



April 2017

# SURF Newsletter

Dear SURF Friend,

On April 3, we admitted our 2017 SURF class! Almost 450 eager, young scholars! This is a very exciting time in our office. After months of helping students secure mentors, assisting them with their applications, working to have all of the applications reviewed and funded, we now get to plan for summer. Not only will students get to do amazing research but they will also benefit from a host of summer enrichment activities. These activities range from weekly faculty seminars, to professional development workshops, to social activities—including our annual trip to Disneyland!

In this newsletter you will find great stories on both the national and global reach of the SURF program and hear about students who have mastered the art of scientific presentations. There is also information about our annual SURF Reunion, which will take place during Alumni Reunion Seminar Day. We hope you will attend and stop by to say hello!

Best,

Candace Rypisi  
Director, Student-Faculty Programs

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SURF students from India checking out the sights of San Francisco during a weekend trip.

## SURF: A Global Affair

On March 2, Caltech faculty held a campus-wide gathering to show support for the international members of our community, especially those who have been, or might be, affected by travel restrictions. The SURF program was greatly appreciative of the Institute's support, as the program has become more and more of a global program. The campus event, entitled Science Has No Borders, drew more than 500 attendees from all segments of our campus. Fifteen faculty and student speakers talked about the globalization of contemporary science and important contributions that international faculty, scholars, students, and staff make to Caltech's culture of scientific excellence.

Over the past 38 years, SURF has increasingly reflected this globalization. Caltech students can elect to travel abroad to do research at universities across the world and more and more seize this opportunity. Last year students studied geophysics at the University of Iceland, astronomy at the Max Planck Institute for Astrophysics, and biology at the MRC Laboratory of Molecular Biology in Cambridge.

Faculty want to work with the best students, whether they are from Caltech or elsewhere. This year we had SURF applicants from China, India, Iran, Colombia, and Egypt to name a few. Additionally, many of our own students hail from countries as diverse as Mauritius, Russia, and New Zealand. It is also important to note that our faculty mentors and postdoctoral scholar and graduate student co-mentors are an especially diverse group.

During the summer, through SURF, students from these diverse backgrounds have the opportunity to work together and live together. They learn about how science is done elsewhere and they begin to create relationships that will serve them well far into their academic and professional careers. Like Caltech, the SURF program is improved and strengthened when we embrace our global community of undergraduate scholars.

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Perpall SURF Speaking Competition Finals

## Perpall and Gee Winners Participate in Alumni Seminar Day

By Mike Stefanko, Chair, Alumni Relations Committee, SURF Board

Once again, over 400 students participated in SURF research efforts this past summer. Over 200 participated in SURF Seminar Day in October, preparing 15-minute presentations designed to explain their research progress to a general audience. About thirty students moved on to the semifinal round of the Doris S. Perpall SURF Speaking Competition and after a final round for eight presenters, three winners were selected. Third Place went to Alec Brenner for studying Detrital Zircons of the Jack Hills, Western Australia: Rock Magnetic and Mineralogical Assessments. Second Place was earned by Ciara Ordner for her presentation on the Synthesis of Chiral Tetrahydropyrans by a Tandem Sakurai Allylation/Intramolecular 6-Exo-Tet Cyclization. First Place was awarded to Daniel Magley who described his work on A Self-Powered Electro-Osmotic Locomotive Implant. Daniel and Ciara will be making their presentations as part of the Alumni Seminar Day on May 20th. The presentations of all eight finalists can also found online [here](#).

Daniel and Ciara were asked to comment on their SURF experiences. Daniel was able to create a circulatory microbot propulsion method that was 103 times more efficient, that met the power requirements of even the most inefficient on board power sources and still left room in the budget for operating integrated circuits, drug pumps, etc. This thruster is the fastest to date achieving speeds of 134 bodylengths per second. In addition to the fulfillment of completing a successful project, the facilities and people he got to work with were something that he dreamt about as a kid, and it was so cool to be living that dream in real life with such kind and helpful colleagues.

When asked about how creating the presentation added to his experience, as he was constructing his presentation, Daniel felt like he was building a story to explain the journey he had gone through and was building a road-map for others to follow. Figuring out how to explain his process coherently in a logical order was immensely helpful when he later wrote an academic paper. He also discovered some new things about the experiments he'd run when he thought about them in the perspective of a general audience.

Ciara was able to design a new reaction in which chiral allyl silanes were transformed into tetrahydropyrans, enantioselectively (more simply, linear molecules were converted into cyclic structures with just one step). This adds to the synthetic organic chemist's "toolbox," and is a quick and easy way to construct what are typically very synthetically challenging molecules. The best part of her SURF experience was when the "training wheels" came off and she started to own that research. "It was extremely rewarding to find ways to push the science even further on your own. The best part of my overall SURF experience was becoming the world expert on a new reaction, seeing it work successfully was a really neat experience."

