



## Week 2 Newsletter

### REMINDER!

Family Weekend is July 18<sup>th</sup> thru July 20<sup>th</sup>. Students must be checked out between 6-9pm on Friday and must return between 2-5pm on Sunday. Optionally, students can be checked out at 6pm on Friday and returned by 9pm that same evening or alternately, 2pm on Sunday, returning by 5pm that day. All students MUST be back to campus by 5pm on Sunday. If you have any questions, please call our office at (858) 822-4361 or email [cosmos@ucsd.edu](mailto:cosmos@ucsd.edu).

### ADMISSIONS & IDEA CENTER PRESENTATION

This coming Sunday, students and parents will be given the opportunity to attend a UCSD Admissions & IDEA Center presentation. The presentation will be conducted by Joanne Higgins of Admissions and Relations with Schools at UCSD & Michelle Ferrez, Director of the IDEA Center at the Jacob School of Engineering. It will begin with basic eligibility requirements for applying to UC colleges, followed by the presentation of statistics to provide students with a visual of the competitiveness of the applicant pool. It will conclude with a Q&A session. The presentation will be held this **Sunday, July 20th from 3-4pm at 107 Solis**

### IMPORTANT INFORMATION

#### Mail

Please address **REGULAR MAIL** to:  
Student's FULL Name  
COSMOS @ UCSD  
ERC Conference Services Center  
9450 Gilman Drive  
La Jolla, CA 92092-0100

Please address **PACKAGES** to:  
Student's FULL Name  
COSMOS @ UCSD  
Jacobs Hall, Suite 1400  
9500 Gilman Drive #0429  
La Jolla, CA 92093-0429

#### Contact Information

COSMOS Office Hours:  
(during the summer program)  
Monday - Friday: 7:30am - 5:30pm  
Emergency after hours, please call:  
(858) 255-0667  
Email: [cosmos@ucsd.edu](mailto:cosmos@ucsd.edu)  
Phone: (858) 822-4361

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## DISCOVERY LECTURE

**D**r. Kim Prather gave an interesting talk to our students on the research being done under the \$20 million National Science Foundation CAICE grant that she is the Director of. CAICE is an acronym for “Center for Aerosol



Impacts on Climate and the Environment,” and the focus of her talk was the effect aerosols have on global weather patterns. The aerosols that are being studied are not the ones that come to mind at first: household aerosols, etc. Her studies focus on the two largest aerosol sources in nature, sea spray and dust. These two sources account for far more aerosol particles than all other sources combined including vehicle exhaust, fire smoke, industry emissions, etc. Understanding aerosol particles role in global climate change will hopefully unlock information that will allow scientists to reverse current climate change trends. Dr. Prather’s research is unique in that biochemists, chemists, biologists, the San Diego Super Computer Center and oceanographers from Scripps Institute are collaborating on research, allowing multiple view points and expertise. Her lab has already uncovered new findings

regarding global weather patterns including information that a dust storm in Africa can influence precipitation in California! Researchers are recreating the factors found in our climate in the lab so that they can better control variables and come to a better understanding of the climatic interactions at work. Through creating new tools, such as a forty-foot long wave pool that effectively recreates sea spray, new information is being uncovered to help complete the puzzle pieces. Dr. Prather had three take-away messages for her audience: 1) climate change is here now, 2) our climate is being pushed and is leading towards abrupt, unpredictable and potentially irreversible changes, and 3) the sooner we act, the lower the risk and cost of reversing unwanted changes. There is much we can do, and it’s through research like that being done through CAICE that we will unlock answers regarding global climate change. For further information please visit CAICE’s website at: <http://caice.ucsd.edu/> and <http://whatwewknow.aas.org/> to find out more about global climate change.



