



## Week 4 Newsletter

### In this issue:

Information for COSMOS Alumni!	1
Discovery Lecture/Residential	2
Congratulations	3
Cluster 1 Highlights	4
Cluster 2 Highlights	5
Cluster 3 Highlights	6
Cluster 4 Highlights	7
Cluster 5 Highlights	8
Cluster 6 Highlights	9
Cluster 7 Highlights	10
Cluster 8 Highlights	11
Cluster 9 Highlights	12
Carnival	13
Dance	14
Talent Show	15
Treats With Tu	16
Week Four	17
Closing Day`	18

### CLOSING DAY AND BEYOND...



The four weeks of COSMOS seem to have flown by this summer. Faculty, teacher fellows, cluster assistants, residential life staff and office staff have worked hard all year to provide a unique opportunity for students to grow and excel both academically and socially. Over half of our students this summer will be entering their senior year of high school this fall and will have a much better idea of what's ahead as they complete their college applications. Hopefully some of our students from this summer will return to UCSD for their college experience. If you do, stop by our office and say hi! Many of our cluster assistants and residential life advisors were COSMOS students within the last two to three years and are now undergraduates at UCSD. For most of these COSMOS alum, their time at COSMOS remains a special memory and time, one that they are excited to give back to. Perhaps that will be you!

### COSMOS ALUMNI Yes...that's YOU!!!

Now that you're a COSMOS Alum, please stay in touch and check back regularly for information about alumni events and internships:  
<http://www.jacobsschool.ucsd.edu/cosmos/alumni.shtml>

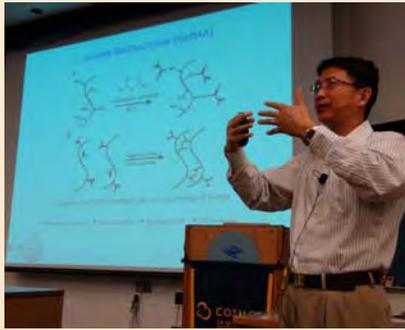
### Continue to support COSMOS by donating!

Please visit: <http://cosmos-ucop.ucdavis.edu/>



### COSMOS RECRUITMENT

COSMOS alum are our best ambassadors. If you would like to help promote the COSMOS program in your area, contact us at [cosmos@ucsd.edu](mailto:cosmos@ucsd.edu).



## DISCOVERY LECTURE SERIES

“ Nano and Microscale Rapid 3D Bioprinting for Precision Tissue Engineering ”

The final discovery lecture of the summer was presented by Dr. Shaochen Chen, Professor in the Nanoengineering Department here at UC San Diego. Dr. Chen's talk was titled "Nano and Microscale Rapid 3D Bioprinting for Precision Tissue Engineering." Dr. Chen discussed how biomaterials are synthetic or natural materials suitable for use in constructing artificial organs and prostheses or to replace bone or tissue. Medical implants made of metals or glass

would permanently remain in the biological tissue if not removed surgically. Biomedical nano/micro-devices made of biodegradable polymers, however, would naturally degrade and disappear in tissue over a desired period of time, eliminating the need for an additional surgery for implant removal. Dr. Chen's lab has been working on developing laser and UV light based 3D bioprinting techniques for biomaterials. They also investigate the mechanical, chemical and biological properties of such biomaterials and explore cell-material interactions through experiments and simulation. Their targeted applications are drug screening and tissue regeneration.



