Week 4 Newsletter

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!

LINK TO PHOTOS FROM THE SUMMER:
https://drive.google.com/drive/folders/1-IpWXE7LWatvUImGrurgq-q5bueAevyv?usp=sharing

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 volunteer opportunities:
http://www.jacobsschool.ucsd.edu/cosmos/alumni.shtml

Keep us updated on your accomplishments and be the next person to get featured in our Alumni Newsletter: https://docs.google.com/forms/d/e/1FAIpQLSfc5AT3F01hW_eArcz-mFldJrgadWFpxQPEO3ycM_KsyQM4w/viewform

Continue to support COSMOS by donating!
Please visit: https://cosmos-ucop.ucdavis.edu/app/main/page/make-a-gift

COSMOS AMBASSADORS

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
DISCOVERY LECTURE SERIES

Dr. Margaret E. (Molly) Roberts, Assistant Professor of political science at UC San Diego gave our final Discovery Lecture, titled “Censored: Distraction and Diversion Inside China’s Great Firewall.” Dr. Roberts began by discussing the comprehensive censorship efforts of the Chinese Government and the difficulty of managing this degree of censorship. In the course of her research, Dr. Robert found that censorship works by distraction and diversion. She also found that most people don’t care about politics - they are busy, impatient, and uninformed. Censorship does work, and it allows the government to focus repression efforts for high profile users, media, and academics.

Dr. Roberts discussed three mechanisms of censorship: Fear - to threaten punishment - must be observable in order to function. But fear is also dangerous as it can cause backlash by drawing people toward information. Friction - make information costly to find and spread. This does not have to be visible to be effective but it relies on indifference and impatience. Flooding: introduces noise and/or distractions which dilutes the information environment. This makes separating good and bad information more difficult.

The Great Firewall of China blocks foreign websites from China - things like Twitter, Facebook, Google, The Wall Street Journal, and other sites. Dr. Roberts discussed the characteristics of people who jumped the firewall versus those who didn’t. They tended to be more educated, wealthier, and tended to speak English; they also followed international politics and had an international network of people outside China. In the course of her survey, Dr. Roberts found that most Chinese people did not feel it was necessary to jump the firewall - there are a multitude of Chinese websites that they found sufficient and did not feel the need to access outside sites. Dr. Roberts then introduced the idea of “rational ignorance” - most people don’t want to spend a lot of time thinking about politics. There are certain exceptions to this: during times of political crises, people want to know what’s going on. Also, sudden censorship disruptions - like the censorship of Instagram. When China blocked Instagram, a vast number of people downloaded VPN access to be able to follow celebrities - in this way they were exposed to politics. Dr. Roberts concluded her lecture by noting that censorship is not as much about fear; it is important to realize that censorship has an unequal impact - between those with resources and those without.

RESIDENTIAL LIFE

COSMOS 2019 is coming to an end. Another year is in the books and the transition back home has begun. What an amazing summer it has been being immersed in the residential life experience, the social events, weekend excursions, and COSMOS community! The students are leaving with new memories and long lasting friendships. The students have explored, endured, and conquered these past couple of weeks while being exposed to new experiences. The Residential Life Team, gave their best to their jobs as each day brought new challenges and new successes—they were energized, they were exhausted, they were inspiring, they were inspired. The Resident Assistants worked hard this past month to make the last couple of weeks unforgettable for the students. There have been an array of programs ranging from clay art, friendship bracelet making, glider port sunset polaroid, and bath de-stressed programs. This past weekend the Resident Assistants planned a Carnival, COSMOS Dance, & Talent show for the students. During the Carnival students played games for tickets and turned in their tickets to pie Faculty Director, Charles Tu and the Resident Assistants. The students had so much fun de-stressing by dancing the evening away at the Cosmos Dance. The Talent show displayed the various talents these individuals hold from hula dancing to playing musical instruments. This summer had many memorable moments, and we are grateful we got to share and create them with your children. We’re sad to say goodbye to these amazing and intelligent students, but we look forward to seeing how they will change the world. Thank you all for entrusting your children to us. It was an incredible month, and a brilliant way to round off an absolutely amazing summer!
RESIDENTIAL LIFE — WEEK FOUR
A lot happened at the end of last week. Last Thursday, we presented our Arduinos musical instrument projects. Congratulations to the Faculty Choice Award winners: Clarice and Zarco for “Bop It!” for creating their own Bop It style game and instrument! Congratulations to the People’s Choice award winners: Christine and Kevin D. for “Bunny Ears” for their instrument which plays musical notes based on the movement of a worn glove!

