



COSMOS UC San Diego

California State Summer School for Mathematics and Science

UC San Diego
JACOBS SCHOOL OF ENGINEERING

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

Week 1 Newsletter

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COSMOS 2019 has begun!

Cosmos is here and what a week it has been! The students are settling in, making new friends and becoming familiar with the campus. This newsletter, the first of our weekly newsletters, will provide you with a glimpse into your students' lives over this past week.

CONTACT INFORMATION

COSMOS Office Hours:

(during the summer program)

Monday - Friday: 8:00am - 5:00pm

Email: cosmos@ucsd.edu

Phone: (858) 822-4361

After Hours: (858) 977-9505

MAILING ADDRESSES:

Please address **REGULAR MAIL** to:

Student's FULL Name
ERC Conference Services Center, COSMOS
9450 Gilman Drive
La Jolla, CA 92092-0100

Please address

PACKAGES to:

Student's FULL Name
COSMOS @ UCSD
9500 Gilman Drive #0429
La Jolla, CA 92093-0429



RECAP of OPENING DAY

Two hundred and twenty-two students arrived on the UCSD campus for the greatly awaited COSMOS 2019 program to begin. Families and staff were found dispersed throughout the Eleanor Roosevelt College (ERC) as students moved into their suites, their home for the next month. The joyful music and friendly environment was very welcoming. All people present walked to Peterson Hall for the Introduction presentation and Welcoming remarks. Students then split into their clusters and took a tour around campus led by the Residential Advisors. They later returned to ERC and said their good-byes to their families. Before dinner, the rules and boundaries for the program were clearly explained. Dinner was well-enjoyed at the college dining hall, Cafe Ventanas. After dinner, the clusters had ice-breakers for the students to begin meeting each other, for they will be working and learning closely together throughout the program. There were still plenty of activities left to do for the day. More ice-breakers were



played by everyone together and others that involved friendly competition between the clusters. Eventually, everybody headed to their suites, where they finished moving in and met with the group of people with whom they will be living. Lights were out by 11:00pm, to ensure enough energy for the next day. This was only the beginning...



RESIDENTIAL LIFE

We are pleased to inform you that your student is keeping busy and is active within the COSMOS community. The RAs have programmed around various topics and this week alone your student was able to participate in one or all of the following programs: Playfair, Magnet making-Laundry 101, Dodgeball, Egg parachute, Cookie decorating, Bingo night, and Dorm Decorations. These programs do not even include the Zoo and Beach field trips that we have planned for this upcoming weekend. We hope to provide a memorable experience for your students and that they enjoy themselves so much that they will not want to go home! This past week, the students have been working hard to prepare their cheers, choreography, and skits for the annual COSMOlympics competition between clusters this Friday. We have invited COSMOS alumni to serve as our judges. We are always excited to keep this tradition alive! We are 100% positive the students will post videos of the event, so be on the lookout for COSMOlympics highlights. Over these couple of days, safety has been our number one priority, and the students have been successful in creating a lively, energetic and safe community in a short period of time. All in all, COSMOS is off to a great start both in and out of the classroom. We have been having the time of our lives!

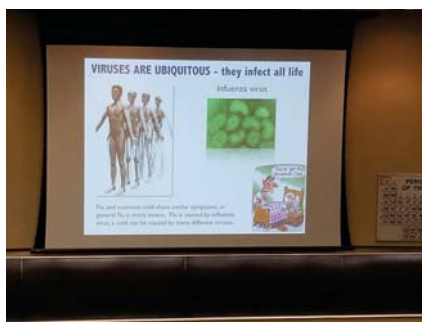


DISCOVERY LECTURE SERIES



Dr. Nicole Steinmetz, Professor of NanoEngineering at the University of California, San Diego gave our first fascinating Discovery Lecture, titled "Nanoengineering Gone Viral." Dr. Steinmetz discussed the importance of nanotechnology as the nanoparticle based delivery of chemotherapies. In the lecture, we learned that viruses are ubiquitous, infecting all life forms. The oceans in the world, for example,

contain millions of viruses - 5,000 types of virus are contained in 100ml of seawater. Some viruses cause human disease - Dr. Steinmetz focuses her research on the plant-based viruses which can provide therapy for humans who are afflicted with viruses. This treatment can even work for individuals who have cancer. Dr. Steinmetz is able to engineer the inside and the outside of the nanoparticles to attach to the virus inside the body. Dr. Steinmetz is looking into different applications of this therapy in her lab - one is molecular imaging: looking at the image to determine whether the treatment is working. This method also allows for non invasive detection of diseases. Also of interest is drug delivery. Nanoparticles can assist with drug delivery and determine if it is working. Dr. Steinmetz concluded her lecture by talking about some of the cutting edge research she is currently working on involving treating companion dogs that have tumors with plant based virus therapy. Four dogs have been treated, three are cancer free ten months after treatment, one dog was in full remission 22 months after treatment. In the future, Dr. Steinmetz hopes to treat humans with this therapy. As we can see, this is a fascinating area of research!