## RESIDENTIAL LIFE

The contrast of smiles and laughter with hugs and tears during the last days of programming as students ready themselves to depart from their journey here at COSMOS leaves us also with a mixture of emotions at Residential life. From a staff standpoint, these four weeks of sports, dancing, crafts, art, movies, and more has left each and every student with new friends, new experiences, and new knowledge on how to maintain a balanced and healthy life. Of course, we had to end with a bang during Week 4. Over the weekend, students enjoyed an outing to La Jolla Shores. There was also a talent show, a Carnival, a movie night, as well as a last dance. Although all of COSMOS was extremely busy trying to finish and perfect their final projects and presentations during the week, there were still plenty of activities to help them balance out all that hard work. Students enjoyed a gender fishbowl activity, a resume and interview workshop, and a large variety of physical activities. We had a visit from COSMOS Alumni, who shared their experiences on how to apply COSMOS to college life. The Talent Show was amazing with dance performances, instrumentals, singers, and more smiles than could be contained in a two hour show. We also had the last of the birthday parties, last run, and last meal. Jerome and Mitchell had a great conversation on perspective, Rachel T. & Selena had the last laugh with some shaving cream, Anna extended her positivity, and Hurlink blew everyone's mind with his hidden talent. Each time the word "last" was used, sighs could be heard abounding. All in all, fun was had, hugs were abundant and memories were created. We hope as students move on from COSMOS that they will look back fondly on their time at UC San Diego. They clearly will recall the amazing lessons learned in the classroom and we hope we have given them a positive insight as to what their college experience can be outside of the classroom. Thank you to families for entrusting your children in our care and thank you students for participating, growing, and living with us. We had a great month with you!



# Treats with Tu



As a reward for being outstanding throughout COSMOS, some students were selected to have a special Q&A session with the Director of the COSMOS program, Dr. Charles Tu. They were awarded with an array of treats, such as: Carne Asada Fries (a Southern California favorite), brownies, cookies, chips, crackers, fruit, and drinks. The students asked many questions regarding COSMOS logistics, Dr. Tu's life, career, and family. One of the more interesting questions was regarding Dr. Tu's hobbies, which includes his love for taking pictures.. Dr. Tu attends many of the student residential events where he takes tons of photos and videos. To check out Dr. Tu's photos follow the link below:

<http://bit.ly/COSMOSDRTUPHOTOS>

# CLUSTER 1: COMPUTERS IN EVERYDAY LIFE



**Cluster 1:** <http://ucsdcosmoscluster1-2015.blogspot.com/>

A lot happened at the end of last week. Last Thursday, we finished up our walking robots and had varying levels of success – moving fast/slow or it moves through air!



Leo Porter came to speak to us about multi-core processors. We learned that more processors doesn't necessarily mean a faster computer. It's important to know what the tasks are and how to appropriately "schedule" them.

Friday afternoon we had the opportunity to tour CallT2 where Curt's lab is located and Engineers for Exploration (E4E) does their research as well. We visited the Visualization lab which had a tiled display of monitors. We got to "fly through" 3-D representations of buildings and towns. It was as if we were at the Maya temple. Next was the Audio Spatialization lab (Spat lab). It had twenty-four speakers around the room, and we heard the difference between playing the rain on all 24 speakers with and without processing. Once the sound was processed, it sounded more realistic. They also had an array of speakers which beamed sounds. Depending on where you stood, you'd get a different



sound. Also, the speaker array could send different sounds to each ear and make it sound like someone was talking on one side and someone was getting a haircut on the other side. Very realistic!

Monday we attended a lecture by a Jim Trezzo, who spoke about Open ROVs (Remotely Operated Vehicles) which are deployed in the water with a range of sensors that allow it to be useful in many fields. They can be used not only for underwater observations but specimen collection, ocean health monitoring, marine archeology and vision systems.

The majority of this week, we focused on our final projects. We got



to propose our own final project and get it approved. It had to involve AppInventor, Scribbler Robots or Arduinos. After many hours of hard work and some laughs at the weird things our programs would do, we are just about done with many of the milestones in our projects. A couple groups are working with AppInventor to implement ideas from needs they saw around them.

Some teams took on the challenge to use both Scribblers and Arduinos together! They used sensors on both technologies to interact with each other. Others are having AppInventor, Scribbler and Arduino communicate together in their project. There are many ways to apply the engineering and science from our



final projects to larger robots. Some of us hope to continue to work on our projects after COSMOS and submit it to a science competition this coming school year, such as a science fair. We look forward to sharing our projects with everyone on closing day.