Last Friday, Sanjoy Dasgupta guest spoke about machine learning and how a computer can determine handwritten numbers. For example, the post office uses software which has to determine the addresses written on an envelope. However, not everyone writes the number 5 exactly the same. Some may curl more that it could be considered by a computer as the number six. There are different algorithms that can be used to most effectively and accurately determine the values. Later that morning we learned about computer architecture including registers, MUXs, memory and ALUs. Leo connected everything that we learned so we had a better understanding of how it all fit together.

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, image processing 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. One project involves an alarm clock which makes you get out of bed to turn it off! Another created their own trash can that will come to you.

Some teams will be using their mobile phones (with an app they created) to control their Arduinos with various sensors and many servos! We have projects that are autonomous driving robots, one that will track water usage, security systems, one inspired by skeeball, and a birthday cake “delivery” system, just to name a few! Students are using components on several technologies to interact with each other. 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 or Science Talent Search. These projects have a lot of work and heart in them and having great potential to do well in research project competitions. 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 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 Curt Schurgers and Professor Leo Porter) to our TAs (Ravi Patel, Maria Parganina, and Anthony Yao) to our RAs (Matt and Isabelle), you helped us learn a lot and have a great time in the process! You can view our pictures on our Cluster’s Blog (UCSD COSMOS Cluster 1 2019) http://ucsdcosmoscluster1-2019.blogspot.com/ to see all the fun we had in class and on our field trip!

From the author: Thank you to my bright, appreciative and overall wonderful students in Cluster 1. You made my “vacation” fun and energizing! Keep up your curiosity and drive for excellence. I know you will go far in your journeys! Your Teacher Fellow, Shirley Miranda
CLUSTER 2: ENGINEERING DESIGN AND CONTROL OF KINETIC SCULPTURES

In our last week of COSMOS, our Cluster 2 students were working on evolving their mini sculptures this week to full operating sculptures integrating their design. They started off by performing risk analysis, testing their sensors, motors, and overall dynamics to determine if the design concept was working as planned. The challenges were to identify the highest risk components of a design, and be creative in finding ways to verify if they will work.

Throughout the week, they worked countless hours expanding and improving their designs, and prepared for the culminating presentation and the research expo. They practiced teamwork skills by communicating, negotiating, and advising their teammates throughout the process. Some team members worked on programming sensors and motors, others were documenting the work on their team website, some were laser cutting new pieces for their designs, and some worked on troubleshooting their sculptures.

Students attended an interesting lecture this week by Dr. Margaret Roberts, a Professor of political science at UCSD. Dr. Roberts talked about her book, Censored, were she explained her research involving the distraction and diversion inside China's Great Firewall.

After the lecture, cluster 2 visited the Solar Turbines manufacturing facility in Kearny Mesa; a leading provider of energy solutions. They toured the facility and saw the extensive line of gas turbine-powered compressor sets, mechanical drive packages, and generator sets. After the tour, they enjoyed a sunny San Diego day in Belmont park; where they experienced the transformation back and forth between gravitational potential energy and kinetic energy as they enjoyed the roller coaster and the rest of the rides!