FAMILY WEEKEND REMINDER

Family Weekend is July 19th through July 21st. Students must be checked out by an adult specified on the Family Weekend Form between **5-9pm on Friday** and **must return between 2-5pm on Sunday**. Optionally, students can be checked out at 5pm on Friday & return by 9pm that same evening or alternately, 2pm on Sunday, returning by 5pm that day. We do not have the staff to accommodate individual schedules. **All students MUST be back to campus by 5pm on Sunday.** PLEASE speak with your child and let us know *via email* if their choice for the weekend has changed so we can staff appropriately. There are many students who will be staying on campus during the weekend and the RAs have planned fun weekend activities for them. **If you have any questions, please call our office at (858) 822-4361 or email cosmos@ucsd.edu.**



CLUSTER 1: COMPUTERS IN EVERYDAY LIFE

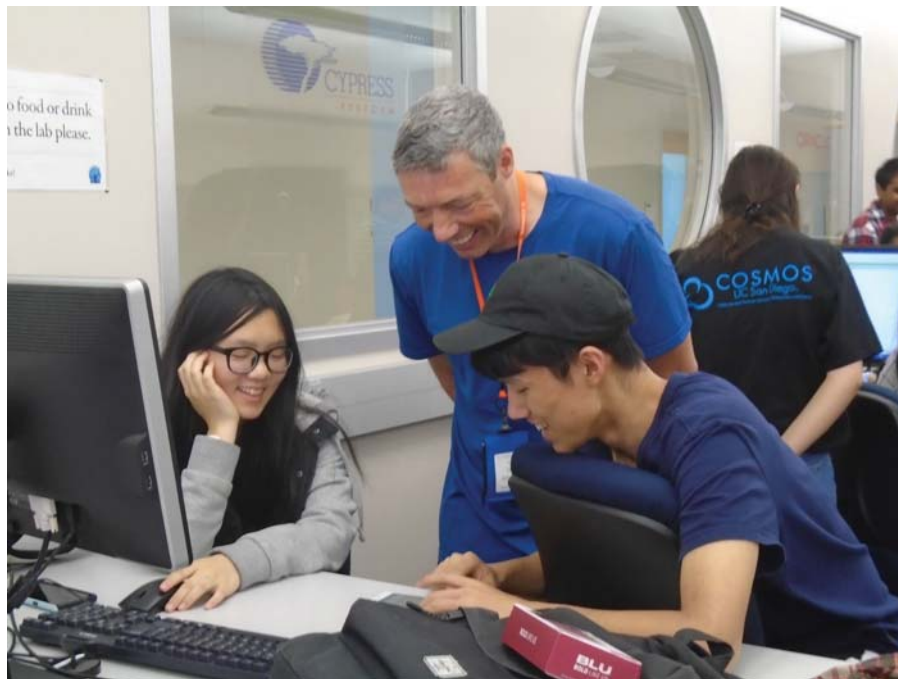
On Day 1 of COSMOS, Cluster 1 had not only gotten a glimpse of what was in store for the next four weeks, but created an Android app! During this first week, we began to learn AppInventor. It is a scripting language with a graphical interface which allowed us to put together our simple app in a matter of hours. AppInventor allows us to develop applications for Android based devices, like cell phones. Some of our first applications for the Android phone included making a Whack-a-Mole game. Next we worked on our own unique app with our partner. If we wanted to, we could put our apps up for sale in the Android Market! We were paired up in teams and made a group app which we will present on Thursday afternoon to the cluster. In about three days, we had created an app and could see what other features we still had to work on.

Wednesday morning started with some students from the Explorers for Engineering (E4E) lab. They spoke about their projects and their journey. Curt is one of the directors for E4E. One of the project we learned about was monitoring baboon movements in Kenya. The students gave us great insight to their experience and projects and offered some useful advice such as joining clubs, doing independent side projects, participating in internships, co-ops, experiences, hack-a-thons and conferences! We also had a chance to ask our own questions of these undergraduates (from UCSD, University of Mississippi and CSU San Bernadino) in smaller groups. Then we will began to learn about Python! It's a powerful language that is fast, friendly and easy to learn. In fact, our first lesson in programming on variables, controls, methods and functions resulted in us being able to read the

Python code and correctly concluding what it would do.

Thursday we heard a presentation from the Science and Engineering librarian that will help us do our research for our upcoming work. In the afternoon, we'll finish up our apps and present our work to our cluster. The presentations will be available on our blog - <http://ucsdcosmoscluster1-2019.blogspot.com/>. Our first presentation to the cluster will be on Thursday afternoon to share what each group did for their original app.

Friday we will learn about image processing. In lab, we'll begin programming in Python to take pictures and process the images. Videos of our app presentations and photos will be posted this weekend on our [blog](#).