Our faculty was thoroughly impressed with our projects and it was difficult for them to select the Gordon Leadership Award winners for our cluster. The videos of our final presentations will be available on our blog.

We would really like to thank all those that helped make our cluster and COSMOS experience one we'll never forget. From faculty (Professor Ryan Kastner and Professor Curt Schurgers) to our TAs (Lucy, Luis and Khelsey) to our RAs (Mara and Josh), you helped us learn a lot and have a great time in the process!



# CLUSTER 2: ENGINEERING DESIGN AND CONTROL OF KINETIC SCULPTURES

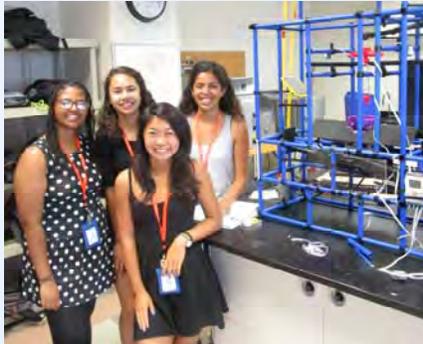


Monday morning students eagerly returned to the design studio to resume design, construction, and troubleshooting their final kinetic sculptures. Having successfully completed the mini sculptures, students were challenged to come up with a theme for the "big" sculpture and start thinking of design ideas. Foosball table prototypes got bigger, catapults were made user drivable with new multiple targets, new track sections were added, pendulums and pulleys were prototyped and tested, and basketball hoops were added. What a thrill to see how well students have utilized the engineering skills picked up in the last three weeks. In addition, the level of teamwork required in dividing up tasks, making prioritized lists and getting things done is considerable and the students rose to the challenge.

Monday afternoon Dr. de Callafon spoke to the students about the "hidden science" of control and how to get the most out of their programming of their kinetic sculpture. This was a fasci-



inating topic as it integrated mathematics, physics and computer science. We have control to thank for DVD and bluray players, cruise control in cars, balancing in a Segway personal transporter, and many products that we use every day. In fact, we only really hear about con-



control in the rare cases when it goes wrong, or when it is not used.

Tuesday morning's Science Communication session saw teams focused on working on their posters, oral presentations and team websites. The skills these students pick up as they document their engineering process will likely pay dividends in a higher level of academic performance during the year. A



number of teams have employed the 3-D printers available to them to print out their own design custom parts for the sculptures. In addition, they are drawing parts in AutoCAD and cutting them out with the laser cutter.

Wednesday teams worked efficiently and quickly to complete their sculptures while making sure

to document the process. Timelines were reconsidered as the ambitious plans from early in the week bumped up against the reality of the time constraints. Students worked at a furious pace to make sure that their presentation posters were finished by the end of the work day.

Thursday teams finished their oral presentation slides and practiced their talks with whoever they could get to listen. In addition, finishing touches were put on the sculptures. It seems the mini sculptures have morphed into complex mega-sculptures!

After a single final hour of construction time in the design studio on Friday morning, our six incredi-



ble teams ventured down to the computer lab to give their oral presentations to cluster nine. After lunch, our teams served as the audience and watched the presentations by cluster nine teams who wowed us by showing us how they designed and built musical instruments from circuits. Musical performances with these instruments was a highlight!

Students are excited to reunite with their families and to share the projects that their hard work have produced. In addition, I am sure they will miss their new found friends from cluster 2 and the stimulating, creative environment of the Design Studio.



# CLUSTER 3: LIVING OCEANS AND GLOBAL CLIMATE CHANGE

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.

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

as one set of data is complete, new observations can be made, and other ideas are always postulated." – Carson Jones



"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



"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



"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.