Our students overcame various challenges throughout the weeks, they worked really hard and were able to show great commitment and stamina as they approached various tasks. Professor de Callafon awarded our student winners who successfully completed programming challenges, met highest accuracy in designing their clocks, and those who were able to sustain their water balloon from breaking when dropped from 6 feet high with nice giveaways.
CLUSTER 3: LIVING OCEANS AND GLOBAL CLIMATE CHANGE

It's hard to believe that we are just a few days from the end of COSMOS. I am very proud of Cluster 3’s progress over the past few weeks. Many started the program with limited knowledge of oceanography and atmospheric chemistry and have learned so much. Cluster 3 has been able to absorb a lot of knowledge from our amazing faculty and TA’s. Now, they are experts in their projects!

“Last Friday morning began with two intriguing guest lectures from field experts. One discussed his work in engineering cyanobacteria to increase its predator resistance, and the other described the process of ocean acidification and measuring oceanic carbon levels. In the afternoon, we commuted to Scripps Institution of Oceanography to learn how to identify different types of fish. We physically classified them by analyzing their body structure and through hands-on interaction.” David Y.

“Entering the classroom at NSB on Monday was a sobering experience for me. After weeks of insights and revelations from Dr. Skip Pomeroy, this was going to be his last lecture with us. When we all settled down, he declared “I’m either going to dazzle you with my brilliance, or baffle you”. In a flourish of strokes, he began writing chemical reactions on the board. As he scrawled equations on the board, he explained to us how to derive the basicity of the ocean using simple logarithms and pH equations. I was amazed how he was able to accurately find the pH of the ocean by calculating the excess acidity from carbon dioxide entering the ocean and turning into acid and factoring in the excess basicity from carbon dioxide dissolving the calcium carbonate on the ocean floor. In the afternoon we completed an acid base titration lab in which we used a pH probe. We slowly added hydrochloric acid to a beaker full of deionized water, making sure to keep track of the amount of acid added and the pH of the solution. Inputting our data into google sheets, we were able to calculate the alkalinity of the water.” Anthony S.

“Tuesday 7/30: Continuing our weekly lecture series, we heard from Dr. Margaret Roberts, a professor at UCSD specializing in data science. She details her findings from the book Censored: Distraction and Diversion Inside China’s Great Firewall, revealing that China uses fear, friction, and flooding to control Internet usage. Later in the day, we finished up our data collection for our project. We analyzed seawater samples from the wave flume to determine the nitrite concentrations in the samples.” Alex S.

“On Wednesday, my group and I made significant progress on our project presentation and poster. We analyzed the results from our experiments and wrote out the procedure we used in the lab these last few weeks. Using this information, along with some background research, we were able to write our abstract - the summary of our experiment, our results, and the significance of what we did.” Matthew J

“On Thursday, my group and I worked on the presentation about the phosphate project we’ve been working on for the past three weeks. We assigned parts that we would work on in the presentation, and I decided to work on the poster. The poster contained the summarized information about our phosphate experiments, including the calibration curve and the phosphate concentration determination.” Sihun

“We are going to present to our professors and rehearse for Closing Day on Friday! We can’t wait to share everything that we have accomplished with our family and friends. We look forward to seeing you all very soon.”- Arteen A.
By the last week Cluster 4 had loaded us with enough knowledge to evaluate structural systems through a truss challenge. Although the work was demanding at times, by the end of the four weeks we had the capacity for greatness. What we have learned here will at COSMOS will help to bridge the gap between high school and college. We were even fortunate enough to have a chance to ask questions to a three person panel this week made of an undergraduate student in Structural Engineering at UCSD, an Architectural Engineer who has turned to Construction, and a UCSD Ph.D student in Geotechnical Engineering.

After learning about earthquake hazards, soil and engineering solutions we felt confident in our projects. Throughout our time in cluster 4 we have gained an understanding that failure in testing provides an opportunity for learning in life. After a few cycles of research, design, test, fail, redesign and repeat, we were proud of our final products. In our groups we enhanced our collaboration, communication and presentation skills until we felt more confident. Our knowledge and communication skills were further tested during our Jeopardy “Final Exam”. It may have been stressful, but it was loads of fun. We practiced to refine our presentation skills within our fellow earthquake engineers before sharing the information with Cluster 5 COSMOS students who had been focusing their time on lasers.