CLUSTER 2: ENGINEERING DESIGN & CONTROL OF KINETIC SCULPTURES

On day 1, all COSMOS students were introduced to the necessary lab safety guidelines they need through their journey using UCSD labs. Detailed instructions were given on how to handle potentially harmful equipment or chemicals, and what to do in case of emergencies or hazardous incidents. After the training, students met with their cluster professors, Professor Raymond de Callafon, and Professor Veronica Eliasson, who shared the four week schedule and gave an overview of the first week's project; the Clock Project. Students introduced themselves, shared their interests, and the reason they chose cluster 2.



On the second day, COSMOS students attended a "Discovery lecture" by UCSD Nanoengineering professor, Dr. Nicole Steinmetz, who talked about "Nanoengineering Gone Viral". Afterwards, Cluster 2 students worked in the computer lab to develop their own Google sites that will be used as their digital portfolios, and used AutoCAD to start designing their clock parts. They also visited the Design Studio, learned shop fabrication and Lascercamm skills



On the third day, Dr. de Callafon talked to cluster 2 about Computer Simulations and motion. Students were introduced to the Working Model 2D (WM2D) software and had to complete a couple of challenges using it. Students then went to the Design Studio to work on fabricating parts and assembling their clocks.



On Thursday, all COSMOS students attended a lecture on how to use the Library resources at UCSD, which they will use throughout their stay at UCSD. Students will research and have access to a huge library of scholarly articles that they will need for their essay write ups and reports.



Students continued their work in the lab to create a simulation of their clocks using WM2D. They were

wrapping up their clocks designs and started recording their work on their web pages in preparation to finalize their clock reports.



CLUSTER 3: LIVING OCEANS AND GLOBAL CLIMATE CHANGE

Cluster 3 has gotten their feet wet and started swimming through material from Week 1. Our first week has been full of introduction to laboratory procedures, our projects and understanding climate change. Cluster 3 is honored to work under the guidance of Dr. Skip Pomeroy on atmospheric chemistry, Dr. George Anderson on seawater analysis as well as Dr. Ngai Chin Lai with oceanography. Below are student comments as they dive deep into the program:



"We kicked the first day here at COSMOS with a lab safety lecture that explained how to dress in a lab and use equipment safely. Then we met our lead instructor, Dr. Pomeroy, who introduced the concepts of aerosols, cloud formation, and global warming. After lunch we headed down to Scripps and met with our second instructor, Dr. Lai, where we had a brief lecture on ocean science. We concluded the day with a trip to the pier where we measured turbidity of the ocean water using a special device called a secchi disk." Julia Hansen



the rest of COSMOS given by Dr. Nicole Steinmetz, a German researcher and professor. She gave us an overview of nanotechnology and then dove into the specifics of her interesting and timely research concerning curing cancer in dogs and other areas. Cluster 3 then went to the lab where Ms. Solberg, our teacher fellow, introduced the ethics essay each COSMOS student has to write. We talked about topics related to our cluster that

pose ethical dilemmas and brainstormed what we wanted to write about. After lunch at Cafe 64°, we went back to the lab where we chose our groups and projects we will be working on throughout the program. In the evening we worked on our Cosmolympics skit and had evening program and suite time, then it was lights out and all of COSMOS went to bed." Emna Sellami



"On Wednesday July 10th, the cluster 3 students began their day with an engaging lecture by Dr. Robert Pomeroy about global warming and the hydrological cycle. Following this, students investigated the albedo of different surfaces using a flashlight, infrared temperature gun, and light sensor; this lab could be likened to the diverse environments of the Earth. In the afternoon, students utilized a variety of methods to obtain the density of seawater: density meters, digital and manual refractometers, BOD bottles, and conductivity. Students then worked to



prepare for the COSMOLYMPICS event this Friday and participated in athletic/recreational activities during free time." Arjun Marwaha

"Starting my day with running in the morning, I had another great day with my cluster. In the morning, we learned about library resources in discovery lecture which was helpful to our further study in COSMOS. Then we spent out time in



NSB researching for our ethics essay. After lunch, I did experiment with my group on our project about nitrate and its connection with ocean. And for the most exciting part at the end of the day, our cluster spent time to prepare for cosmolympics, designing costumes and making our cool ocean-theme banner for our skit! Absolutely lit!" Claire Liu

On Friday we will be hearing from local researchers in the fields of food security and greenhouse gas chemistry. Stay tuned to hear more about our adventures next week!



CLUSTER 4: WHEN DISASTER STRIKES: EARTHQUAKE ENGINEERING

Cluster 4 spent the first week learning the lay of the land on the UCSD campus. We hit the ground running (or more realistically walking) to the Structural and Materials Engineering building each day.