"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



"It's fascinating how the research process seems almost endless. As soon



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



# CLUSTER 4: WHEN DISASTER STRIKES: EARTHQUAKE ENGINEERING



Our final week has flown by, and COSMOS 2015 at UCSD will soon be a memory for the talented students of Cluster 4. We have witnessed their phenomenal growth over the past four weeks, coupled with their numerous accomplishments which filled us with pride. And we shouldn't overlook the many friendships that blossomed during this summer experience on one of the most beautiful university campuses anywhere! Week 3 concluded with Kevin's discussion highlighting the importance of soil characteristics and mineralogy in structural design. Students got up close and personal by examining the properties of clay and creating some amusing sculptures in the process. As week 4 began, testing had concluded with all eight project groups, and attention was directed at communicating the results of their structural testing and analysis.



The Tuesday Discovery Lecture earlier this week got us off to a motivational start, as we learned about 3-d printing and biofabrication. Students were amazed to learn about the process of producing functional body tissues in microscale. Students also engaged in a Q&A

period about college life with our cluster assistants James, JJ, and Kenneth. There were many great questions that our CAs willingly answered spanning areas from dorm life and campus dining to the rigors of academic success and speaking effectively with professors.



Wednesday and Thursday were dedicated to project poster and presentation design and proofing. They gratefully accepted the editing



suggestions and formatting advice as they moved closer to producing interesting and robust electronic posters and presentations. Interesting to think that in four short weeks our students proceeded from absorbing the challenging lecture material, to researching project ideas, designing and building, analysis and retrofit, and finally retesting and analysis. We can all share in their pride with such an accomplishment.

Finally, Friday arrived and our groups formally presented their projects to the students and staff of Cluster 5. It was such a relief to bring the projects to conclusion, and their presentations were very impressive. The day concluded by acknowledging our special students in the traditional Cluster 4 way.



We enjoyed a pizza lunch, scavenger hunt, and private awards ceremony. Later in the afternoon we rehearsed for Saturday's ceremony in Warren Mall.

COSMOS is a one-of-a-kind opportunity, and we thank you for allowing and encouraging your students to experience all that was offered here at UCSD. We will truly miss their warmth and wit, their sincere friendliness, and their contagious positive attitudes. We hope to keep in touch and to follow their future plans!



<https://sites.google.com/a/eng.ucsd.edu/ucsd-cosmos-cluster-4-2015>



# CLUSTER 5: FROM LASERS TO LCDS: LIGHT AT WORK



Our final week of COSMOS has passed and what a week it was! We toured the Qualcomm Center at UCSD and saw their 3-D visualization technology at work in the StarCAVE and NextCave before heading to the Prototyping Lab to see some exciting work being done by undergraduates who are using unmanned aircraft to survey prehistoric sites in Central America. In addition to our Qualcomm Center tour, we were able to make a visit to Cymer, which is a San Diego company that creates high-power lasers that are used by 70 – 80% of the world's microchip manufacturers. For the first time in the history of the program, COSMOS students were able to view Cymer's Extreme Ultraviolet (EUV) laser which emits light with a wavelength of just 13.5 *nanometers*. This technology is expected to drive microchip manufacturing for decades to come.

Two of UCSD's cutting-edge researchers also stopped by to discuss their current research with the class. The first, Professor Boubacar Kante, explained his research group's pursuit of invisibility. In his talk, we learned how he is able to create an "invisibility cloak" that can bend light to make objects disappear from sight. The second guest, Professor Yuhwa Lo, gave the class an overview of photons and explained how highly refined and sensitive the human eye is in terms of its imaging capabilities.

Even with such excitement, the real culmination of the week was the presentation of the research projects. The six student groups toiled to perfect their pitch by practicing in front of their lab manager and graduate TAs before the final, stressful task of delivering their findings to an audience of friends and family on Saturday. The end of the week is a bittersweet time but we are all richer for having experienced COSMOS at UCSD during the past month.





# CLUSTER 6: BIODIESEL FROM RENEWABLE SOURCES

“After our cluster exploration session, our cluster headed towards our classroom. After lunch, the algae group had their share of fun measuring out and feeding dry ice to their algae cultures, hoping not to get frostbite nor let all the CO<sub>2</sub> sublime before reaching the culture flask. The aerosols group had an equally fun day burning biodiesel to measure particulate concentrations in the air.

