an extension activity where we could! It was an amazing experience to walk through the supercomputer's racks and meet Gordon and Comet - two of the supercomputers there. Thank you to Jeff Sale at the Supercomputer Center for hosting us!

On Thursday, we had another extension activity – because again we were very interested to learn more, but we couldn't fit it into our class time – Solid-Works. We learned how to design with CAD which could be used to laser cut or 3-D print. Thank you to our TA Matt for setting it up and teaching us after class hours!

It's been a busy and challenging week. We're going to make the best of the final week of COSMOS!



CLUSTER 2: ENGINEERING DESIGN AND CONTROL OF KINETIC SCULPTURES

In week 3 of COSMOS Cluster 2, students worked on their mini sculptures. The goal of this project is to work out the most difficult aspects of the final kinetic sculpture. Some students used their skills in CAD and the Lasercamm to cut out acrylic parts for their sculptures. Others 3D printed their parts. To get the sculpture to move, servos were controlled with Lego NXT or Arduino. In order to make these work the students had to program in ArduinoC or RobotC.

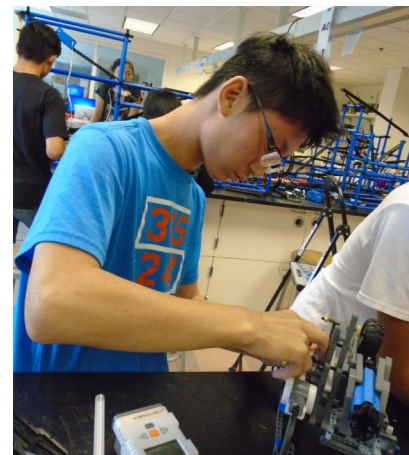
On Monday Dr. De Callafon lectured on the design process and on the physics of motion in the sculpture. Students had worked on ideas for their sculpture over the weekend and brought them into the Design Studio for prototyping. In the afternoon they drew aspects of their sculptures in Working Model 2D and modeled the physics.



On Tuesday Dr. John Hildebrand from Scripps Institution of Oceanography gave a fascinating Discovery Lecture on marine archaeology. Students then spent more time in the Design Studio on their mini sculptures.

On Wednesday Dr. De Callafon guided students on a tour of the Mechanical and Aerospace Engineering controls lab where students saw a wind tunnel and various other experimental apparatus. The cluster also received a lecture on controls and how to implement them in their projects.

The rest of the week students were hard at work on the mini sculptures. They learned more about the design process and how to refine their ideas. A key lesson was remembering that they could give up a component that wasn't working and replace it with another component that would perform the same task. On Friday students presented the results of their mini sculptures and started their final project, the kinetic sculpture.

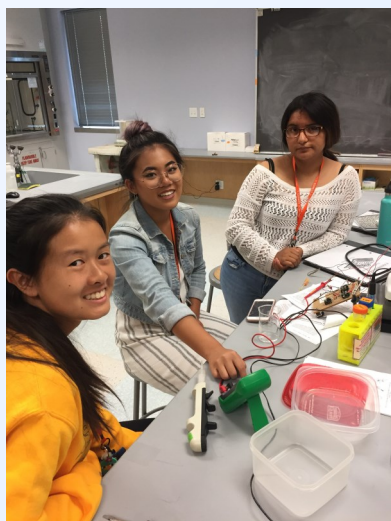




CLUSTER 3: LIVING OCEANS AND GLOBAL CLIMATE CHANGE

Greetings from Cluster 3! Our third week has flown by quicker than we could have imagined. We are currently designing our poster and presentations for our projects. We are working hard to prepare for our talks next week! This week we will be applying our knowledge of global climate change to ocean acidification. Here are some insights to our busy week!