## ACADEMIC ENRICHMENT

**A**t our Academic Enrichment Session, Shirley Miranda presented information on student research competitions. Ms. Miranda has been a Cluster 1 Teacher Fellow for the past eight summers, serves on the COSMOS Statewide Advisory Board, and is the director of the Greater San Diego



Science and Engineering Fair. Ms. Miranda provided COSMOS students with information regarding the various science and engineering fairs and competitions that are available to high school students. She pointed out that participation in science fairs can be a strong element of a college application and that many of the awards for these competitions are given in the form of college scholarships and cash awards. After her presentation, two of the top winners of the Greater San Diego Science and Engineering Fair (GSDSEF) and finalists at the Intel International Science and Engineering Fair (ISEF), Eric Chen and Russyan Mabeza, shared their experiences with participating in their local science fair. Russyan won first place at GSDSEF, and is also a Gates Millennium Scholar. Eric placed first for his project on the flu and has won over \$250,000 in scholarships and awards as well as a trip to the Galapagos Islands. For more information about science and engineering competitions, visit: [www.sciencebuddies.org](http://www.sciencebuddies.org) or [www.gsdsef.org](http://www.gsdsef.org)

## COSMOS CONNECTIONS

**F**ive wonderful women: Kat Lo, Dr. Williams, Kerri Seger, Dr. McCoy, and Dr. Aluwihare, met with UCSD COSMOS students and shared knowledge their about careers in STEM yesterday during our COSMOS Connections Panel. Each woman had a great story to tell about the careers in STEM. For example, Scripps Oceanography graduate student, Kerri Seger, shared how she went from growing up in the cornfields of Ohio to chasing whales around the world because she knew she wanted to expand her knowledge past the boundaries of her small farm town. Seger and the rest of the women went on to

encourage COSMOS students to reach out and connect with the world. They explained to the students the importance of exploring and finding out what your passions are. The fabulous five mentioned there is no direct route however if you want something you should go work for it.



## RESIDENTIAL LIFE

**O**MG! Who would believe we are already half way through the program. You are going to love all the exciting stories your student will be sharing with you! Be sure to ask about the interesting things they are learning in class, in lab, and on their field trips. Ask them about the many programs they participate in every night, the suite time with games and stories they share, and all the new people they have met. Nilay may tell you what he learned about etiquette. Miranda would tell you how everyone loves her artistic abilities. Chris may tell you how he got harassed when he said he needed a break from learning Salsa. And Jacqueline would tell you how during her time at COSMOS Connections she was inspired by Dr. McCoy to reach out for internship opportunities at The Scripps Research Institute.

We are happy to again report that there have been nearly no injuries, which when talking about 181 active teenagers, to not have injuries is quite amazing. Some students are getting a bit of a sore throat so please help us in reminding your students to spend less of their meal times

eating pizza and frozen treats and more of the time eating fruit and the salad bar. The biggest challenges currently are making sure the students return to check in on time, they wear their lanyard, and they go to sleep promptly. Their boundaries around campus



had been extended so they could take some time to explore the campus, but due to the slight challenges, some of their extended privileges were not extended as was earlier hoped. When they are in open boundary time they are encouraged to travel in groups to places like the Geisel library which houses 3.2 million books, the UCSD Bookstore with everything from scotch tape to Dr. Seuss hats, or even visit our many recreational and art facilities within the four sides of the UC San Diego main campus.

Our goal beyond safety is for everyone to excel academically and practice balanced living outside of the classroom. We could really use your help in sharing with students the significant value of taking at least 1.5 hours per day to not work. This camp is reflective of what will be expected of them in college and as adults who will have knowledge and ability to do work well, but also to play well with others, a skill that can only be practiced by actually interacting with others. On the other hand, we have students at camp who have no difficulty at all using the 1.5-3 hours of social time to be very social as you can see on the photo page. Those are often the students who also call their families and ask not to leave camp during this Parent's Weekend as they have the rest of your lives with you but only two more weeks with their new friends. For those who stay we will be going to the movies together and afterwards some will go with RAs in small groups to places like the beach, shopping, running, and more. When everyone gets back we will kick off week three with our second dance, resume writing, a bonfire, and more.

## CLUSTER 1: COMPUTERS IN EVERYDAY LIFE

We ended last in lab working on our Scribblers Dance projects. We quickly became engrossed in making our designs perfect but learned that they didn't always behave the way we thought they would. We discovered that the battery strength sometimes played a role in the execution as did the surface our Scribblers drove on. We learned to adapt and become comfortable with Python (the language we program our Scribblers with). We presented our final Dancing Scribbler Friday afternoon. Our demos from can be found on our blog at [ucsdcosmoscluster1-2014.blogspot.com](http://ucsdcosmoscluster1-2014.blogspot.com)



On Monday and Wednesday, we learned about image processing. We learned how programs like paint and Photoshop do some of their basic functionality like finding a color and changing it to another or clearing the screen. We discovered how to do some image processing functions in Python - which means we'll be able to do it with the Scribblers! Currently, we are trying to get our Scribbler to find a box in the middle of the room, find the yellow side and enter in the box. Once our Scribbler enters the box, we have to find the drawing inside and take a picture of it. We've learned that the cameras on our Scribblers don't always seem to present the exact color

shade we expect and we had to adjust for that. Also, textures and shadows give off different shades of blue (for example), so we can't just use one single definition of blue.