After our cluster activities had ended, a few of us volunteered to stay at the lab to pass on the knowledge of biodiesel brewing to Latino/a students from a summer camp (Institute of the Americas) not much different from ours. We instructed and guided groups of students in the making of biodiesel from the mixing of the original oils to the washing and drying of the final biodiesel product. We all enjoyed attempting to communicate with the students and fooling around with Google Translate.” - Raylen Li

“Friday morning Dr. Pomeroy focused his talk on algae, explaining its various environmental and economic benefits and its global significance as a sustainable resource for fuel. He left us intrigued over the possibility of algae biodiesel as a growing source of fuel looking into the future. Dr. Albizati began by reviewing a series of functional groups, specific bonding arrangements of elements which appear together in larger compounds. Then, he introduced the ABCD gas laws, before concentrating on the ideal gas law. He explained how the ideal gas law has many important implications in various fields of science. After lunch we continued testing the quality of our biodiesel. After a long day in the classroom and at the lab, we had a blast watching the COSMOS Talent

Show when we got back to Eleanor Roosevelt College for programming.” - Riley Henderson

“On Monday, we started our fourth and final week of COSMOS! Dr. Albizati gave us two lectures today. The first was on chemistry and fuels in the real world. We learned about oil production and biomass composition. After a break, we had our second lecture: tips on a career of science in the real world. We learned a lot about benefits and drawbacks of going into a career of teaching science versus working in a private company. It was very interesting, and I think most people en-



joyed it. After lunch many groups continued their lab work, finishing up their testing and starting to work on their posters.” - Selena Huang

“On Tuesday morning, we walked to Center Hall for our last ever Discovery Lecture. We listened to Dr. Shaochen Chen talk about nanoengineering, which involves mechanical engineering combined with biology. Afterward, we had Scientific Communication where we walked to Bonner Hall and Urey Hall to look at some posters. They were all very unique, and we obtained a lot of insight and new ideas that we were excited to add to our own posters.

After lunch, we worked on putting finishing touches on our individual

projects. We were also finally able to calculate the amounts of different FAMES, or fatty acid methyl esters, in our biodiesel.

As we continue to finish up our projects, it's finally hitting us that these are the final few days we have with our new friends. But for now, we'll cherish the moments that we have together.” - Tiffany Zhang

“We spent nearly the entire day working on various tasks related to analytical tests on our biodiesel and our projects. Some students filled out a Certificate of Analysis form with facts about the composition of their biodiesel, which is checked by the professors for documentation that the students have made good quality biodiesel. Others continued working on their Power Point presentations for the group projects. There were even students who helped each other practice presentation skills, identifying areas of improvement in speech or body language.” - Wilson Tam

To finish off the week with Cluster 6, our project groups are evaluating the results of their experiments and preparing their presentations.

“It has been a pleasure working with Cluster 6 over the last month. The Cluster has come together, learned a lot of organic chemistry and options for resolving the fuel and climate situation the world is dealing with. The Cluster has worked together well, and had a lot of fun in the process. I appreciate all the effort and hard work that the students, Cluster RA's, Cluster Assistants and Faculty Instructors have put in to make this a fantastic summer for Cluster 6” - Mr. Towler



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

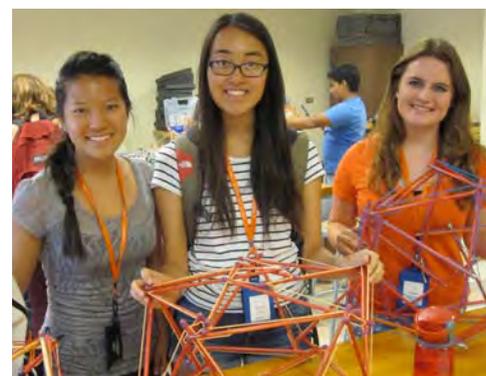


The final week for cluster 7 was a busy one with students learning new engineering concepts that apply to tensegrity structures as well as completing all the preparations for the COSMOS final projects. Professor Mauricio de Oliveira continued to develop the concept of tensegrity as stu-

