We are off and running in Cluster 4! Eager minds, smiling faces, and great attitudes abound. The C4 Cosmopolitans are getting acquainted quickly, sharing ideas and helping each other with the fun challenges of their introduction to structural engineering and geophysics. Our group of 24 students has already displayed great enthusiasm and pluck, and seem to be integrating into the regime of their simulated college lifestyle quite well.

Their initial activity and icebreaker was designing and building a K’Nex structure, and then testing it on the ‘shake table’. It is a bit more complicated than it initially sounds however. The designing process involves selecting structural members on the basis of their perceived strength as well as cost. A ratio of cost per square foot is calculated, and the students learn about real life considerations of architects and engineers. Lead professor Lelli introduced the terms and elements of structural design earlier this week.

We saw some ingenuity and thought lead to successful testing that withstood the simulated seismic energy on our shake table, and some equally thoughtful designs fail instead. (Please visit our cluster website to view images and videos of their testing.) They will be using the shake table frequently in the upcoming weeks to test more sophisticated creations. Yes, they were beginning to think like engineers!

Our C4 group then attacked truss analysis, or did truss analysis attack them? Their math skills, conceptual skills, and patience were greatly tested, but hey, that’s sophomore level college information they’re digesting. So following some heavy lecture and discussion, they broke into small groups and designed and assembled wood and aluminum trusses, then tested them after calculating a predicted strength. Thomas Edison wrote that the three keys to great personal achievements were hard work, perseverance, and common sense. By the end of the day, our Cluster 4 students understood his observation well!

Kevin enjoyed introducing and sharing his geophysical knowledge with the students, which led to some basic geology discussions and the adoption of a special rock for each student. Students had to use adjectives and descriptive terms in order to allow another team to quickly match the adjectives to their ‘mystery’ rock. Similar to the K’Nex activity, observational skills were honed and

The week concluded with the testing of metal ‘coupons’ for tensile strength and behavior. We crunched numbers and formulas using Excel, quantified the differences between aluminum, steel, and brass, then graphically displayed the data. A Friday tour will give the students a taste of the unique facilities at UCSD, and current engineering research that’s underway. Soon they will be placed into one of eight assigned groups of three, and this cadre will design, build, test, redesign, and collect data on a specific structural type or building material. This will be their focus for the remaining three weeks. More about this, their major project, during the next newsletter.

It is our pleasure to work with your terrific students at COSMOS this summer. We sincerely mean that it is a highlight of our year! Cluster 4 rocks!

https://sites.google.com/a/eng.ucsd.edu/ucsd-cosmos-cluster-4-2015
Our Cluster 4 Cosmopolitans continue to impress us with their superior work effort, problem solving strategies, and tremendously positive attitudes. Above all that, we find this group to be a very warm and friendly assembly of inquisitive young adults. Good job parents! Students were placed into one of eight project groups comprised of three students each, and on Monday they began to delineate the individual responsibilities required to carry out their mission, and to create organizational time charts.

The eight project groups each have their own unique characteristics and design challenges, not to mention time management hurdles. Yet, the students have bravely forged ahead, and soon will experience the realities of a three week deadline. The groups include ‘soft story’ structures, timber, masonry, concrete bridge columns, liquefaction, lightweight reinforced concrete aggregate, base isolation, and tuned mass dampers.

During the morning sessions, Lelli continues to explore various aspects of engineering design considerations with the students, preparing them to strike out on their own with idea development. Following approval of their designs, they began building and testing their models based upon the assigned structural type. Cluster Assistants James and JJ keep very busy advising and supporting our student groups during the afternoon project sessions. Almost all groups completed their models by Thursday and began testing the strength of their models Friday. They will be using the ‘earthquake shake table’, or another instrument specific to their structure during testing. Keen observations are necessary while testing for structural failure, and these notes are used in assessing the needs during the redesigning days to come.

In other news, our students were treated to a Discovery Lecture by Dr. Elsa Cieland on Tuesday. Her research has demonstrated that the timing of plant growth is a key indicator of species response to global change. We learned that ecosystems often respond in surprising, non-linear ways when exposed to multiple, simultaneous environmental changes such as global warming. It is powerful for the students to experience her passion towards such a vital environmental issue, and to understand that she successfully balances her research with her family priorities as well. On Thursday we are attending our first cluster exploration hour, where they are able to hear about the cool things other clusters are doing. The final exploration hour will be next week.

Thursday was spent soaking in the warm San Diego sun and learning about San Diego geology from Kevin. We trekked a short distance up Mt. Soledad and were inspired by the beauty of a 360 degree view. Box lunches were enjoyed on the beach at nearby La Jolla (tough job, isn’t it!) before we journeyed to Torrey Pines State Reserve. Kevin led the students on a geologic scavenger hunt of sorts, all the while honing their GPS skills in the creation of a field trip map on Google Earth, to be shared with you soon. Before returning to campus, students relaxed on the beach and appreciated the amazing setting that UCSD students are so fortunate to experience.

Our student groups are functioning well thus far, and the process of building, testing, analyzing, and redesigning will continue into next week. Those families taking advantage of Parent Weekend will undoubtedly hear all about their successes and challenges over some home cooking. They look forward to sharing their final results and products with you in two more weeks. As always, please keep up with their endeavors by checking out our Cluster 4 Website and photo galleries.

https://sites.google.com/a/eng.ucsd.edu/ucsd-cosmos-cluster-4-2015
Clyde Tombaugh, discoverer of ‘minor planet’ Pluto, is quoted as saying “A person that is much interested in science is going to neglect their social life somewhat, but not completely, because that isn’t healthy either.” We needn’t worry about our COSMOpolitans neglecting their social lives, even though they were extremely busy this week with testing and retrofitting their structures. Our wonderful residence life advisors scheduled a bonfire, the talent show, and many other worthwhile distractions from their hard work in the Cluster 4 lab.

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

Students embraced two trips outside of the lab this week. They enjoyed a tour of the campus Cal-Trans SRMD facility. You may enjoy reading more about it yourself at this link: http://structures.ucsd.edu/node/62. The Seismic Response Modification Devices are used to test structures such as highway bridge columns under earthquake stresses. On Thursday we bussed to the San Diego Office of Emergency Services, receiving a tour detailing the responsibilities of city personnel during fires, earthquakes, and other natural disasters. We residents of San Diego thoroughly appreciate the level of preparation detailed in order to successfully provide the vital services to citizens following such an event. The building itself has been fitted with base isolation devices, which the students saw from below ground level. The day concluded with an amazing tour of the Englekirk Center and the UCSD NEES shake table, a full scale earthquake shake table, capable of testing buildings as tall as seven stories. You may enjoy watching their testing videos at http://nees.ucsd.edu/. It was truly special to see and learn about such a world-class facility.

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

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

The Tuesday Discovery Lecture earlier this week got us off to a motivational start, as we learned about 3-d printing and biofabrication. Students were amazed to learn about the process of producing functional body tissues in microscale. Students also engaged in a Q&A period about college life with our cluster assistants James, JJ, and Kenneth. There were many great questions that our CAs willingly answered spanning areas from dorm life and campus dining to the rigors of academic success and speaking effectively with professors.

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

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

We enjoyed a pizza lunch, scavenger hunt, and private awards ceremony. Later in the afternoon we rehearsed for Saturday’s ceremony in Warren Mall. COSMOS is a one-of-a-kind opportunity, and we thank you for allowing and encouraging your students to experience all that was offered here at UCSD. We will truly miss their warmth and wit, their sincere friendliness, and their contagious positive attitudes. We hope to keep in touch and to follow their future plans!

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