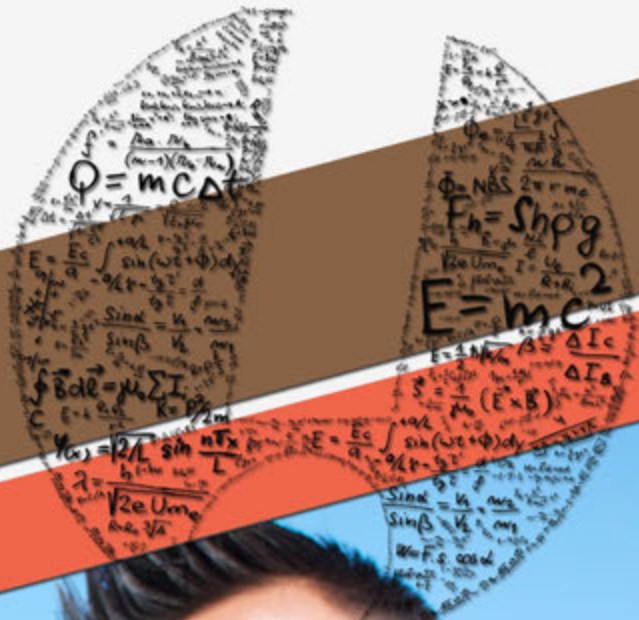


IDEA STUDENT CENTER
QUARTERLY NEWSLETTER

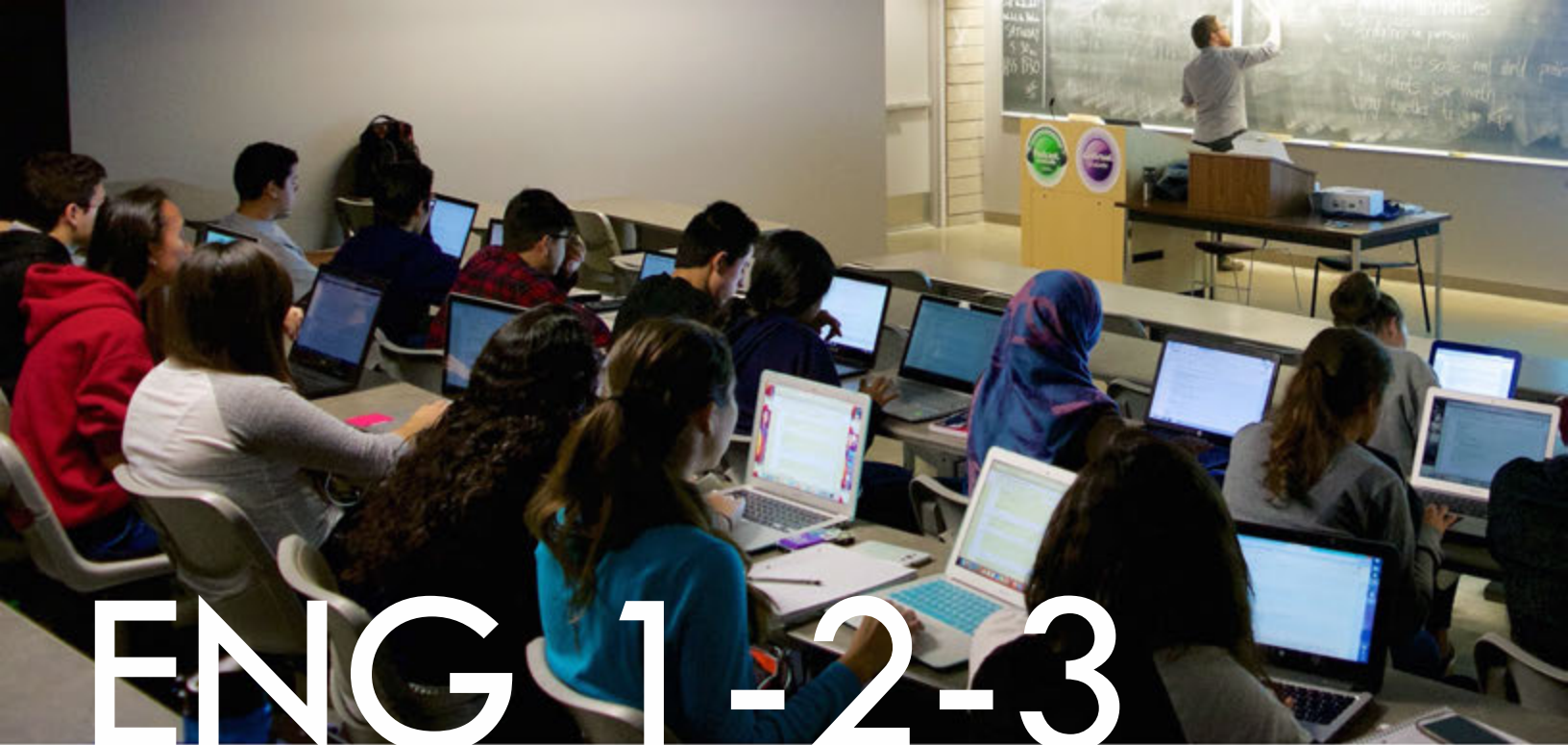
VOLUME 2 . ISSUE 2 . FALL 2015



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ENG 1-2-3

Orientation to Engineering Course

Photo by Renn D.

The Orientation to Engineering course series starts with ENG 1, which focuses on the successful transition and orientation of students to engineering studies at UC San Diego, with particular emphasis on those students coming from economically or educationally disadvantaged backgrounds. ENG 2 and 3 prepare Engineering students for internships, professional careers, and graduate school. Weekly meetings consist of interactive activities that include presentations from alumni and practicing professional engineers.

Q&A with ENG 1 INSTRUCTORS

Why is the class important?

The class helps students make connections between their coursework and engineering early on. This helps keep them motivated, but also helps them get into an engineering mindset where they have to take what they've learned in class and apply it to solve real-world problems. Additionally, the fact that it is a first year class is a huge plus. It sets the stage for the students to start strong and succeed throughout their undergraduate careers. In those ways, it truly is an "Introduction to Engineering" course.

What makes it unique?

ENG 1 is unique in that it covers the range of skills needed for engineering problem solving. It highlights how to apply the math and theory, but takes it one step further by leveraging programming to be able to tackle larger, more realistic problems. One example of this was our section on integrals: we started with a review of integrals and a few basic examples, then moved onto using Python to numerically integrate the energy usage of a prototype device.

¹ idea.ucsd.edu

Afterwards, students used their results to recommend batteries to meet the energy needs of the device. And finally, we presented the students with a hardware demo that used an Arduino microcontroller and an off-shelf DC current sensor to collect the energy data. This showed them the full circle of solving a problem, although not every part was covered in detail.

How have you seen students change throughout the quarter in their approach to problem solving, using math, etc.?

Students have started picking up on the "bigger ideas" of the topics, and are starting to realize they have to do more than just reiterate facts and formulas. They still have a lot to learn, which they will via courses like the MATH 20 series, but they're on the right path.

