



**THE**

# **VISCOUS BULK**

**AICHE UC BERKELEY**



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A WORD FROM THE

# PRESIDENT

# RAHUL BATRA



Greetings, my friends! What a semester it has been. My good pal Dr. Seuss would have chimed, “How did it get so late so soon? It’s night before it’s afternoon.” The weather’s getting colder and the fashionable peacoat jackets have finally made their appearances. Students anxiously await winter break and the chance to finally take a breather, something us Cal students are so used to foregoing for so long. Looking back on this semester, I must say that I am very proud of what our AIChE officer board has achieved in the past few months. This fall semester saw many great accomplishments, and I look forward to many more in the spring semester.

At our first general meeting in August, we introduced several committees for students to get involved with, in an effort to allow general AIChE members to be able to participate in the planning of our various events and projects. The publicity, outreach, corporate, and social committees all achieved many great milestones, and their success shows in the fantastic attendance we have been getting at AIChE events. Our AIChE officers have done a great job in leading these committees, and it has been great to see their growth as leaders over the semester.

Just a few weeks ago, at the AIChE national conference in Salt Lake City, Utah, our chapter was honored to receive the Outstanding Student Chapter award, which recognizes the top 16 chapters, out of 231 total, for their exceptional level of participation, enthusiasm, program quality, professionalism, and involvement in their university and community. The 2014-2015 officer board deserves hearty congratulations for this award.

And just like that, the semester is winding down. With all the craziness that is fall semester, from job searching to extracurriculars, midterms, and more, it is often very difficult to step outside of one’s schedule and try something new. Just yesterday, however, I serendipitously happened to attend two events that I otherwise may have casually passed by, often consumed by a busy schedule

that doesn’t accommodate for events outside what is pre-planned in my Google Calendar. Attending the Big Game Tree Chopping Rally after a p-chem lecture was a nice way to get in the spirit of Big Game week. Later in the afternoon, I decided to attend a rally led by the Black Student Union and marched with fellow students, staff, and community members down to Berkeley City Hall, where I



**Do something every day that challenges you.**



was able to hear the stories, testimonies, and perspectives of black students at Cal. It was a valuable experience, and it reminded me of the importance of civic engagement and standing up for causes you believe in.

It is with that in mind, that I encourage fellow students to do something every day that challenges you. Step out of your comfort zone into the realm of the unknown, the unplanned, and the unforeseen. Whether that’s a project you’d like to pursue, a person you’d like to meet, a club you’d like to join, or a cause you’d like to stand up for, taking those risks is what makes us human and what makes our lives worth living.





DOW

# WINE & CHEESE

A night of networking with faculty and Dow reps. Free flowing wine and cider, and a great selection of cheeses and snacks made for an enjoyable evening for everyone!

“ It was a great opportunity for us not only to interact with Dow representatives to learn more about what roles they have in the company but also discover what little knowledge we have during trivia ”

-Mindy Huang

“ I loved the opportunity to meet older students and company representatives, all while eating fine food and keeping it classy. ”

-Rohan Chakraborty

# MY SUMMER IN INDUSTRY



By **Fares Maimani**

**T**his past summer, I interned at Aramco Services Company (ASC) - Houston Research center (HRC). I worked there for 8 weeks as a summer research intern with the Drilling Technology Team. In 2013, Aramco Services Company, an American subsidiary owned and operated by Saudi Aramco, the national oil company of Saudi Arabia, established new research centers in Boston, Dallas, and Houston.

The branch I worked at, Houston Research Center, develops upstream technology. Seven different teams work to research topics such as cementing, drilling fluids, drilling muds, and cement slurry design. This drilling technology was relatively new and could use as much intern help as possible.

I spent the first two weeks going through the orientation process and learning the necessary lab tech-

niques to excel on the job. During this time I was also able to observe the corporate culture of ASC and the social dynamics of my team. In fact, I began my personal project on the third week. My responsibilities included both designing and carrying out experiments and collecting and analyzing data under the supervision of the team lead. I investigated the kinematics of commercial cement additives. In particular, to devolve a better understanding of the cement hydration process, I studied how dispersants, super plasticizers, and retarders are adsorbed in cement slurries.

My experience with ASC was overall very positive. I learned so much more about myself, the oil industry, and the corporate world. I developed long lasting relationships with my coworkers and fellow interns, and, most of all, I got a chance to ex-

plore beautiful Texas! Overall, this has been one of the best summers of my life so far! ■

**“I learned so much more about myself, the oil industry, and the corporate world.”**

# ON AUTUMNFEST



By **Ria Someshwar**

**A**s one of the activity officers for AIChE, I am involved in every AIChE event from start to finish. I witness the behind the scenes of the logistical, technical, and mental processes that develop when an event of any scale is executed. This perspective has not only provided me insight into how intense organizing events can be, but also an appreciation for any kind of event that is well executed by an organization.

AIChE this past semester has hosted/co-hosted all kinds of events, from professional info sessions, to social activities like ultimate frisbee with graduate students (aka our GSI's), to even networking events such as DOW Tailgate. These events can sometimes take a few days or even months to plan; yet they all come together and prove to be quite successful (knock on wood).