Then we had a guest speaker named David Kriegman. He spoke to us about computer vision and coral ecology. In the last 30 years, coral coverage has declined by 80% in the Caribbean, and 50% in the Pacific and Great Barrier Reef. Before, people had to go in the water and manually count the coral. Now, divers go in with a camera and every meter or so take a picture. This contains a lot less bias than before and more time can be spent in the lab to analyze it. The images are filtered and they made a classifier to help analyze the data. Its accuracy is 70-80%. Human experts are about 80% accurate. So, they are very pleased with the results and can gather more data and analyze than before.

On Tuesday afternoon, we took a field trip to Qualcomm. Saudi Naderi (former Cluster 1 faculty) was our host. We checked out the Qualcomm Museum which shows the history of technology that the company has done and their future projects. Afterwards, we visited Saura's lab "Thinkabit". She introduced us to Arduinos and we got to do

some hands-on work. In just over an hour, we built our first Arduino project using a servo. You can view the videos on our blog. The engineers at Qualcomm get to go to her lab to "play" with Arduinos as well, so we got to experiment and play just like them.

Wednesday morning our Rubik's cube robot builders came to visit again. This time, they asked us how we would build a Rubik's cube solving robot. In pairs and trios, we came up with some designs - most of our ideas had two to six arms. Then they shared with us some that were out there and finally theirs. Theirs had four arms, an iPhone, a Raspberry Pi processor and programmed in Python. A video of Ruku (their robot) at work can be seen at <https://www.youtube.com/watch?v=VmwUbWrTCw>

At the end of the week, we'll start our Arduino labs and submit our ethics essay for the contest. It's been a busy, challenging and fun week!

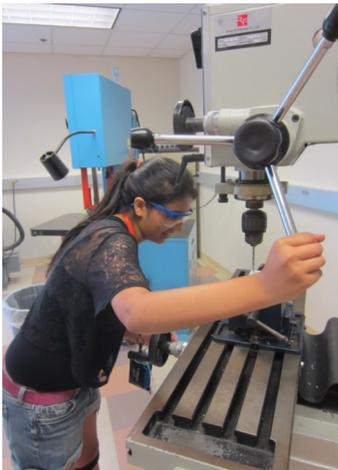


# CLUSTER 2: ENGINEERING DESIGN AND CONTROL OF KINETIC SCULPTURES

The excitement continued in Cluster 2 this week with clocks, programming and mini-sculptures! The week began on Monday with a unique engineering challenge... protecting a water balloon from a drop using straws. The students broke into



their teams and began by brainstorming a variety of ideas for contraptions that would save the balloon! The students modeled engineering practices by creating a Pugh chart to compare their ideas such as "feasibility" and "ease-to-modify". The students also used a high speed camera to film the impacts so as to analyze why the structure succeeded or failed. Most groups' balloons survived drops up to 6 feet, but the higher drops became more... umm... wet. There was one group capable of the third story



drop (40 feet) by employing a tape parachute. All in all the students had a great time!

In addition to the water balloon project, the students finished their clock projects as well. This included assembling the actual clock, analyzing their work, and presenting their work on a web page (which can be found here: <https://sites.google.com/a/eng.ucsd.edu/kinetic-sculpt/home/teams>) The analysis proved challenging as students entered their calculations into excel to display their theoretical times using a "point mass" and "rigid body simulation" analysis. Needless to say the kids will never look at a clock the same again!



In the middle of the week, the students moved on to next project: a mini-sculpture using servo motors, sensors, and a human interface. This mini-sculpture will hopefully serve as a base for their overall final sculpture which you will see at the end of COSMOS. Using a similar engineering approach as with the water balloons, the students came up with a variety of ideas and I am looking forward to seeing their sculptures take hold! Outside of our cluster, the stu-

dents had the opportunity to hear from Dr. Kim Prather in the second discovery lecture series. Dr. Prather spoke to us



about her work at Scripps Institute of Oceanography regarding aerosols and their effect on climate change. Her presentation was a thorough and interesting look at this contemporary issue.