HEAR IT! FROM THE STUDENTS



Introduction to future math topics

Python + hands-on learning:

“I used Python to do calculations for my chemistry homework, which helped me avoid mistakes. I used variables, so it was easier to keep track of the calculations as compared to using a calculator.”

Latest engineering trends and developments

“I like the class discussions to understand the “how” and “why” of projects we see on the news like Tesla's Fremont manufacturing plant or MIT's cheetah robot.”

Seeing engineering devices in person

“Photos are okay, but seeing it in person is even better! For example, the hardware demo that showed how to measure energy usage 9-DOF sensor, which showed how you could track position and velocity of something like a VR headset.”

How to use math to solve real world problems

“We learned how you could use math for robotics (understanding the why/how now, instead of much later in our undergrad career).”

“Calculating the hand position of a two-link robot arm and using a rotation matrix to quickly find the position of a rotating robot arm.”

Tying things together to their major

“I think I have a better understanding of what my major could do and I see why we are learning certain math topics now (rather than realizing it later).”

sound bite

ENG 1 INSTRUCTOR, FALL 2015

“*ENG 1 strives to give understanding of why certain math concepts are useful for problem solving and how they can be applied to real world problems. By giving the engineering mindset to students early, we are helping them to have a greater appreciation for the formal math that is taught in other classes.*”



Instructor David Larson with his ENG 1 class. | Photo by Renn D.

JUMP

JACOBS UNDERGRADUATE MENTORING PROGRAM

Interview with Eugene Sato
Bioengineering PhD Candidate
Co-Coordinator of JUMP



How did you get involved in JUMP and what has it been like for you to be a part of this program for the past few years?

My good friend and lab mate, Margie Mathewson, was also one of the founders of JUMP, and she told me that she was looking for new Graduate student mentors for the program soon after it was started. I was a graduate student mentor for two years, and then I started working with Margie as a Coordinator for JUMP.

I'm now in my 5th year with JUMP, and I've had a great time. I've run into some of my mentees from my first few years and it was great to hear about their successful college careers, whether they were graduating, or working on really interesting projects around campus.

What do you think sets JUMP apart from other student mentoring programs?