My favorite event thus far has been Autumnfest. Autumnfest was not only enjoyable to organize, but it was also a great way to socialize with other students of different years, participate in entertaining activities, and come together as a CoC family. Autumnfest was Lisa's and my first large-scale event to coordinate, so we were slightly intimidated at first. However, after discussing our duties with Victoria (the CoC coordinator for Autumnfest), we were excited to collaborate and take part in hosting. Autumnfest was also the first event our social committee was involved in, so it was a great way to "test" our committee (by the way, they did fantastically).

The event itself went smoothly, which was a great relief to both Lisa and me. The DJ provided the cool vibe for the gathering (though the alcohol did help), the activities AIC-

hE hosted contributed to the festive atmosphere of the evening (shout out to "Stan the Man" for dominating the pie eating contest), and we had a memorable showcase by "Still CBE", a famous chemE rap group (contact "Raja Fresh" for bookings). Although I have only attended two Autumnfests in my life, I was extremely pleased with its turn out and overall execution. Attendees left with full stomachs, smiles, and enjoyable memories. Autumnfest will always be one of my favorite occasions during the school year, and I cannot wait to attend the next one. ■

[#Autumnfest2k16](#)



# Engineering Abroad: a Pipe Dream or Dream Come True?



By **Kadie Jaffe**

Ever since I transferred to UC Berkeley, I have been overwhelmed by a constant onslaught of activities. Every day there are countless events on campus: club meetings, decals, recruiting events, distinguished speakers, the list goes on. Every time I see a new thing I would love to participate in, I have to ask myself, but when? How am I possibly going to pursue a new interest when I am on the verge of a problem-set induced panic attack as it is?

Any engineering student knows the feeling. Going abroad is one of those activities that is hard to find time for. I missed at least one homework assignment in favor of improving my study abroad applications. In the month leading up to my departure, I was so consumed with finals that I did next to nothing to plan my trip. To give you some perspective, my passport came in the mail less than 12 hours before I left the country.

But the paperwork is only a small part of the consideration. I think for engineers, the bigger questions are whether you can afford a semester to go abroad without delaying graduation. Or if going abroad in the summer will keep you from doing an internship (arguably the most important “extracurricular” for engineering students). With all of these obstacles, it is understandable why engineering students are underrepresented in study abroad programs.

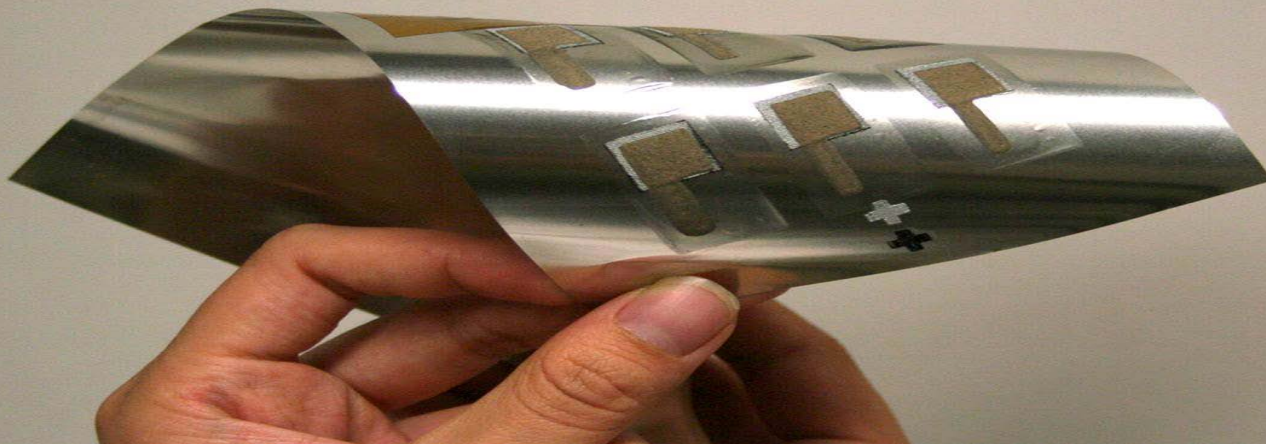
So, is it worth it? For me, it was. I applied for a lot of scholarships, and was awarded four. I found a summer program that kept me on track to graduate and allowed me to participate in an internship. During my time abroad, I worked as a student researcher at A\*STAR Institute of High Performance Computing in Singapore. I wanted to learn about computer graphics, and my supervisor Like Gobeawan

found the perfect project for me. I built a 3D model viewing application that renders .obj files and lets the user rotate, zoom, and move the models around.

Not only did I learn a bunch of new computer graphics concepts and jargon, I discovered what it is like to work on a real project outside of the classroom. I ran into a lot of obstacles that I didn’t anticipate and witnessed the terror that my program became when I wasn’t organized. Not only did I become a better programmer, I learned how to tackle my problems resourcefully.