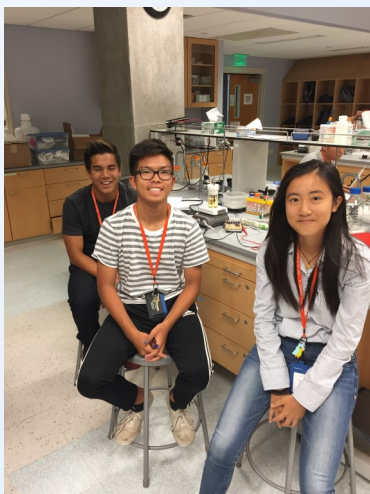
Today (Monday) we started the day by going to the SIO pier. Our cluster went down to the pier and caught a bucket of crabs by picking them out of the flume. After SIO, we went back to the NSB and took notes on Professor Pomeroy's lecture on ocean acidification. Finally, we did an ocean buffer zone lab based around measuring salt water acidification. —Jonathan Y



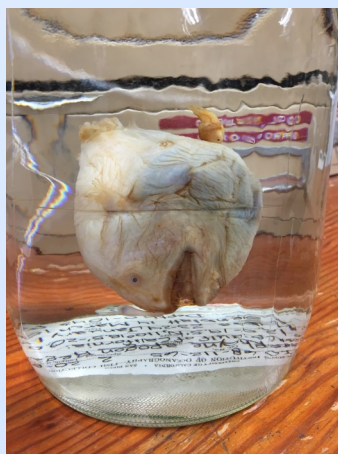
On Tuesday, all of us got a little further into our group projects; those of us in Group 1 spent the day gathering data in the halls of the Keeling Apartments. As we have gone through the motions of our respective science experiments, I have received a sense of the diligence that goes into each and every scientific endeavor —Sunwoo K

On Wednesday, we first headed over to SIO and had a lecture with Dr. Lai about general oceanography. We then went to the Fish Collection in SIO where fish specimens are kept, and we learned

a lot about fish anatomy and behavior. After that, we went back to UCSD and ate lunch, then had a lecture with Dr. Pomeroy at NSB. Finally, we did a coulometer lab where we were to change the pH of an acidic seawater solution. —Michelle Z



On Thursday, we started off by going to Cluster Exploration where we learned more about what the other clusters have been working on these past few weeks. Then, for Science Communications we continued working on our final projects by organizing our presentations and posters. Later today, we will break into our project groups to gather what remaining information we need; those of us in Group 5 will head down to SIO to interpret our data about the effect of temperature on the respiration rate of crabs. —Sara N



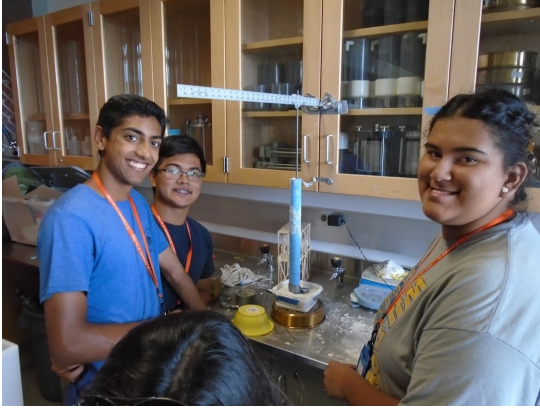
On Friday, we will be continuing our studies at SIO learning about the rocky intertidal zone. We will be finishing a lab around dissolved oxygen concentration and respiration in marine zones. We can't wait to see you next week to present our projects to faculty, families, and friends!



CLUSTER 4: WHEN DISASTER STRIKES: EARTHQUAKE ENGINEERING



Thomas Edison reportedly mused, "I have not failed. I've just found 10,000 ways that won't work." We needn't worry about our COSMOpolitans encountering a shortage of ideas, as they were extremely busy this week with testing and retrofitting their structures. Deciding upon the best idea was challenging, but that's hand in hand with the process of engineering.