I think the diversity of our students; diversity of majors, background, gender, work experience, etc. is something that is rare in many student programs. Many mentoring programs focus on one of these aspects at a time (i.e. major), and I think JUMP does a great job of getting a mix of people that mirrors the increasingly diverse and interdisciplinary nature of science and engineering.

In addition, the multi-generational aspect (which spans beyond undergraduates) of JUMP is something that I hadn't experienced before. I think grouping underclassmen, upperclassmen and graduate students together provides a unique multi-layered experience that I have not seen in other mentoring programs. I believe this unique mentoring experience expands further with our close relationship with UCSD alumni. I think our networking nights with the alumni benefits undergraduates, graduates, and alumni alike, and I hope the interactions at these events helps facilitate the development of successful engineers.

For more information on the JUMP, please visit http://jacobsschool.ucsd.edu/student/student_jump/

What are the greatest benefits for students and alumni who participate in JUMP

The benefits for undergraduates can be tremendous. I would have loved to have had the opportunity able to talk to graduate students and alumni about not only how to finish college, but how to plan for after graduation. I hope the students are not only learning from each other about how to succeed in the classroom, but also learning how to become a part of the engineering community on and off-campus.

As for the graduate students and alumni, I think JUMP is a great way to become connected to the UCSD community. As a grad student myself, I often felt isolated in my lab, but JUMP has helped me to stay connected and meet new people that I would never have known otherwise. I also think that people enjoy helping other people, and I certainly have enjoyed my time meeting and interacting with everyone in JUMP. So I hope everyone is able to come away with that feeling of connection.

Now that you've completed your PhD, what are your plans? What will you miss most about JUMP?

We will see what the future holds! I have a diverse interest in science and engineering that I would love to cultivate and explore. There are so many fascinating challenges out there that need to be solved, so I am doing some research to see which of these challenges resonates with me the most.

I will definitely miss the connection to the UCSD community that comes with working JUMP. The people that are part of or support JUMP are all genuine in their desire to support each other, and I'll definitely miss those interacting with all of those people. I hope that JUMP continues to provide new opportunities for everyone involved so that we can continue to build a strong and diverse engineering community at UCSD.



Photos Top-left & clockwise:
Winners of the Catapult Launch competition,
Over 200 attended the first JUMP meeting
of 2015! Another team's catapult launch,
more mentoring sessions over dinner

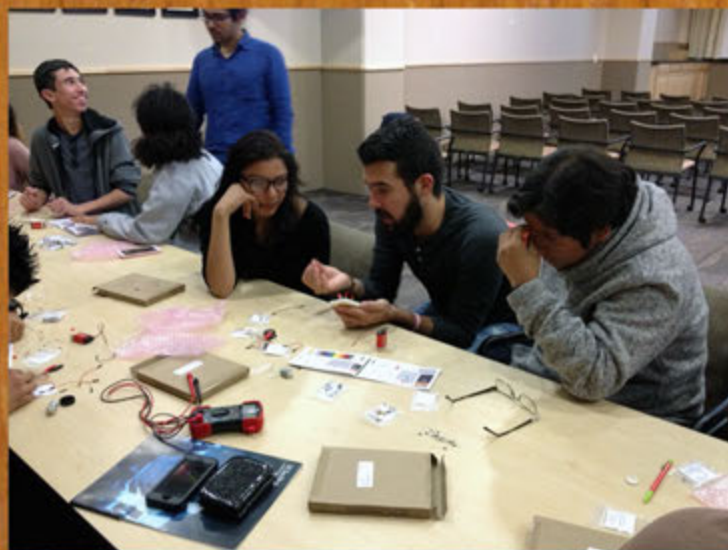


POSSE PROGRAM ON STUDENT SUCCESSION IN ENGINEERING

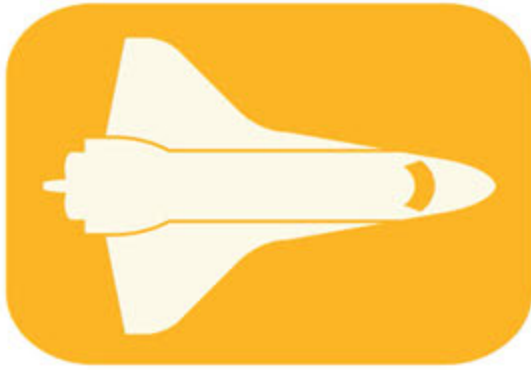
The Program on Student Success in Engineering (POSSE) is a year long supplemental academic program designed to encourage youth at Gompers Preparatory Academy High School to pursue college and a degree in Science, Technology, Engineering, and/or Math (STEM).