Day one the Faculty Instructor Jacqui Le introduced students to qualities that make good engineers and loaded us with information about how gravity and lateral movements from earthquakes impose forces on a structure. Our K'nex buildings were not a complete failure. Many of the K'nex structures withstood the earthquake simulating shake table, because we learned about and

implemented techniques

such as moment frames, cross-bracing and shear walls that provide lateral resistance. Students learned about various important historical earthquakes and the lessons engineers have learned from their "stories".

The rest of the week required students in Cluster 4 to get their hands dirty. Quite literally in the case of the liquefaction project group. Students teamed up into eight different projects groups that focus on processes, devices and materials related to engineering for earthquakes. This week students started phase 1 testing for projects, which included learning some new skills and repurposing other skills. Who knew that soldering and using piping bags used for cake decorating would come in handy when learning about reinforced concrete columns and masonry? Tuned mass dampers and base isolation groups needed a little extra research, while other groups working with wooden structures were yelling

"Timber!". Although we do have at least one "soft story", there is more to learn and do in the upcoming weeks of COSMOS.

At times engineering can have a demanding workload. We do force ourselves to use our brains and that can result in some stress to develop. Cluster 4 was lucky that we had our Teaching Assistants Alan and Maria to help out with the tensile testing that took place. Fortunately, we also had our COSMOS Olympics to reduce some strain at the end of the week.



CLUSTER 5: Photonics: Light-based Technologies in Everyday Life

Only one week into the COSMOS program and it's already been a wonderfully exciting and rich learning experience for everyone. After an eventful Opening Day and introduction to COSMOS, our first day as a group in Cluster 5 began with an interesting Laboratory Safety Training session where we learned about proper eye protection when working with lasers. With many types of lasers that operate at different wavelengths, it is very important to use protective glasses that correspond to the proper wavelengths to ensure safety. Immediately after the safety training, we were able to get started with a lecture from Dr. Charles Tu on some of the amazing ways light contributes to technological advancement in communications, energy production, health and biomedical applications, and nearly every aspect of science and life in general. After lunch, we went to the Photonics Lab in the Jacobs Engineering Building to learn about light refraction, prisms, and Snell's Law from Dr. Peter Ilinykh. Students then had the chance to conduct a lab with a Helium-Neon (HeNe) laser and a prism to verify Snell's Law experimentally and find the critical angle of the prism.

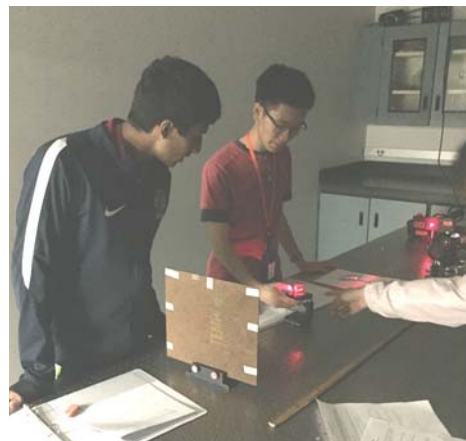
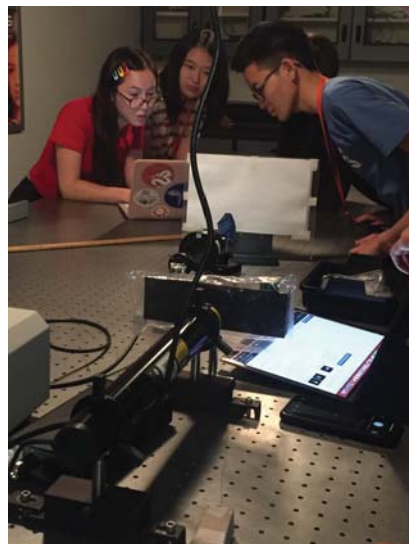
Tuesday began with the first Discovery Lecture of the program, from Dr. Nicole Steinmetz, a professor of Nanoengineering here at UCSD. She explained her exciting research on plant viruses being used to construct targeted and effective cancer treatments. Her research looks incredibly promising, and we will all likely be hearing about her work in the news in the years to come. After a look at our Science Communications curriculum and lunch, we tackled another lab with Dr. Ilinykh, this time involving prism refraction and diffraction grating spectrometry. Students took data to calculate the resolving power of the prism and the line spacing of the diffraction grating.

On Wednesday, the day started with an in-depth lecture from Dr. Tu on semi-conductor physics, n- and p-type doping, quantum numbers and energy levels, LEDs, and refraction and diffraction of light. Our laboratory work on this day involved a fun mini-project on mobile spectrometers. Each student had the opportunity to build their own spectrometer out of cardstock and a piece of a compact disc (CD) to use as the diffraction grating. Students took data using their mobile phone and uploaded the spectra to a great website called Spectral Workbench in order to analyze the data in detail. Students even

got to take their spectrometer with them to keep.