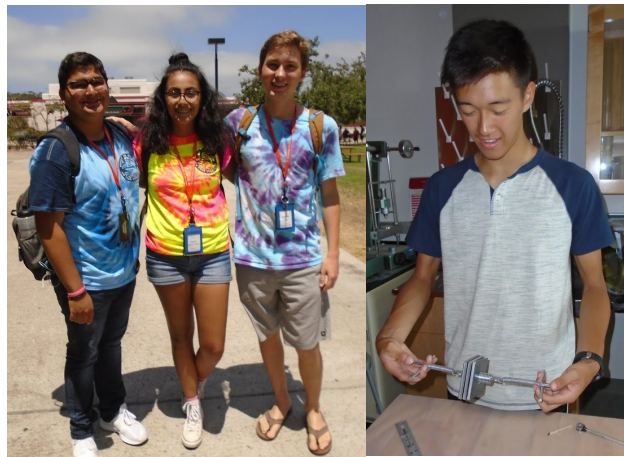


Week three is in the books, and their progress has been substantial. This week is typically a transitional week, as students returning from the fun and relaxation of parent's weekend awaken to the realities of deadlines, analysis, and the expectation of finishing in two more short weeks. They are actively involved with finishing seismic testing, redesigning and retrofitting, and final testing of their newly strengthened structures. It requires and teaches the importance of teamwork and time management to effectively and successfully conclude the structural engineering component of their assigned project. Compounding the frenzy of planning is the initial designing of their group's website, including the formalizing of their geophysical setting information and associated Powerpoint presentation. As Bob says, "There is no such thing as free time!"

Students embraced two trips outside of the lab this week. They enjoyed a tour of the campus CalTrans SRMD facility. You may enjoy reading more about it yourself at this link: <http://structures.ucsd.edu/research/laboratory-listing/srmd>. The Seismic Response Modification Devices are used to test structures such as highway bridge columns under earthquake stresses. On Thursday we bussed to the San Diego Office of Emergency Services, receiving a tour detailing the responsibilities of city personnel during fires, earthquakes, and other natural disasters. We residents of San Diego thoroughly appreciate the level of preparation detailed in order to successfully provide the vital services to citizens following such an event. The building itself has been fitted with base isolation devices, which the students saw from below ground level. The day concluded with an amazing tour of the Englekirk Center and

the UCSD NEES shake table, a full scale earthquake shake table, capable of testing buildings as tall as seven stories. You may enjoy watching their testing videos at <http://neestpm.ucsd.edu/>. It was truly special to see and learn about such a world-class facility.

As week four approaches, students will give more thought to communication skills in order to best showcase their project results. This will involve further analysis of their eventual data and methodology, and brainstorming ways to best organize the details of their journey through cluster 4. We press on towards the completion of our projects, and producing some terrific posters and professional presentations for our cluster families to enjoy.



CLUSTER 5: FROM LASERS TO LCDS: LIGHT AT WORK

Dreadful news was announced on Thursday that the students' beloved card game, Mafia, had been banned. Life went on and students found other ways to entertain themselves during free time through activities such as basketball, paranoia, hammocking, and enjoying expanded boundaries at Price Center. On a positive note, ethics essays were completed, taking some weight off students' shoulders.

Lecture material continued to increase in rigor, with Professor Tu's lectures covering how lasers are produced and the science of transistors in computers. Meanwhile, Thursday and Friday marked the final days of guided labs with Dr. Ilinykh and company. Labs included making a 3D hologram on a sheet of film and using an interferometer to demonstrate light interference.

Casino night took place Sunday night and included Poker, Blackjack, and Roulette. Virtual money from winnings was used to buy prizes such as slinkies and glow sticks.

Students entered lab Monday excited for their final project dreams to be realized. By Wednesday, all groups had finalized their projects and were ready to begin working.

Also on Wednesday, cluster 5 visited Birch Aquarium to see the Infinity Cube, an exhibit displaying the reflection of light and bioluminescence of deep-sea creatures.

Students are looking forward to activities such as the talent show and the formal dance. Everyone is looking forward to the opportunities to come in the final days of COSMOS.

-Caleb T.

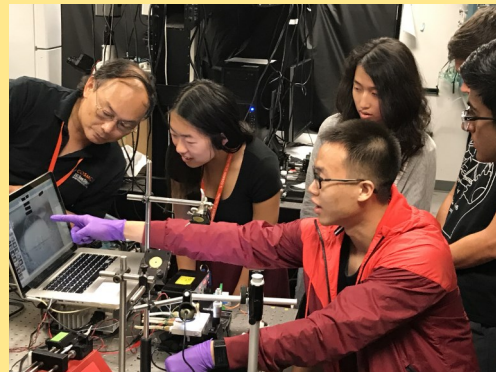
During family weekend, students who stayed on campus, approximately half, participated in late night icebreaker activities as well as a field trip to Balboa Park, a nearby cluster of museums and gardens. At the park, we had the option to either participate in a scavenger hunt or roam around freely.