The four weeks of summer flew by in Cluster 4. Visiting the largest outdoor shake table or an active construction site are special opportunities that most people never get. It was interesting to hear all of the perspectives of the people we met on the field trip and that participated in our panel. Plus, what is more fun than going on a field trip to a construction site where you get to wear a hard hat? Trisha Torres admitted “My three favorite things from my COSMOS experience are the interesting lectures and activities, the new friends I have made, and the onion rings at lunch.” Reflecting back on our time at COSMOS, the consensus was that we will remember the people the most. We appreciate the mentors that helped us grow and the new friendships that will last into the future. “We have come a long way in four weeks, at first the students were all strangers at COSMOS, then it got cliquey, but now we are all bonded in Cluster 4” said Aarushi Wadhwa. The new skills and friendships that were gained over the past month will follow us home and serve us well into the future.
CLUSTER 5: Photonics: Light-based Technologies in Everyday Life

Somehow it’s already over, but COSMOS 2019 was a huge success! Students in Cluster 5 learned so much from their time with professors, hands-on experiments, and activities with new friends that surely created lasting memories and will inspire future scientific endeavors. Right now, students are working diligently on the final touches of their projects as they prepare to present at the Research Expo on Saturday.

During lectures this week, students learned more about biosensors, optoelectronics, and how nanostructures influence color in nature and engineering. There was even a chance to discuss some solar spectroscopy and use a solar telescope to view the Sun. Finally, two of the most fun and interesting parts of the week were some hands-on activities. In the first, students built an electric circuit that converts sound (music from your cell phone) into a light signal from an LED that can be detected by a solar panel or photodiode and played through a speaker. In the second, students build a $1 foldable microscope that could be used to magnify to an astounding degree. Students had a great time learning the circuitry, playing music with light, and learning about simple, yet powerful microscope technology!

The final Discovery Lecture of the program was a wonderfully interesting and engaging talk by Dr. Margaret Roberts on censorship in China and the Great Firewall. She explained her research and the impacts of internet censorship on citizens of autocratic countries as well as some potential effects around the world, and students were very interested and learned a lot.

Students are now working diligently on their projects; implementing plans, collecting and analyzing data, writing and practicing their presentations, and preparing for the Research Expo on Saturday. Keep an eye out for the awesome Cluster 5 t-shirts when you join us for the final day of COSMOS 2019! Here are a few send-offs from students.

“The time we spent in the photonics lab is by far the best academic activity our cluster provides. We have the opportunity to learn in a collaborative with like-minded peers while also being able to utilize lasers, lenses, and other various tools that we would have access to in a high school environment” - Austin P.

“I liked learning about how fiber optic cables worked in the lab because it is so cool how much information you can fit in just one fiber.” - Nina H.

“I think that my favorite academic activity would actually be the lectures since a lot of the information was new to me and has taught me a lot about how semiconductors work in the molecular level and how lasers are made.” - Emily C.

“What I enjoyed most about COSMOS was making tons of new friends with my cluster and roommates. During the first week, I didn’t really enjoy the program, but my friends really made the next few weeks fly by, and now I’m really sad that we have to go back to our own separate lives in a few days. I loved complaining about Cafe V food with my cluster, listening to Prof. Peter’s savage jokes, seeing Prof. Charles ride his bike every day, running under the beautiful morning sky (as exercise, definitely not because I was late to class haha), and more. Thanks for such a memorable month everyone!” - Rebecca M.
"In the morning Friday, Dr. Ryan Simkovsky gave us a lecture on his research on algae and some of the problems with scaling up algae production from a lab to a large farm. May Linn Paulsen then gave us a lecture on ocean geobiochemistry and her work in measuring ocean alkalinity. After lunch, we cleaned up the lab that we first made biodiesel in and continued working on our final projects."  Phillip Jeong