On Thursday, the student heard a brief presentation from the professors from clusters 1-4, and had a chance to see what their peers are doing. Just between you and me... We have the most awesome cluster; cluster 2!!



# CLUSTER 3: LIVING OCEANS AND GLOBAL CLIMATE CHANGE

Our focus concluding week 1 and through week 2 is experimental design, ethics and data gathering.

The group projects are coming together, with groups collecting pre-lab data to set boundaries for their experimental work in Week 1. Variable identification, hypothesis formation and protocol design are in process, with data gathering through Week 2.



Thursday, we learned about the myriad research sources available at UCSD through the library tour. By utilizing the library's online databases, we will be able to improve our projects, ethics essay, and academic debates with scientific information. In our Science Communications class, we discussed our Ethics Essays, final projects and began formulating hypotheses under Mr. Towler's guidance. These hypotheses were further developed in our group meetings after lunch with the input of UCSD professors.

- Orianna X.

Friday, we split our day in half to learn about both aspects of our cluster: climate change and living oceans. The morning lecture was given by a guest professor from the University of Iowa, who taught us how to analyze spectrometry data in Excel with various formulas and filters. In the afternoon, we headed down to SIO

to learn about crab and crayfish dissection. This was a particularly messy and fun afternoon filled with pictures and videos of research group 2 running their treadmill with the crabs. To top it off, Cluster 3 won the skit competition for COSMOlympics at night. We all put in so much effort and enthusiasm into our practices, and we were so proud of our final performance. A huge thanks to Mr. T and our amazing RA's, Bryan and Tamika, for helping us out so much! Shark bait, ooh haha!

-Yu-Jane C.

Monday, Cluster 3 went



back to the Scripps Institute of Oceanography and spent a day learning more about the Rocky Intertidal ecosystem. We also went to La Jolla beach and searched the shore for sand crabs! Later, we would test the different salinity and temperatures of multiple sites on the beach including a rocky cliff and on the shore.

- Tony D.

Tuesday, we went to an exciting Discovery Lecture! Professor Kimberly Prather of UCSD and SIO, chair of the Center for Aerosol Impacts on Climate and the Environment, gave us a lecture on the environmental impacts of aerosols. Some fascinating facts I learned were: 1) It takes just 10 days for an area's pollution to circulate the Earth. 2) Aerosols can be good (cooling)

and bad (warming). This lecture made everyone realize that global warming is a big and complex issue, and we must act fast. In the afternoon, half of us went to Scripps and the other half went to the Natural Science Building to work on our cool research projects.

- Joanne C.

Wednesday, our day began with lectures from Doug Collins about Aerosols, Clouds and Climate, Greg Matters on the Uncertainty in Global Climate, and Michael Shaloski on Pressure and Temperature supersaturation. After each topic we were able to investigate the topics by looking at formation of bubbles in Root Beer based on the size of condensation nuclei introduced. We used compressed CO<sub>2</sub> to explore the effects of gas expansion on temperature, and relate that to what happens as materials rise in the atmosphere. We finished the morning with a lab using pressure, water and condensation nuclei to create clouds in a bottle that could be visualized using a green laser. Today, we'll be visiting the 30m wave flume experiment at SIO and be able to see big science in action.



# CLUSTER 4: WHEN DISASTER STRIKES: EARTHQUAKE ENGINEERING

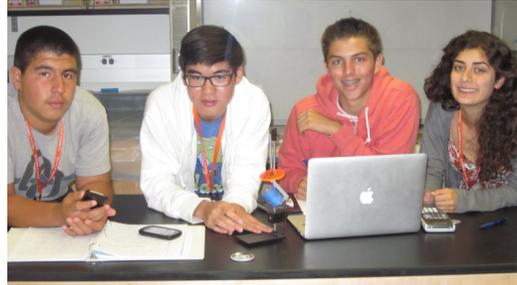
Week Two flew by as our eight project groups dove into research and testing. With the helpful yet intense lectures of week one in the past, our students eagerly immersed themselves into the development and completion of project objectives.