On Monday July 24th, Cluster 5 began getting into groups for the final projects. Students expressed interest in investigating solar energy, programming Arduino, and creating spectrometers. After forming groups, we further brainstormed and started writing up reports detailing our objectives and goals for our final project.

Programming activities on Tuesday night included one on stress ball making and another one on stress management. Evidently, the STEM field is ridden with stress and hard work. This proved relevant in our lab work on Wednesday afternoon, when several groups struggled to bring to reality their final projects. Everyone is determined and dedicated, though.

Overall, this third week of COSMOS has given students insight on what to expect during the last week. Final projects have begun to prove their difficulty and importance; the talent show is gradually being put into place; RAs are hinting at the upcoming dance by asking for song requests. Everything is being planned to end with a bang.

-Ingrid R.





CLUSTER 6: BIODIESEL FROM RENEWABLE SOURCES

Week 3, Cluster 6 has been working diligently on analyzing our Biodiesel to verify it meets standards. All of our project groups have made great progress in experimental design and data collection for their final projects. We will be completing data collection for projects and work on presentations next week. We look forward to presentations next Saturday. Mr. Towler

"In lecture our professor brought in a guest speaker, Dr. Stephen Mayfield, who founded the algae-oil based company Sapphire Energy. He gave an interesting presentation- he demonstrated the dovetailing between both technological/environmental and business/politics concerns, which was a neat perspective." Elizabeth N.

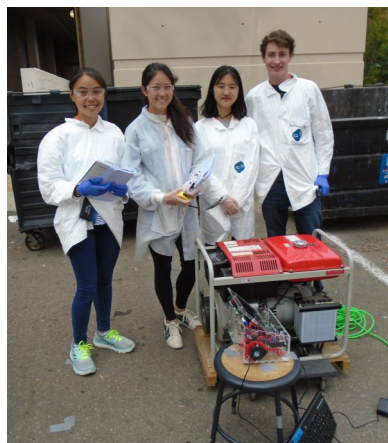
"A part of our lab work is tied to what we learn in lecture, so on Monday we found the viscosity and cloud point of our biodiesel. Previously we had learned that those two features affect the viability of biodiesel in widespread use so we tested our samples to prove what we had talked about in lecture." Anthony O.

"Today we had a discovery lecture from Dr. John Hildebrand about offshore archaeology. We also continued to work on our final projects." Meera P.

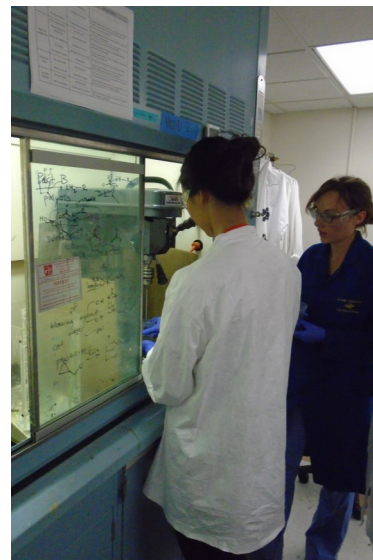


"A critical aspect of our biodiesel is the functional groups which make up the fuel and determine its properties. Therefore on Wednesday we used an instrument called the FTIR which used infrared radiation and its

diffraction with a crystal to measure the different functional groups inside our sample of biodiesel. This was a really eye opening experience and taught me about the technology that chemists use in their work." Jason P.



"Today, we gained insight into many different clusters ranging from music to tissue engineering." Gokul R.



CLUSTER 7: BIOENGINEERING/MECHANICAL ENGINEERING: THE AMAZING RED BLOOD CELL



Week 3...how has our time at COSMOS gone so fast?!? COSMOS Cluster 7 has completed two weeks working in the wet lab and focusing on red blood cells and bioengineering. Last week we visited J. Craig Venter Institute (JCVI) and learned about the wide variety of bioengineering that has and is currently happening at JCVI. It was an absolutely beautiful building and was so amazing to be in the presence of professional who are making profound scientific advances.