On Thursday, students got some helpful training on how to utilize the vast library resources online at UCSD before continuing work on their Ethics Essays. Students chose their topics and started researching relevant sources. In the afternoon lab session, students worked with LEDs and analyzed different wavelengths of light through various methods. It is becoming very evident that nearly every aspect of physics and engineering that relate to optics will be addressed throughout our lecture and lab sessions, and stu-

dents will continue learning a lot! We will be sure to keep you updated on Friday's happenings in the next newsletter, which will be written by the students. Please know that your students are learning, growing, and enjoying COSMOS and the beautiful San Diego weather!



CLUSTER 6: BIODIESEL FROM RENEWABLE SOURCES

"Cluster 6 has gotten underway rapidly, making Biodiesel and starting projects. We look forward to a full, informative, and fun summer." Mr. Towler

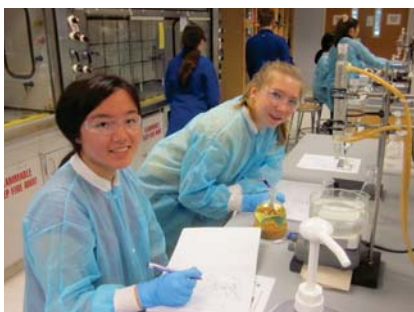
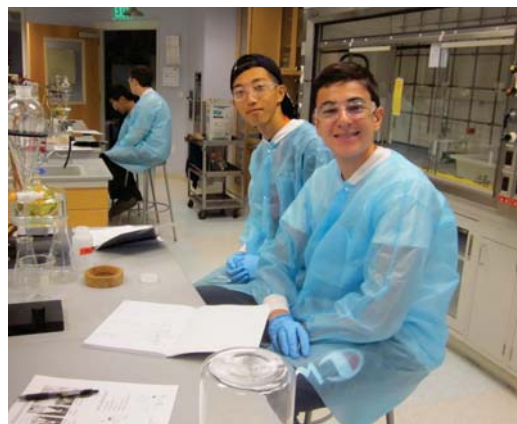
"On Sunday I arrived at COSMOS with a warm welcome. After settling into my dorm I walked around the campus's with my cluster. Then after many icebreakers and a fun play fair program the day was over." Adam Kazden

"Our First day of COSMOS began with lab safety presented by the UCSD Safety Office. Cluster 6 then went to the lab and made Biodiesel which will be cleaned, dried and tested over the next three weeks. We wrapped up the day with a lecture from Dr. Pomeroy about what fuels are." Mr. Towler

"Today Prof. Nicole Steinmetz gave us our first discovery lecture on the applications of nanotechnology in medicine. In the afternoon, we chose our groups and the topics we will be exploring throughout the next four weeks for our final project." Aileen Mi

"On Wednesday, Cluster 6 began the process of purifying biodiesel. They learned to use a separatory funnel and a hot plate to wash and dry biodiesel. In the afternoon, they listened to a lecture by Dr. Pomeroy about intermolecular forces and how fuels work." Anakha Ganesh

"On Thursday we learned how to access the library sources at UCSD. On our way to our lab, we found the art installations of the three metal trees. Unfortunately, though we were promised they would sing and talk, the trees did not make any noise. In the afternoon, we continued to work on our projects." Angela Kou



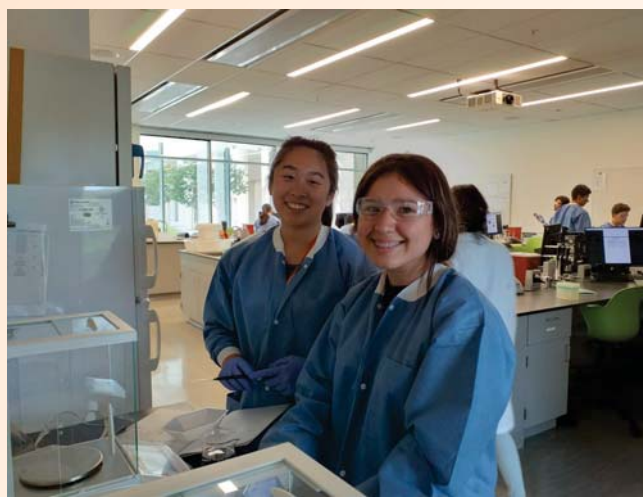
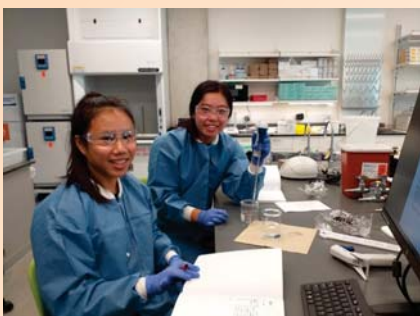
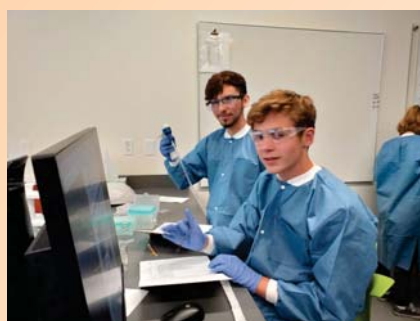
CLUSTER 7: SYNTHETIC BIOLOGY



Cluster 7 started off really strong with the students getting their lab safety lessons and lab work on the first day. Dr. Vera has been working with the students on lab safety, good lab practices, and how to handle lab equipment. Students used micropipettes, learned how to use restriction enzymes to cut DNA, and how to perform gel electrophoresis to analyze the size of the DNA fragments. On Tuesday and Thursday students worked on their science communication skills, got to know Geisel Library, and started their ethics essays on Thursday.