Students continue to receive further vital instruction in project-specific engineering methods and geophysics this week, and were directed in developing their individual group project designs. This required internet research time and some



creative ideas! Our eight student project groups include 'soft story' structures, timber, masonry, concrete cylinders, liquefaction, concrete columns, base isolation, and tuned mass dampers. They will eventually build and test a structure from their assigned structural type. Each group has almost completed an initial design of their structure, and will begin testing the strength

of their models soon. They will be using the 'earthquake shake' table, or another instrument specific to their structure during testing.



Tuesday began as all Tuesday do, with a Discovery Lecture attended by all COSMOS students. This week the students were amazed by Dr. Kim Prather's research into the effect of aerosols on climate. These mornings are always motivational and energizing as the students hear some unique and important research from around the UCSD campus.

We also toured several campus engineering labs, and learned about the relevance of each to our projects. We saw enormous actuators that can 'load' a beam or structural member with enormous pressure. Cables attached to the structure deliver information to computers that can be analyzed. One lab even had a full scale train track covered with sensors to measure deformation



under high temperature. Cool stuff!

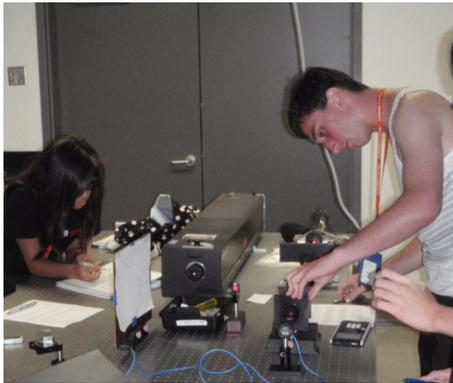
Kevin has assigned each project group a geophysical region where their structure is commonly found. For example, the group studying concrete bridge columns are assigned southern California, since freeway bridge columns are very common. Groups are responsible for researching case studies of earthquake effects in their region. This information will be a component of their final project presentation, along with the analysis of their test results of course.



Our student groups are functioning well thus far, and the process of building, testing, analyzing, and redesign will continue into next week. We appreciate these inquisitive and hard-working students and appreciate their terrific attitudes! Can't wait to share their results with you in two more weeks. In the mean time, check out our website: <https://sites.google.com/a/eng.ucsd.edu/ucsd-cosmos-cluster-4-2014/home>

# CLUSTER 5: LASERS TO LCD's: LIGHT AT WORK

This week has started with a bang. Sadly, after a fantastic skit and the "BEST CHANT" from any cluster, Cluster 5 was saddened they did not win the COSMOS-Olympics.

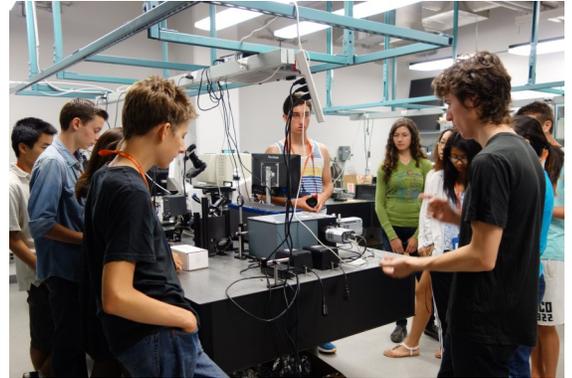


This did not lower the spirits. After a great study on biometrics, light controlled bugs, and fingerprinting, the students enjoyed a quick trip to the beach and went back to work on some great things.

The invention and study of lenses has allowed our society to progress to some great heights, and the group has really been studying the effects and concepts of how these work. From learning how both camera and glass lenses are made to contact lenses, the students were able to get into the lab and apply these same methods to lasers and

lenses. By manipulating certain variables, they were able to create great images and resolve many image issues with great resolution.

Tuesday we also were able to meet and greet NASA Astronaut Chris Cassidy. He was part of a different project on campus, but our Cluster was able to jump over and see some of the studies and work being done with optics and NASA. We had the opportunity to see some great images from space, touch a moon rock, and listen to Astronaut Chris Cassidy's experience on the International



Space Station.