The program, hosted by the IDEA Student Center of the Jacobs School of Engineering at UC San Diego, combines project based learning along with personal mentorship from graduate engineering students. Although the emphasis of the curriculum is on STEM, our ultimate goal is to build and develop student's critical thinking skills, analyze and question problems, and provide students with the ability to solve novel solutions in a creative way that expands all fields of interest and is applicable every day. We also want to build a "posse" of diverse learners, whereby students work together as a team and support and encourage one another, all while having fun!

For more information visit:
idea.ucsd.edu



Full STEAM Ahead Program



On October 24, 2015, the 1st Annual *Full STEAM Ahead* event was held at the Jacobs School of Engineering with approximately 300 students, parents, and teachers in attendance. Initiated by the IDEA Student Center & the National Society of Black Engineers (NSBE), UCSD Chapter, the goal of the event was to strengthen our commitment to an inclusive and diverse student population, especially African American students and expose African American students and their parents/families to UC San Diego and the overall process of pursuing higher education. According to the U.S. Bureau of Labor Statistics, in 2014, African-Americans represented only 5.5% of the country's engineering workforce



Full STEAM Ahead could not have been successful without our collaborative efforts with North San Diego Jack and Jill Foundation, Black Resource Center, UC San Diego, and as always, our Jacobs School faculty, graduate students, and engineering student organizations.



ENG GRAD & SCHOLARLY TALKS



In Fall 2013, JSOE IDEA Student Center created ENG GRAD & Scholarly Talks, which academic/professional seminar series for graduate students to promote research success. There are 18 ENG Grad Talks throughout the academic year (6 per quarter). The average number of attendees is 80-125 ENG Grad students per session, with approximately 80% PhD students and 20% MS students. Workshops in this seminar series have included topics such as: (1) How to Synthesize and Write an Effective Literature Review; (2) How to Develop a Powerful Scientific Research Presentations for Diverse Audiences; (3) Establishing Key Benchmarks Towards a PhD; (4) How to Write a Research Proposal; (5) Careers in Engineering Outside of Academia; and (6) Commercialization of Research (Entrepreneurship). This seminar series also serves as an opportunity for the graduate/post-doctoral students to come together to share information, collaborate on research and/or professional interests, as well as serve as forum for academic presentations and peer review



GRAD STUDENT TESTIMONIALS

"Grad Talks allowed me to connect with faculty and graduate engineering students that I believe I would have never met. This in turn helped me to think about my research and career in more broad terms and now I have diverse faculty whom I can go to for feedback and advice."

"This has increased my understanding and knowledge of professional skills and has better equipped me in my training in academia; especially the multiple Writing Seminars; Careers in Engineering Outside of Academia."

FACULTY TESTIMONIALS

"It made me reflect, in a positive way, on how I (or we in academia) should be training our graduate engineering students."

"This experience has encouraged me to be a more thoughtful faculty advisor and thinking of the student holistically and in their overall professional development."



SHPE National Conference

Baltimore, MD
November 11 - November 15, 2015

Review



The UC San Diego chapter of the Society of Hispanic Professional Engineers ventured off to Baltimore to participate in the annual National Conference. The National Conference hosted multiple tracks dedicated to various aspects of engineering. Roman Aguilar, Itzel Gomez, Ivan Torres, and Rafael Aguayo participated in the *Graduate Prep Track* for undergraduate students. The program provided information of the process, opportunities and benefits of grad school.

The *Latina Track* was newly founded to empower and unite women in the STEM fields. It provided an opportunity to network and inspire each other to reach their fullest potential. The workshop leaders explained how few Latina women there were in the STEM field and emphasized the importance of building a community to stay accountable and supported. Students such as Karina Garcia, Isabel Jauregui, Itzel Gomez, Karina Nino, and Emily Reveles found this experience to be crucial towards their future career goals.



Ivan Torres and Rafael Aguayo represented UC San Diego at the Research Symposium competition at the conference. Both students had the opportunity to present their research from UC San Diego. Ivan was awarded the *Best Paper Award* under the Materials & Chemical Science division.

- Excerpt from SHPE UCSD Post National Conference Report

Extreme Engineering

Students were tasked to design, build, and market a product within a 24 hour period. This year's product was a marshmallow shooter, which was judged in terms of accuracy and propulsion distance. In order to be considered by a team, students had to participate in a career fair and interview with the company teams. Around 330 students participated in the interview process, and 100 were selected. Alejandro Buitimea and the Boeing team was awarded first place. Jose Ramirez placed third with the Chevron group. Other student participants included Isabel Jauregui (Marines), Karina Niño (Army), and Carlos Anaya (Raytheon).



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