"On Monday, July 29, we opened the week with our first time organizing our thoughts from our projects into a presentation. Our guides for each of our projects clarified the requirements for the presentation. Shortly thereafter, we began our slideshows and posters, considering every aspect of our presentations along the way, from our scientific findings to visuals and speaking style. Later that afternoon, we continued our initial take at the presentation, gathering all data of which had had collected throughout the length of the project."  Prerana Devadhar

"On Tuesday, we had our last discovery lecture from Dr. Margaret Roberts about censorship in China. Afterwards, we worked in our project groups to complete our posters and presentations."  Shriya Araveeti

"On Wednesday morning, we went down to York Hall to clean our lab stations, as well as our glassware from the biodiesel production. Then, we spent the rest of the morning and afternoon finishing our posters and polishing our final presentations for Friday."  Rocky Versace

"On Thursday, we went to NSB for our final science communications meeting. Afterwards, we put the finishing touches on our presentations, and completed our project posters. Afterwards, we were able to watch the sunset at gliderport."  Xiuyuan Qiu

Friday was our last day to meet as a Cluster for activities. We spent the morning doing final revisions on presentation PowerPoints and practicing the presentations. After lunch, Clusters 3 and 6 met in NSB 2303 and all 10 project groups presented their projects to their peers and instructors. We look forward to Saturday, when we will present all of the projects from Cluster 6 to our guests before the awards ceremony. It’s been a packed and fun four weeks, and we’ve all learned from our experiences here at UCSD COSMOS and had a great time learning from each other. Mr. Towler
Week 4 students have been working really hard on their experiments. Of course, we had our Discovery Lecture, which was a fascinating exploration of internet censorship in China. We visited Illumina on Wednesday and had a great tour and panel discussion with Illumina associates.

Our six groups worked on their projects all week, and had to overcome some issues with the experiments as well. In the end, they learned a lot, and ended up with interesting questions about why things turned out the way they did! All of the students are excited to share their work with the families on Saturday!

Alguys working with Dr. Eva Sanchez on microalgae. They worked on a really cool system and did something really unique.

The Yeasty Boys worked on glowing yeast. They have an interesting story to tell with some cool photos and videos.

Luminescents did interesting things with plasmids tried to answer complex questions around protein expression.

The CRISPY Ladies worked on a CRISPR project. They solved problems in a really innovative way.

ProGlo worked on a design for probiotics. They did a lot of work on their project and had a lot of issues because of the complexity of their project.

KEWLights engineered a really cool device for growing glowing bacteria. They had a really unique project that will inspire new groups of students to follow their project.
Four weeks really flew by! Week 4 began and ended with an immense amount of work. It was astonishing how much planning and preparing was necessary to complete our projects and how much thought was required to problem solve and analyze our data. As week four progressed our projects were completed, posters were finalized, power points finished, and our research paper ultimately completed. Each group worked with a professor and cluster assistant in order to complete their projects. In the end we proficiently presented our projects to our cluster, cluster 7, and on Saturday we will give professional poster presentations to our families and friends. In our last Discovery Lecture, Dr. Molly Roberts discussed how China maintains one of the most vibrant online communities while still repressing it. As COSMOS 2019 comes to a close, it is GR8 to see what everyone has accomplished. We have become proficient in our lab skills, refined our technical writing, and developed and implemented our leading edge projects. We all want to extend a gigantic thank you to our GR8 Professors, Dr. Sah and Dr. Gaetani, our GR8 Cluster Assistant’s, Arya, Steven, Swetha and Veronica.