The students also were able to visit this week Dr. Tu's, Professor Zhao-wei Liu's Lab, and the UCSD Photoluminescence Lab. The applications of the knowledge we have been studying is getting much more in depth and exciting for us all. The work that is being applied in these labs amazed us and helped to cement those concepts we have been working with in our lab. This was the last week we worked on all the projects and students will have to choose next week what they want to study more in depth for their project.

As this was the last week of introductions, students were able to work on both PDMS Lens and Holographic images. These projects may be chosen for future studies. The applications of the PDMS lens was great as these are most likely the lenses that will be used in smart phones and small cameras in the future!



## CLUSTER 6: BIODIESEL FROM RENEWABLE SOURCES

Welcome Week #2! Students have got the campus and shuttle system down pat, and they are off and running! Students are forming friendships and really seem to work well together in a cohesive cluster group. We have produced our biofuel, washed it, dried it, and now students are tasked



with testing their fuel according to American Society for Testing and Materials (ASTM) to verify its quality. While completing these tests students learn the techniques and theory behind analytical instruments including atomic absorption spectroscopy, gas chromatography - mass spectrometry (GC-MS), X-Ray fluorescence, and bomb calorimetry. These complex testing methods allow the students to determine the quality of their fuel. Morning lectures include advanced concepts in analytical chemistry



that allow the students to truly understand the “why’s” behind the chemistry of their biofuel and the reasons their quality testing is important. Students have almost completed their biofuel ethics essay. This assignment allows students to think and project about various environmental and community concerns related to biofuel production. Students should propose a remediation for the ethical concern and communicate this information effectively.

On Tuesdays and Thursdays of every week students are hard at work in their specialized project groups. There are 5 project groups ranging from production to by-product elimination.

Team Algae is focused on algae production to include: building bioreactor tubes that effectively grow algae, and testing the algae throughout its growth cycle and eventually harvest its oil.

Team Soketal is focused on turning the by-product of biofuel - glycerol into soketal which can have useful properties as fuel additives or soap production.

Team Polyol is creating polyol from a vegetable oil mix. Polyols can be used to make plastics and foams, which have beneficial implications in many markets.



Team Rancimat is building a machine that is capable of detecting oxygen levels in biodiesel. Managing the oxygen levels is important in biodiesel production as it affects the overall quality of fuels.

Team Dioxane is also focusing on the by-product of biofuel, glycerol. They are chemically converting glycerol into dioxanes which can then be used as fuel additives.

All the team projects allow students to use their biofuel knowledge and apply it to real world applications!



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

The focus of Cluster 7 during week two were molecular and cell biology studies of red blood cells (RBC). Purified RBC “ghost membranes” were analyzed in week two by the combined techniques of SDS-PAGE (to separate the mixture of proteins contained in membranes) and western blotting (for protein identification). Students discovered the immense power of western blotting in the identification and quantification of actin obtained from RBC cell membranes. For western blotting, RBC membrane proteins were first separated by electrophoresis and then transferred to a paper matrix that was then probed with an antibody that only binds to the protein actin. The paper-bound antibody was then visualized using chemiluminescence. High quality western blot results were obtained by all lab groups in Cluster 7!



During week 2 students also measured oxygen transport by

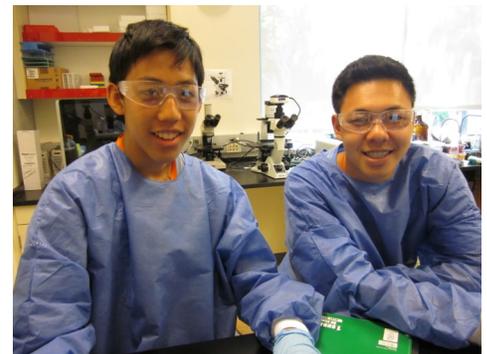
red blood cells using the technique of pulse oximetry, a non-



invasive method for monitoring a patient's oxygen saturation level. A light sensor is placed on a fingertip and the blood-oxygen monitor displays the percentage of blood (hemoglobin) that is loaded with oxygen. Data for all Cluster 7 students were recorded that, along with pulse rate, were graphed and analyzed for various trends. Students also explored Electrocardiography (EKG or ECG) which is the recording of the electrical activity of the heart. An EKG is used to measure the heart's electrical conduction system and displays the overall rhythm of the heart and weaknesses in different parts of the heart muscle. Students learned that a regular heart rate is between 60 and 100 beats per minute; less than 60 is called bradycardia and more than 100 called tachycardia. Students learned additional aspects of EKG including QRS patterns (wide or narrow) and P waves (are they present and upright).