During their program in the afternoon, students worked on COSMOS Olympics for Cluster 7, and also had activities in the afternoon and evening.

It's fair to say Cluster 7 students were very, very busy this week!



CLUSTER 8: TISSUE ENGINEERING AND REGENERATIVE MEDICINE

Our first week of COSMOS 2019, has been GR8! We settled into our dorms and meet our Cluster 8 Resident Assistants, Sammy and Brandon. In the evenings we have spent time working with them on COSMOS Olympics and have had variety of programming activities, our favorite being volleyball and Frisbee! We are super excited for COSMOS Olympics on Friday night!

On Monday morning we began our day with two safety meetings as safety is our top priority. Then during the remainder of the week we have had lectures and discussions with our esteemed professors. Dr. Sah, who is a Professor in the Departments of Bioengineering and Orthopedic Surgery at the University of California-San Diego and a Professor at the Howard Hughes Medical Institute, and Dr. Gaetani who is an Assistant Research Scientist, Department of Bioengineering & Sanford Consortium Regenerative Medicine at the University of California-San Diego and an Assistant Professor in the Department of Molecular Medicine Sapienza at the University of Rome.

In the lab we were guided by our GR8 Cluster Assistants (CA). Shitian, who is getting a B.S with a double major in Bioengineering: Biotechnology and Mathematics: Applied Science, Veronica, who just graduated from UCLA with a B.S. in Bioengineering and in the fall will begin her Masters in Bioengineering at UCSD, Swetha who is currently pursuing a Masters in Bioengineering in UCSD and Arya, who just finish his B.S. in Bioengineering: Biotechnology and in the fall will begin his Masters in Bioengineering. We have learned how to pipette, make dilutions, perform sterile technique, make solutions, make media for cell culture, and pH the solutions we make.

Outside of lab we attended a GR8 Discovery Lecture on Nanotechnology and a library presentation so we can do all of our research for our Ethics papers and projects. In Science Communications, with our Teacher Fellow, Mrs. Patty Fowler, we have evaluated and discussed presentations, been introduced to and begun our Ethics Project, learned how to maintain our data in laboratory notebooks, and reviewed how to present our data thoroughly and clearly.

The first week of COSMOS has been GR8 so far because....

... it's been fun to experience college life. —Michael

...of how quickly I've grown close to all my cluster mates! —Jared --ps- Hey Mom!

...I've become close to so many people in such a short amount of time and it's like a small family away from home. — Misha

... of all the awesome people I got to meet, especially those in my cluster. — Sameer

...I have been able to meet a lot of really nice people and am really excited for the next few weeks! — Celine

... it is simply magnetizing! It's been a pleasure being in the melting pot of knowledge that COSMOS offers, from learning about nanotechnology to living at UCSD's campus, both my peers and professors have blown away every preset expectation I came to the program with. — Lizzie

...I was able to dive right into the subject of tissue engineering and meet so many amazing people. — Anna

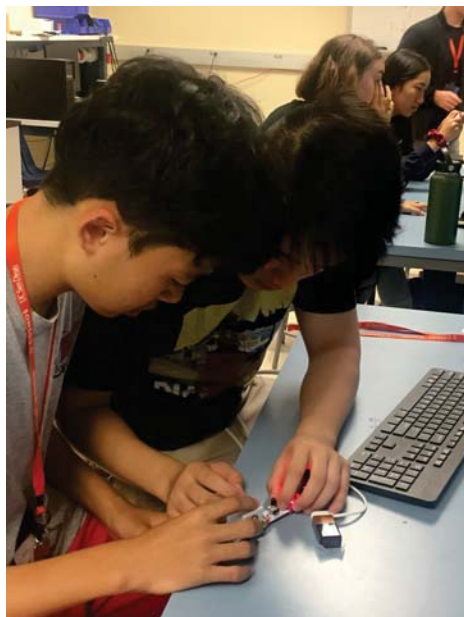
...the people have been absolutely incredible from my cluster mates to Mrs. Fowler to the professors to the TA's. They make the experience not only educational but fun. — Rachel

...I met so many good friends and can't wait to know them more! — Andy

...I genuinely feel that I have grown so much already. I have put myself outside of my comfort zone, meeting countless new people and learning so much about the world of tissue engineering. In a couple of days, I've made friendships that will forever impact me. I've also learned so much both inside and outside of the lab, including the wide range of applications of tissue engineering and the many benefits it offers. I'm excited for the next 3 weeks to come! — Allie