For Ciara, creating the presentation meant she had to find ways to convince a more general scientific audience - specifically, more than just chemists - that her research was interesting and

worthwhile. She believes that this is a valuable skill to have, because one day, her research will depend upon whether or not she can "sell" the value of her science.

Several years ago John and Barbara Gee, recognizing that the Perpall competition had improved the quality of oral presentations, funded a competition for the best poster presentations. The addition of prizes seemed to increase the number of poster presentations, with this year's total being thirty-four. The improving quality of the posters made judging especially challenging, but eventually two top posters were selected. Second Place went to Bea Atsavapraneer for a poster displaying her work on Protein Catalyzed Capture Agents Targeting Misfolded Superoxide Dismutase 1. First Place went to Diandra Almasco who researched the Effect of Laser Power and Scan Speed on the Mechanical Properties of Two Photon Lithography Structures. These posters will also be displayed during Alumni Seminar Day at the SURF Reunion.

Diandra enjoyed being given a project with the ability to choose her own ways to complete it. She was able to seek out information and figure out how she best learned on her own. She most enjoyed being able to expand her abilities and skills. Her SURF included opportunities to work in a lab, to learn more coding, and to write up her own conclusions and results. She loved being able to gain experience and expand her horizons. Diandra found that creating a poster was a great challenge because of its unpredictability. You know the main topics that you would like to cover, but you may not know the questions that people may ask. She felt that she gained a lot of experience adapting to what questions were being commonly asked, and what she wanted the passing people to leave her poster knowing. Academically, compiling a poster taught her a lot about being succinct in balancing detailed information and overarching concepts.

Well done to all the presenters, finalists, and winners!

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Students celebrating #UGRW2017

## Undergraduate Research Week 2017

In 2010, the House of Representatives declared the week of April 11, 2011, as National Undergraduate Research Week. Since then, the Council on Undergraduate Research (CUR) has continued to celebrate this week annually as a way to draw attention to the important role research plays in the undergraduate educational experience.

This year the Student-Faculty Programs office, with leadership from our student ambassadors, celebrated Undergraduate Research with a full week of events starting April 3.

- SURF Award Ice Cream Celebration
- Caltech Undergraduate Research Journal (CURJ) Showcase

- Research Matters: A Cupcake for Your Thoughts
- Gratitude Thursday: Say Thank You to Your Mentor
- This is What a Researcher Looks Like Photo Booth

The week was not only a lot of fun but students, mentors, and campus staff were all engaged in a conversation about the importance of providing meaningful research opportunities and mentoring to our students. Kudos Caltech!

For more pictures of the week check out our [SURFriends Facebook](#) page.

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2016 SURF Luncheon in CT, hosted by Dr. James Whitney, BS '64

## **SURFin' USA**

By Mike Stefanko, Chair, Alumni Relations Committee, SURF Board

The SURF program has been around almost as long as the Beach Boys and, like those energetic rockers, we are interested in gathering crowds across the USA to cheer and shout for SURFing, Caltech style. We have over 6,000 Caltech and non-Caltech alumni who now live and work all across the country (and internationally). That is an amazing potential network for new (and renewed) friends and colleagues. Through various types of regional events we'd like to bring folks together for networking, connection, and, as our name states, fellowship!

The first things we need are HOSTS. We need SURF alumni, Associates, Gnomes, and other active alums to volunteer to host a SURF-focused event in their area. This could be an event for all Caltech alums (and non-Caltech SURF alums) that features a SURF mentor, current undergraduate SURFer, or SURF alum speaker. It could be a meet'n'greet for SURF alums at a local pub. It could be a reception prior to an event sponsored by the Alumni Association or Associates. It could be a luncheon that gathers donors and potential donors to SURF organized through the Development Office. It could be...well, the second set of things we need are EVENT IDEAS.

If you think you might be interested in strengthening the SURF network across the USA by hosting some type of event, contact Candace in the SURF Office and share your thoughts. If this idea is a social event focused on Caltech alums, the Alumni Association has some funds to assist. If this is focused on potential donors, the Development Office can help with logistics and an invitee list.

This is an exciting new venture for SURF. I hope that some of you are as excited by the possibilities as I am and will contact the SURF office for more information.

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## **SURF Reunion: You're Invited!**

Please join us for our Annual SURF Reunion (to be held as part of Caltech's Alumni Seminar Day).

Saturday, May 20  
4:45 - 5:30 PM  
Parsons-Gates Lawn  
Wine and hors d'oeuvres will be served

Reconnect with former classmates and research-mates, chat with current SURF students and mentors, and learn about what's new with undergraduate research at Caltech. All SURF alumni and friends are welcome!

Alumni Association membership is not required.  
No charge to attend the SURF reception.  
Please RSVP at <https://reunion.caltech.edu/products/surf-reunion>

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Student-Faculty Programs

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Want more information about SURF? We'd love to hear from you.

Call us at 626-395-2885  
Check us out at [sfp.caltech.edu](http://sfp.caltech.edu)  
Email us at [sfp@caltech.edu](mailto:sfp@caltech.edu)