In additional experiments, students used the polymerase chain reaction (PCR) technique to convert small amounts of DNA into very large quantities using a thermostable DNA polymerase

(Taq). The PCR-produced DNA was then analyzed using agarose gel electrophoresis to confirm the huge capacity of PCR to amplify targeted DNA. Finally students learned about a powerful method of gene silencing known as a “gene knockout” (KO), a commonly used technique in bioengineering and biotechnology research labs. Students were able to analyze the presence or absence of a gene for the RBC membrane protein, E-Tmod, from a KO mouse created in Dr. Vera's research laboratory. Us-



ing PCR, students could genotype the KO mouse and determine whether the mouse was completely lacking the E-Tmod gene compared to positive control levels found in normal mice.

Students were equally busy during science communication completing their independent bioethics essays and organizing their final projects. Having achieved a solid foundation in RBC molecular and cell biology, Cluster 7 students will now embark on building and analyzing RBC models using mechanical engineering principles under the direction of Dr. Olivera. The culmination of these studies will provide deeper insight into the structure and function of the amazing red blood cell.

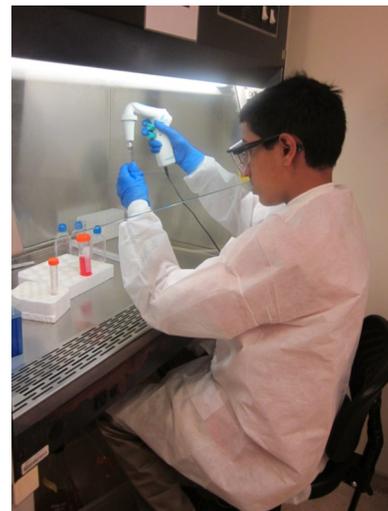
# CLUSTER 8: TISSUE ENGINEERING AND REGENERATIVE MEDICINE

The end of the first week was amazing! We wrapped up last week with a brainstorming session for our upcoming projects and discussing tissue engineering in the news. At the COSMOlympics our skit, cheer, amazing skills in relay race, and of course brainpower earned us a first place finish overall. Way to go Cluster 8! Eight is truly Gr8!

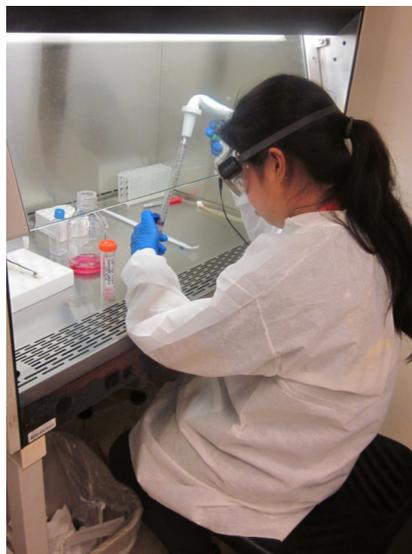
Our second week began as we learned from our passionate faculty members Barbara Shumacher and Robert Sah about cell and tissue characteriza-



The biggest challenge for most of us was learning how to use a hemacytometer to count our cells. After we counted our cells successfully we compared our counts to the counts from the *Scepter*, which is a handheld automated cell counter that provides a fast and accurate method for counting cells. Overall our lab work is going well and Cluster 8 continues to be great as we found out that no one had contaminated his or her cell cultures. All of our hard work will pay off, as we will be well pre-

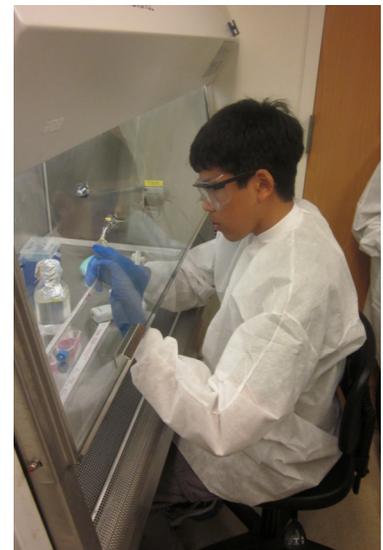


tion, bioreactors, biomaterials and stem cells. In the laboratory, we were also learning leaps and bounds! Lab math, excel skills, and new lab techniques were just a few of the new arsenals we acquired in tackling tissue engineering and regenerative medicine. We learned how to thaw cell and passage cells, count cells using trypan blue exclusion, pH solutions, and make collagen gels.