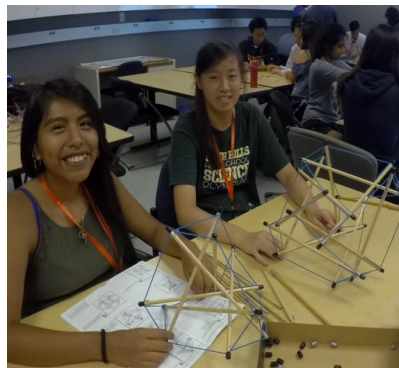
This week we transitioned into mechanical engineering with a small portion of coding and the students have been very busy learning so many exciting and interesting new things! Also, our cluster started working on our final projects, and the students are eager to continue developing their projects.



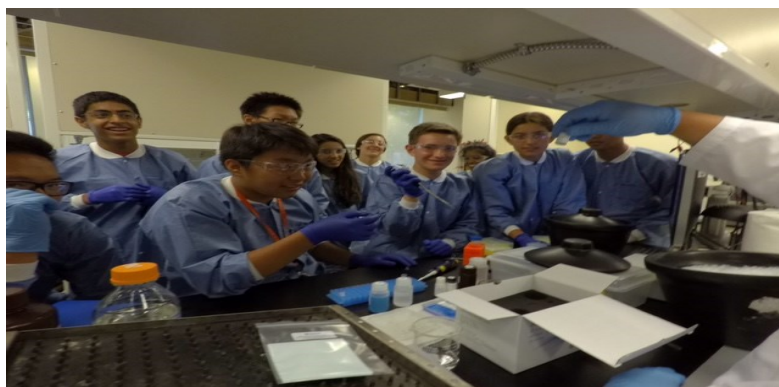
Here is what the students have to say about the last week:

"This week Cluster 7 started on a new exploration: Mechanical Engineering! After completing the bioengineering portion of the class, we said goodbye to Dr. Vera and started our mechanical engineering adventure with mechanical and aerospace engineering professor Maurício de Oliveira and teacher assistant Janelle Duenas. For the first lab of the week, we started with the construction of a tensegrity structure. Using Tensegritoys, Professor Mauricio challenged us to reconstruct a sample tensegrity structure. The structure we attempted to build using only rods and elastic bands with none of the rods touching each other and being held up by tension from the bands. This chal-

lenge turned out to be a real struggle with many groups having to redo their structures MANY TIMES, but by the end of the class, everybody had successfully built the structure! After powering through this challenge slowly and meticulously, professor Mauricio managed to blow everyone's minds by showing us a way to build the structure in less than a minute with all the parts assembled beforehand. To say the least, it was no doubt frustrating realizing just how simple this odd structure was but it inspired everybody to see these tensegrity structures from a new geometric perspective and make their own awesome and complex structures. After lunch, we went back to the computer lab and learned how to program using Python. This proved to be quite the challenge, and for many of us, it was our first time programming!! Today was definitely a great start for the last two weeks of camp and set the tone for how the rest of camp was going to run. Can't wait for what's to come!!" - Tiana



"After our miserable attempts at making tensegrity structures two days ago, we returned to the lab and made another attempt. This time, knowing our previous mistakes, we had meticulously followed the instructions to the T, and before lunch, we managed to create structures like tetrahedrons, octahedrons, and icosahedrons using simple rods and elastic bands. Upon returning from lunch, we all connected to a self-balancing robot, known as a Mobile Inverted Pendulum (MIP), and had gotten to steer it. The hour of fun went by, and we then proceeded to the coding aspect of the activity. We had looked at and analyzed the code behind the MIP and also fetched data from the MIP to plot graphs like position against time and velocity against time." - Will and Jonel



CLUSTER 8: TISSUE ENGINEERING AND REGENERATIVE MEDICINE

Week two ended with a day of project planning, presenting for feedback, and research. Our esteemed professors, Dr. Sah and Dr. Gaetani answered our extensive array of questions and our TA's, Erica, Becky, Marisa, and Nathan helped with every step. As we began week three each project group of three students was able to develop a title, summarize background information, propose an experimental approach with an aim, hypothesis and study design, and plan appropriate laboratory methods and select proper project analysis.