dents began to explore the engineering principles of feedback and control using a DC motor equipped with a potentiometer and interfaced to a beaglebone computer running Python programming. Students learned how to add line by line Python3 code to implement numerous experiments to learn how a motor responds to variable voltages and how feedback is used to regulate voltage changes. These investigations were an excellent exposure to the types of engineering analyses that can be applied to tensegrity structures that can serve as models of red blood cell morphology and function.

Cluster 7 students had their last field trip this week to Illumina, Inc., a leading local biotech company that develops and markets products for the analysis of genetic variation including DNA sequencing, genotyping, gene expression and DNA methylation. Students were also treated to an insightful overview of life at UCSD by former Cluster 7 student William Coulter, a 4<sup>th</sup> year UCSD bioengineering major. Students also got a close up look and some hands on experience with Professor Bewley's MIP and Rover robots (featured during his week 1 Discovery Lecture) that was presented by Tasesa Bleything, a Ph.D. student in Professor Bewley's lab and former Cluster 7 TA.

As we reach the conclusion of COSMOS 2015, Cluster 7 students wish to thank Dr. Mauricio de Oliveira and Dr. Carlos Vera, and Cluster 7 TA's Anusha Pasumarthi, Sherry Zhang and Tamoz Dunov for all their efforts in guiding a detailed exploration of bioengineering and mechanical engineering principles and their application to studies of the amazing red blood cell. Thanks also to all COSMOS staff with a particularly big shout-out to cluster 7 RA's Martha and Kevork. It was a truly memorable academic and residential experience at UCSD this summer for all Cluster 7 students!



# CLUSTER 8: TISSUE ENGINEERING AND REGENERATIVE MEDICINE



At the end of last week everyone had received guidance from our esteemed Professors, Dr. Sah and Dr. Gaetani and felt prepared to complete their background research on their projects over the weekend after their trip to the beach and the carnival.



Week 4 began with collaborative meetings to organize supplies, with the help of our highly appreciated TA's Evan and Chris, and finalizes procedures to ensure the success of the projects. It was astounding to us just how much planning and preparing was required and we had countless questions that our group leaders were always there to answer. With the expert guidance of Dr. Sah; Shivani, Stephanie and Pravin have been studying fibrillogenesis and gel formation, Lauren Jiayi and Ken are investigating the regulation of chondrocytes by bound growth factors, and Jennifer, Grace and Franklin have examined the role of epiphyseal growth plate matrixes in endochondral ossification.

Under the leadership of Dr. Gaetani; Catherine, Annabel and Milan have evaluated sulfate glycosaminoglycan hydrogels for retention and delivery of growth factors, Michelle, Jerome and Karissa have performed liver decellularization in the form of hydrogel, and Phillip, Roshini, and Amanda have worked on the generation of microspheres from cardiac decellularized ECM.

Our last Discovery Lecture was from Dr. Shaochen Chen. He spoke to us about his nano manufacturing processes and nano mechanical systems for biomedical and life sciences. Cluster 8 was thrilled with his talk as he went into detail about his work in biomedical engineering on a small length and time scale and Dr. Chen graciously answered all of our questions!

Laboratory time was filled with a tremendous amount of hard work as projects had to be finished. All of the experiments had to get done, data collected, and analysis performed. Then with all of the data in hand, each group had an electronic poster to complete for their presentation, a power point presentation and a research paper. The end of this week will bring COSMOS to a close. The students have mastered their lab skills, polished their technical writing, and spent countless hours developing and implementing their leading edge projects. They will have the opportunity to show off their work to each other on Thursday, to Cluster 7 on Friday, and to family and friends on Saturday. An enormous thank you to our brilliant leaders, Dr. Sah and Dr. Gaetani, and our incredible Teaching Assistant's Evan Teng and Chris Yin. Cluster 8 has had a Gr8 summer at COSMOS!