What I will always remember about COSMOS 2019 is...
- the wonderful friends that I have made here. Michael
- the wonderful people I have bonded with, and the amazing projects we worked on together. Esha
- the friends I made and the Italian I learned. Mitchell
- working with so many amazing people. Jared
- the unique, hands on experience. I have never been able to work so closely with real cells, and analyze their behavior. It was very eye opening and fascinating to have been able to work in the lab with UCSD professors! Allie
- the invaluable experience I had with my friends and the rigorous but interesting labs with our professors. Andy
- all the amazing people I met. From the beginning my cluster felt like family and I enjoyed every moment with them. Kaylin
- the inspiring people and the galvanizing passion we all have for punny lab jokes and tissue engineering alike. Lizzie
- the close bonds I was able to form with the people in my cluster and the fun times we spent in lab #888! Celine
- coming into class/lab everyday and working in such a supportive environment. Anna
- the one-of-a-kind lab experience I’ve had the past few weeks and the bonds I’ve made with others over the many hours spent together and our shared passions. Rachel
- meeting unforgettable people, culturing beautiful cells, and the sound of the centrifuge when we forgot the lid. Smera
- working with Dr. Gaetani, Mrs. Fowler, and Dr. Sah! Luke
- the people I’ve met and the friendships I’ve made. Sameer
- seeing how people came from different backgrounds can get along so well together like a family. Jenny
- Swetha morally supporting us even through our failures during lab. Matt
- the wonderful people I’ve met and the long lasting memories that I’ve made! Misha
- flying bones, seagulls, spilled coffee, cells that finally dyed, and laughter with Cluster 8. Shreya

Cluster 8 has had a GR8 summer at COSMOS!
Introduction:
Over the course of these last two weeks, the students of Cluster 9 have formed their own trios for our final project. Learning from the COSMOS curriculum, they have developed the experience, knowledge, and maturity of true intellectuals, innovators, and creators, and this 2-week project is a perfect microcosm of their talent and potential in the STEM field. Our future scientists, engineers, and programmers have been working diligently from Monday morning to Friday evening, setting their intellectual ideas into motion with the end goal of making the world a better place.

Project 1: Visual Audio
Members: Alson Chan, Leo-Yang, Aniketh Prasad
Description: Our project aims to help deaf people by taking in audio/midi input and comparing it to a midi file. With these comparisons, we can display the audio using objects and colors and can give feedback to the user, detecting wrong notes and other problems with playing. Furthermore, we plan to have a synesthesia type object that displays the current pitch and note that the user is playing in a piano-type interface.

Project 2: GANmidi
Members: Conan Lu, Elena Alturi, Satvik Nagpal
Description: Our project aims to convert music into a given style using machine learning. We accomplished this using an algorithm known as a generative adversarial network (GAN). A GAN consists of a generator, which creates music based on an input, and a discriminator, which judges if the generated music is real or fake. We fed in pairs of pitch classes and piano rolls to train the algorithm in a given style. Then, the trained generator can be used to interpret other musical pieces into the style it was trained on.

Project 3: piLED
Members: Teresa He, Lia Seo, Sophia Yu
Description: piLED is a program developed with Pure Data and Python that composes a melody and displays the beat by using LED lights. Through PD, the user will be able to provide a tempo for the program, which will correspond with the lights’ actions. In addition, piLED will create the melodies by using markov chains: models that use probability to create sequences.

Project 4: Harmoni-US
Members: Twisha Sundararaman, Megan Wei, Maya Itty
Description: Our product recognizes chords from a voice or an instrument and generates real-time harmony to the melody presented based on the key. Using PD to detect the pitch, we transpose it a specific amount of semitones in order to create a minor and major chord based off a single pitch.

Project 5: Transform-A-Tune
Members: Natalie Brewer, Rupali Sarathy, Yuhan Chen
Description: This application allows a user to input a melody of their choice and choose a conversion in order to create a brand new melody. Transform-A-Tune utilizes the process of reflections and mathematical algorithms in order for brand new melodies to be discovered. Some conversions include a negative harmony, a symmetric harmony, reversing the pitches of the melody, randomizing the pitches in the melody, and stretching the relationships between pitches of the melody.