At last, everyone was prepared to begin the much anticipated projects. Briefly, three groups will be studying Cartilage Tissue Engineering: Areli, Sandhya and Tyler will be looking at the 'Effect of Matrix Depletion on Resilience of Immature Articular Cartilage', Jennifer, Robin and Trancy will be studying the 'Effect of Matrix Depletion and Compression on Chondrocyte Microenvironment and Viability' and Nathan, Priscilla and Simran will be investigating the 'Modulation of Gel Contraction by Chondrocyte-Matrix Interaction'. The other three groups will be focusing on

Cardiac Regenerative Medicine: Julianne, Katie and Sophie will be looking at the 'The Effects of Laminin and Fibronectin on Cardiac Spheroids', Erin, Andrew and Sydney will be studying, 'The Effect of ECM Proteins on Cardiac Progenitor Cells Grown in 3D Scaffold' and Alejandro, Lauren, and Victoria will be investigating the 'Fibroblast Influence on Collagen Contractions and Cardiac Progenitor Viability'. In the lab, tissues are being processed, gels formed, cells cultured, and materials are being prepared and tested. After an intense week in the lab our projects are underway and we eagerly await the results in a few days.



Dr. John Hildebrand, from Scripps Institution of Oceanography, was our speaker for the Discovery Lecture this week. He discussed his research in marine archeology, specifically relating his studies to a recent mastodon find in San Diego which provided evidence that humans reached North America over 130,000 years ago, much earlier than previously believed. In Cluster Explorations, it was all about cluster pride, as Dr. Sah presented Cluster Eights under-

takings to all of COSMOS. Dr. Sah definitely impressed everyone when he gave brief glimpse into the 'GR8' projects underway! In science communications, we presented our ethics topics within cluster, worked on creating posters, power points, and papers to document our projects and prepared for our upcoming presentations. Cluster 8 continues to be 'GR8' as we have mastered the required expertise to plan and execute our projects.



CLUSTER 9: MUSIC AND TECHNOLOGY

This week saw lectures and essays give way to brainstorming, creativity, and collaboration as the Cluster 9 team members formed groups of three and began work on their capstone projects. Essays explored an ethical issue related to sound, related technology, or the music industry. The essays submitted by the Cluster 9 students were of high quality. A number of essays were forwarded to the COSMOS administrators to be considered for COSMOS awards that will be presented at the closing ceremony. Teacher Fellow, Jeff Mellinger, selected the three for intramural awards. The first, second, and third place awards went to Tejal A., Emily K., and Rochelle T., respectively.

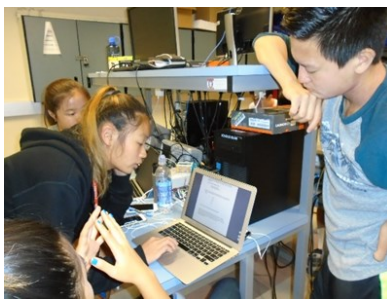


Among the most popular technologies used by Cluster 9 students are Pure Data, Arduinos, and the Python computer language. Pure Data is a visual programming language that provides users with the capability to create wide array of musical sounds and general sound effects. As one of the first systems presented to the cluster, several of the groups are using this program extensively in their projects. Of the microcontroller systems available, the most readily comprehensible is the Arduino. While an Arduino does not have digital signal processing capability useful in producing audio sound it has many uses as a general-purpose control of automated functions. The functionality of Arduinos is enhanced when it is connected to external cir-

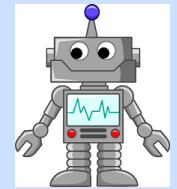
cuitry. Python, though a relatively new computer language is rapidly gaining popularity for its ease of use.

The projects being developed at this point include a system that uses artificial intelligence to produce a melody for an input sequence of chords (Ryan, Ike, Bhargav); software that uses a piezoelectric stimulus to produce a percussion sound (Tejal, Emily, Mari-amma); an instrument tuner and synthesizer activated by voice recognition (Nick, Sam, Jun); a system that compares a performed piece of music against its corresponding sheet music (Sihyun, Elena, Ashley); the use of neural networks to apply style transfer in synthesizing sound (John, Eric, Mark); a glove with internal sensors to produce different percussion sound based on the motion of the hand (Derek, Johnny, Laryn); The computer-generated creation of a harmony to accompany a user input melody (Saachi, Rochelle, Kaylee).