CLUSTER 9: MUSIC AND TECHNOLOGY

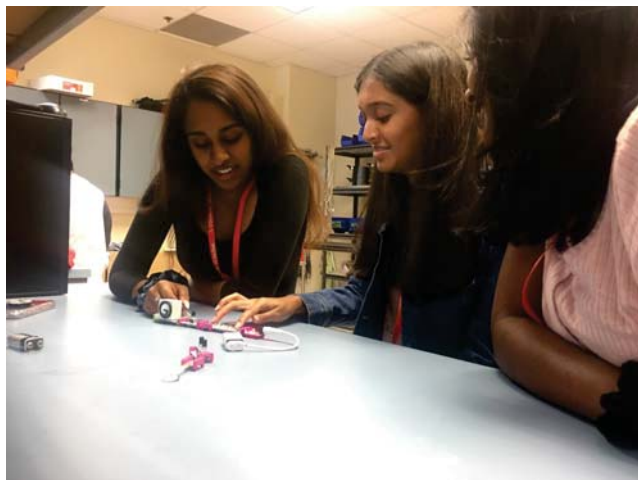
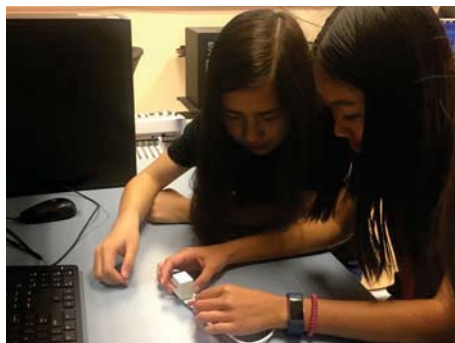


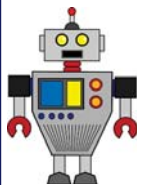
Although it's only the first week of COSMOS, we have already plunged straight into the curriculum for the Music and Technology cluster. After settling into our suites and meeting our roommates, we began learning about the technical aspects of music, starting with an introduction to sound waves using the concept of resonance. We were able to play around in the lab with a few circuits, using oscillators, filters, and delays to create our

own mini instruments. We became familiar with a few electronic platforms that help produce digital music, like Ableton and Impro Visor. Impro Visor uses machine learning technology to help generate certain possibilities for jazz music and music in general based on a few chords. Some interesting features include the ability to mimic a certain artist and generating sheet music while playing your instrument, making this a useful program to aid people in composing. Ableton was the other program we learned about. Ableton is a DAW (Digital Audio Workstation) which allows users to create midi tracks and combine them with synthesizers or samples and layer these tracks.

Outside of the curriculum, all of cluster 9 has been able to enjoy COSMOS. Cosmolympics is a competition between all the clusters, and each group has to create a skit or live performance. Since we are the Music and Technology cluster, we decided to create a medley of 3 songs using our instruments and singers. Working together for the Cosmolympics helped

our cluster bond together, and we all found common ground through our love for music. We are looking forward to what the next three weeks of COSMOS Cluster 9 will bring us.





CLUSTER 10: ROBOT INVENTORS



Cluster 10 is facing their first challenge - the battle of the bots!

Day 1: Today students met the faculty in charge of their cluster and learned about this history of robotics and had an introduction (from our amazing faculty Curt Schurgers; Nick Gravish is out of town this week, so they will meet him next week) to python and raspberry pi. With this knowledge in hand, in the afternoon students began building their first robot of the cluster, which involved assembling a laser cut chassis, wiring and programming their raspberry pi, and wiring their wheel motors.

Day 2: Students began today with their first Discovery Lecture, which was all about nanotechnology and using plant viruses to trick the immune system into taking action. Students were then introduced to the concept of finite state machines, and challenged to use this idea in their robot designs later in the afternoon.