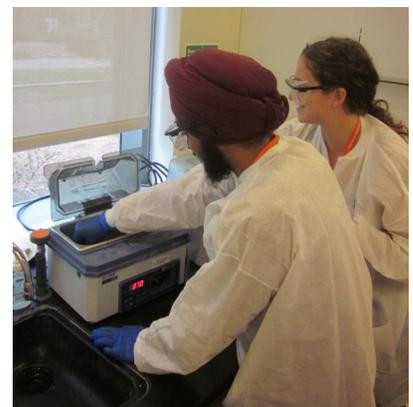


pared for our upcoming projects.

In the communications portion of the cluster we have learned of some ethical and moral issues in regenerative medicine and tissue engineering that we may be interested in writing about for the ethics contest. We are currently working on polishing our rough drafts for final submission on Saturday.

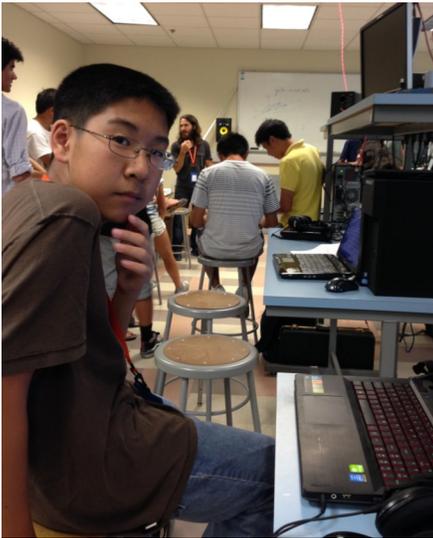


To end another 'GR8' week for Cluster 8 we are excited to go on our first field trip on Friday to Organogenesis, a company working on wound healing and soft tissue regeneration.



# CLUSTER 9: MUSIC & TECHNOLOGY

We are singing along in Cluster 9! Week 2 was highlighted by our first field trip to the Digital Media Gym and Iacon. Students were able to explore how projects could live on past their time at COSMOS and learn from those who are working in the music and technology field. Professor Shlomo and Professor

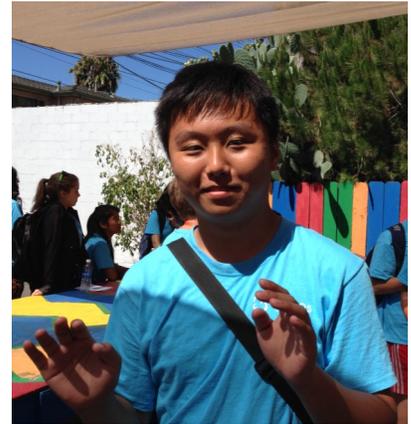


Mauricio have pushed students thinking with our study of circuits, Audacity and harmonics. Students continued their work with littleBits by connecting oscillators to the oscilloscope via breadboard and wires. This allowed them to see a sawtooth and square waves on the display. Afterwards, students used the frequency on the oscilloscope to tune the littleBits oscillator to a specific pitch. Students learned how to utilize the multimeter in order to measure voltage from a power source and resistance. Students then created their first circuits consisting of resistors, capacitors, a button, and a light bulb, while also connecting the littleBit's oscillator to a



potentiometer through a breadboard. Afterward, Joe began a visual demonstration where he introduced the Raspberry Pi, a credit card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. By connecting it to the workstation computer via Wi-Fi, he was able to control the transducer's vibrations. After learning how to remove vocals in a song, the class began an impromptu karaoke session, complete with solos, duets, group performances, and an

awesome rendition of "We're All in This Together" from High School Musical. Your students were amazing! Looking ahead



our students are going to be starting their projects soon and we are excited to see all the amazing work that our students will do.



# COSMOLYMPICS 2014





Cluster 8 won COSMOlympics, some won at Casino Night, and everyone won at the Zoo!





**Birthdays Kareoke Salsa & Indian Dance World Cup Frisbee Foam Sculpting Drawing**