Students will be devoting some extra hours over the next week to complete their projects for the August 5 presentation.



CLUSTER 10: ROBOT INVENTORS

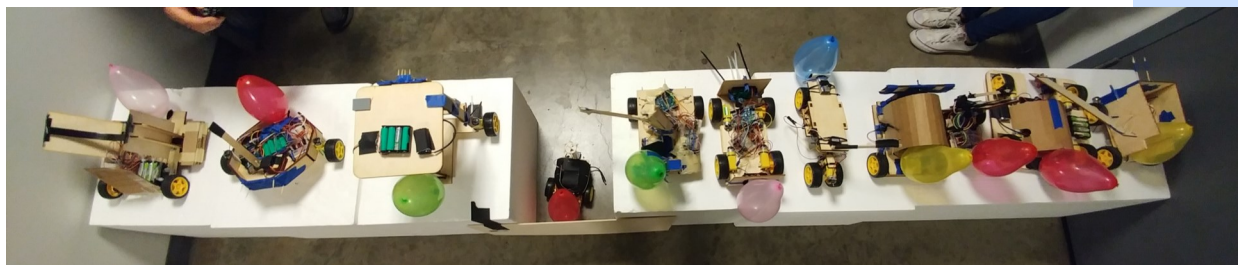
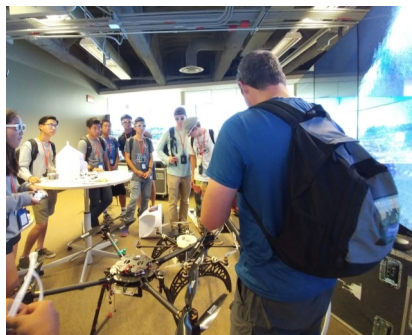
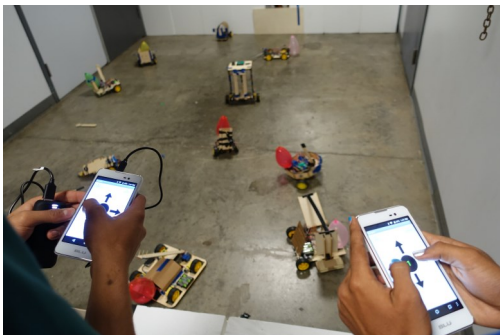


This past week has been very exciting in Cluster 10! We finished last week with our first field trip, to company called 5D Robotics. The students saw robots in action, including a tracking robot, drones, and a self-driving golf cart (which they got to ride on!). Students got to speak to experts in robotics from the company and ask many questions about how these robots were developed.

Week 3 kicked off with a fierce competition between robots. The students designed "Mario Kart" inspired robots, with balloons attached to back. Programming an arduino, students had to design and build a car that could defend itself from attack while trying to pop balloons on other vehicles. We had three rounds of competition: last robot to have its balloon popped, largest number of balloons popped (the TAs participated in this one as well!), and a capture the flag team competition. Both strategy and design were in play, as well as driving technique (using an app on a cell phone).

The week continued with a new design challenge - build a walking robot! The robot may not roll, but must instead take individual steps. This challenge will push their physics understanding, as well as continuing to expose them to new techniques using servos (they are only allowed standard servos this week; no continuous motion!). We will end this week with a competition between walking robots - who can cover distance the fastest! This week students also developed project proposals for their final robots, and had them reviewed by faculty for feasibility. Next week they will finalize designs and build their own robots!

Students also had the opportunity to tour UCSD's robotics and visualization facilities at Calit2 and the labs of both Dr. Schurgers and Dr. Yip. They heard from both professors and graduate students about their work. We also had guest speaker in the fields of robotic use in oceanography, engineering industry (the world's largest plane and the James Webb Space Telescope), and the field of soft robotics. Finally, this week we also have a field trip to General Atomics. Students will tour one of the largest developers of drones, surveillance equipment, and radar technology. Look for updates next week!



CASINO NIGHT



Katie G. 7/16
Arshia S. 7/17
Seohyun A. 7/23
Melany F. 7/25
Monica T. 7/26
Pranav K. 7/27
Sergio S. 8/2
Jennah E. 8/3
Jason L. 8/5

Happy Birthdays!