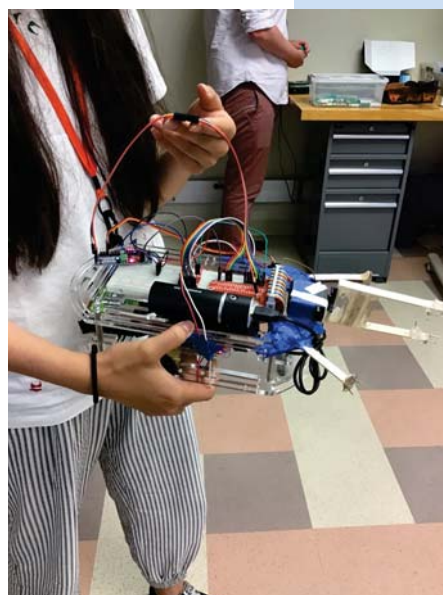
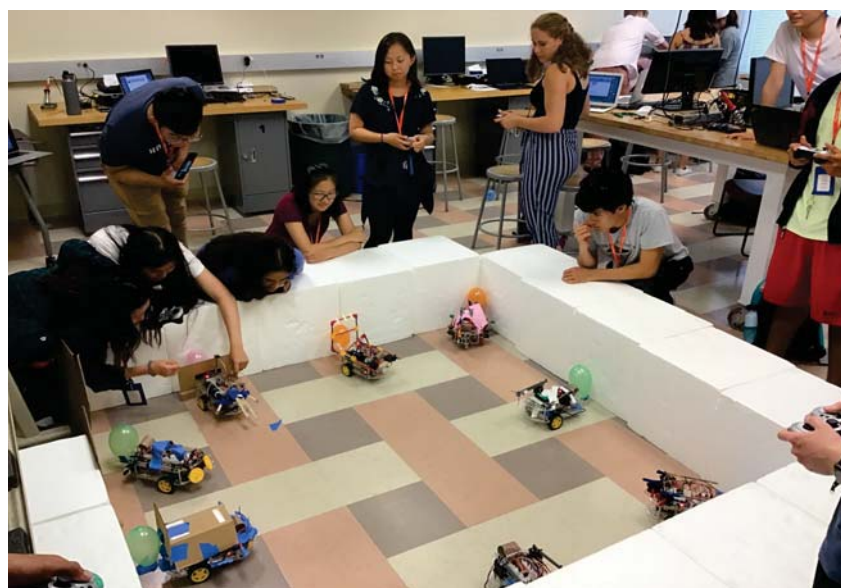


Day 3: Today began with an introduction to the ethics essay that students will be writing as part of their science communication course. Students were introduced to some ethical dilemmas in robotics and read some literature around those topics. They will choose one area of robotics and investigate its ethical dilemmas. Students then got introduced to picobot, a finite state machine practice tool, which proved an excellent challenge! This afternoon students continued building, designing, and testing their battle robots!



Day 4: Battle day! This morning students learned how to use the university's library to its fullest extent, gathering resources for their essays and learning how to cite sources. Students then prepped for their final robot battle in the afternoon. Check next week's newsletter for winners! Finally, students continued to develop their ethics essay drafts, and prepared for COSMOS olympics on Friday.

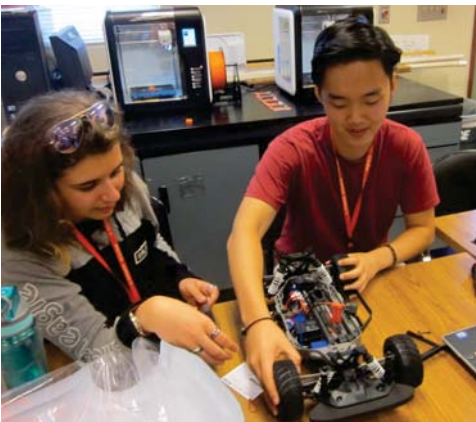
Day 5: Today students face a new challenge - they will navigate a maze autonomously using cameras attached to their robots to interpret the colors. This morning they will be introduced to a whole new level of challenge as they learn about how computers interpret images. This competition will take place at the end of Week 2!



CLUSTER 11: Introduction to Autonomous Vehicles



Cluster 11 is in its first year and the students were very excited to get started. After the safety lecture students learned CAD from Dr. Phan using the Autodesk Inventor program. The cluster learned quickly and were able to complete their first design before lunch. After lunch we formed teams. The students unboxed their RC cars and took measurements to design the mounting plate for the autonomous car. This is the component that all of the parts needed for autonomy will be attached to. The rest of the afternoon was spent designing the mounting plate using CAD. Upon returning to the residence halls students prepared for Cosmolympics.



On Tuesday students attended the Discovery Lecture by Professor Nicole Steinmetz. The topic was nanoengineering of plant viruses as therapeutic agents. Dr. Phan then gave a lecture on 3D CAD. Students worked on finishing their mainplate from Monday and on drawing the camera mount for the autonomous car using 3D CAD. In the afternoon TA Sayan helped the students prepare their CAD files to laser cut the mounting



plates in the Mechanical and Aerospace Engineering Design Studio.

Wednesday morning students finished their 3D CAD files for the camera mount and began printing them. Students also used the laser cutter to cut the mounting plates. Both the camera mount and the mounting plates had to be tested and in some cases redone all part of the engineering process. Some students designed camera mounts that could vary the angle of the camera. This was tricky and difficult to 3D print. Another issue was finding a suitable axle for the variable mounts but the students persisted and succeeded.



Thursday morning began with a presentation on how to use the UCSD libraries for research. The students then completed 3D printing the camera mounts. In the afternoon, we worked on electronics and learning to solder. On Friday students mounted the parts for the autonomous car on the mounting plate and began assembling the cars. In the evening the cluster participated in Cosmolympics.

COSMOS Social Programming