# CLUSTER 9: MUSIC AND TECHNOLOGY

On Thursday July 23rd, we examined an abstract on acoustic sound which refers to electronic music that is played through speakers rather than being performed live. Afterwards, we had a presentation on music composed using a computer program known as Logic Pro.



Then, two guest speakers came to tell us what they do in music. The first guest speaker was Music For Peace, an organization that works with both kids and adults to create songs for a good cause. Javier and Tonia showed us what it is like to record a song with the help of Darius, Avneesh and Charmhel. Javier also showed us examples of songs he had completed in the past.

The second guest speaker was an interesting man. Patrick Hadley had worked with a partner to come out with the Array Mbira. The classic Mbira was a South Afri-

can instrument played by plucking steel tines. However, Mr. Hadley had arranged these tines in a specific pattern to make it very easy to play and very easy to learn. In fact, we found out through his speech that Taylor Swift had used his Mbira in her song *Clean*. His Array Mbira also appears in the sound mix of

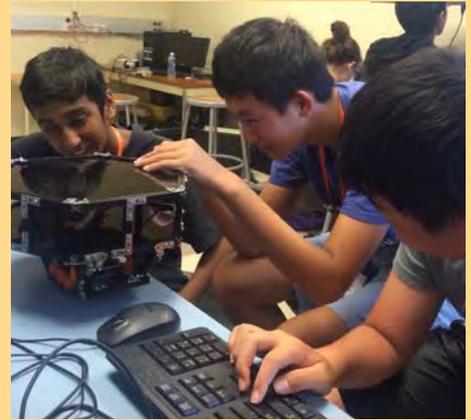


later *Breaking Bad* episodes and current *Better Call Saul* programs. He showed us how lovely the instrument sounded by playing it himself, and then allowed us to play with it ourselves. Without any prior knowledge of the instrument, we were able to play it decently thanks to the special arrangement of tines. By the end, everyone was left in awe and amazement. Overall, it was a lovely presentation by Patrick Hadley.

On Friday, we spent the entire day working on our final projects. First thing in the morning, we headed straight to the lab where we have all the tools to work on our projects. For many students, this was our first long session where we were able to work on our projects. These final projects use a wide variety of programs that we have learned throughout COSMOS. The TAs and the professors circulated throughout the class to help us when we had trouble.

Overall, it was a very productive and fun day.

Cluster 9 started the final week finishing up final projects. Every group finalized their project ideas, from one group creating a filter processor that controls the outcome of a song to another group programming a robot that detects



the source of sound. With diverse ideas, each group was able to incorporate information that was taught during lectures. Groups used either Raspberry Pi's, Arduino, Python, Pure Data, sensors, and other materials that would allow all to get their project working. During the whole day we were working with Colin, Eric, Mauricio, Joseph and Shlomo in order to figure out the program languages or figure out the hardware. Each group is on their way to completing a successful project. --Audria, Sophie, Amelia, Aditya, Charmhel, Eric



# At the CARNIVAL





**DANCE**





# TALENT SHOW





Open Mic—Just Dance—Resume Workshop—Friendship Bracelet—LARP—Sharks&Minnows—Zumba/Salsa  
Basketball—Murder Mystery—Ultimate Frisbee—Mural Making—Karaoke—Interview Prep

To see more photos from  
COSMOS 2015, go to:  
<http://bit.ly/2015COSMOSphotos>



**WEEK FOUR**

# CONGRATULATIONS!!!

...to our Ethics Essay Awardees



.... and Gordon Engineering Leadership Center High School Fellows.



# COSMOS 2015



CLUSTER ONE



CLUSTER TWO



CLUSTER THREE



CLUSTER FOUR



CLUSTER FIVE

# CLOSING CEREMONY



CLUSTER SIX



CLUSTER SEVEN



CLUSTER EIGHT



CLUSTER NINE



TEACHER FELLOWS