Project 6: Mooderater
Members: Megan Peng, Carol Tu
Description: The Mooderater will monitor and classify brain waves as either alpha or beta by measuring their frequencies. The user will select whether they would like to focus or relax, and in response, the Mooderater will play customized music that will enhance either alpha or beta waves, which will either improve concentration or reduce stress, based on the dominant wave. Alpha waves have a low frequency, with a range of 8 to 12 Hz, and they elevate levels of serenity; meanwhile, beta wave haves a higher frequency ranging from 12 to 32 Hz and heightens attentiveness and problem solving abilities.

Project 7: Musiciser
Members: Tevin Wang, Austin Wang, Doyoon Kim
Description: Are you an athlete? Do you listen to music while you exercise/workout? Musiciser is the perfect app for you! Musiciser is an app that allows you to not only listen to music while running but also helps you keep a consistent pace. First, you can upload the music of your choice onto the application. Next, you can set the intensity of your exercise from the range of light to vigorous -- we call this the Exercise Tempo. Lastly, you can start musicizing or exercising with the app, but know that if you are running behind your set desired pace, the music will slow down in real time corresponding to how far you are behind your pace and the pitch will also become distorted in real time. If you prefer not to listen to distorted pitches, there is also an option to preserve the pitch of the audio file no matter how slow it becomes in real time. This app is designed to motivate you to move at a constant speed by manipulating your hearing sense to send a warning of your unconscious laziness (if it happens) so you can fully enjoy the music that the wonderful musical stars of today have released. Start exercising at your tempo today!
We have made it to the final week of COSMOS, and students are taking on their greatest challenges: custom robots!

**Day 16:** Our final week in COSMOS kicked off in the lab with individual robot designs. Today was completely focused on working in the lab and getting ready for Friday's cluster showcase.

**Day 17:** Today's discovery lecture was all about China's Great Firewall, presented by Dr. Margaret Roberts. She talked about the challenges of censorship in China and how people are getting around it. We then worked on the students' final posters for their projects (ask them to show you their posters!). We then transitioned to the lab for the remainder of the day for everyone to work on their final projects!

**Day 18:** We began with a panel of undergraduate students sharing their college experiences and high school choices with the cluster. The students were able to ask many questions and hear about college life and college choices. We then spent the rest of the day in the lab preparing final robots!

**Day 19:** Today was the last day to work on robots in the lab, and it was exciting to watch ideas come together and robots to work!

**Day 20:** Our final day in COSMOS! We had the opportunity to see Cluster 1 and Cluster 11 in action this morning, then we got to present our final projects to both clusters in the afternoon. This was a chance to see if everything is working before families arrive on Saturday morning!

We have had a fantastic time getting to see your student's creativity, drive, and capability to learn new things! We are always excited to see what students are capable of when given support at a university level, and we hope they let us know what they accomplish in the remainder of high school and beyond!
Week 4 began with a lecture on Open CV from Dr. Phan. Students then began hard coding a line following program to see the difference between using a neural net and traditional coding. In most cases the neural net worked better but the drawback is that it requires a great deal of training. Various groups got the cars to follow other cars, follow people with tape attached to their shoes, and drive around courses made of cones.

Tuesday morning was the Discovery lecture by Professor Molly Roberts on the topic of online censorship. After that students worked on their final projects. In the afternoon students were taught Tensorflow by Dr. de Oliveira of Clusters 7 and 9. There was also more time for the final projects. Topics include following other cars, following bouncing balls, stopping at stop signs, following people and adaptive cruise control to avoid rear ending other cars.

Wednesday afternoon was a lecture on the technologies employed in full size autonomous vehicles. Thursday morning we visited the robosub competition and saw teams from around the world competing.

On Friday students presented their work to Clusters 1 and 10 and also heard from those clusters on their work in computer science and robotics. Late Friday afternoon was practice for the final ceremony. On Saturday families had the opportunity to see the cars and ask questions of the students and the cluster staff.
CONGRATULATIONS!!!

Ethics Essay Awardees

Dr. Joseph Watson Awardees

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

Cluster 1

Cluster 2

Cluster 3

Cluster 4

Cluster 5

Cluster 6

Cluster 7

Cluster 8

Cluster 9

Cluster 10

Cluster 11