The things I learned at my internship will set me up for the rest of my life, but that wasn’t even the best part. The highlight of going abroad was getting to meet people from all over the world.

# Battery Engineering



By **Stan Reeder**

This past summer I worked as a battery engineering intern at Imprint Energy, a startup battery technology company located in Alameda, CA that focuses on a flexible solid-state battery using a zinc polymer. Their battery is composed of layers micrometers thin. The layers of the battery are deposited on a substrate by a printing machine that takes viscous ink. The potential application of this battery is food processing labels and next generation wearable devices. My internship focused on the research and development side of the company in which half of my day is devoted to the process engineering of the battery. This included improving the methods of formulating the inks as well as developing more efficient ways to deposit the inks into layers.

The environment at Imprint was very friendly and encouraging of creativity. There were around 12 employees with mostly technical

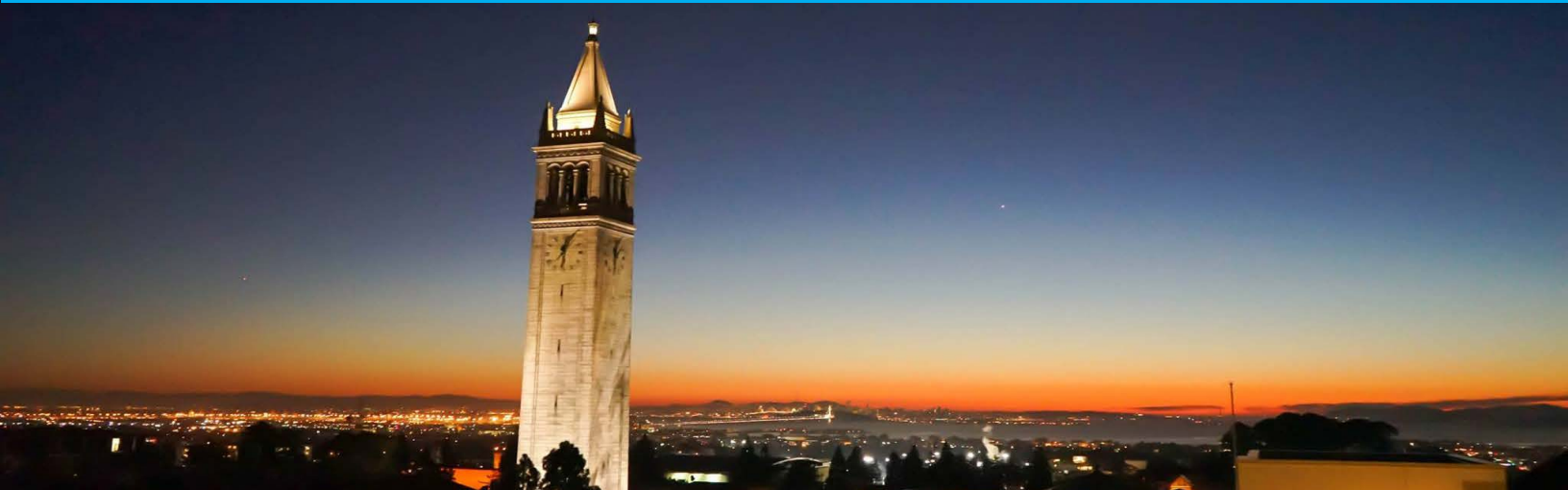
backgrounds. Four out of five days of the week were dedicated to producing hundreds of batteries (“battery run” was the term for each day’s production) for various tests including layer thickness and energy discharge profiles—indications of battery capacities. Working at Imprint’s lab was somewhat similar to my research experience in the Materials Science Division of Lawrence Berkeley National Laboratory (LBNL). However, it was much faster pace than the pure research I was conducting at LBNL. This was due to the difference in technology market presence. I enjoyed this change in pace significantly.

Imprint had a great community feel. The success of a battery run was dependent upon teamwork. Each scientist has a different responsibility for the battery. One made the anode and cathode layers. Another scientist made the electrolyte. A support engineer helped with communica-

tion between the printer operator and the scientist who made the ink for the layer being printed. There was also oversight by the process engineer. Everyone was involved in the science either with operation or immediate feedback. I learned that effective communication was essential for each day’s work. It was important to understand other scientists’ goals to make the battery stronger and daily goals for each battery run.

I learned a great deal of project management and discipline this summer. I would recommend those who have conducted undergraduate research or those interested in research to check out some startup companies. It’s a great way to see how research is market driven. Imprint Energy has inspired me to look for other engineering internships in the summer of 2016.

# How I Learned to Appreciate Berkeley



By **Tiffany Lay**

Berkeley is stressful, especially for a ChemE. During my first two years, I missed Los Angeles a lot. I couldn't wait for Winter Break or Spring Break to come because it meant leaving behind all the stress and pressure that wore me down during the semester. Berkeley has a competitive atmosphere and it really started to put me off. No longer was I extremely excited as when I first arrived at Berkeley. I began to see Berkeley as a place where I felt defeated all the time.

During my junior year, I spent a year abroad at Imperial College in London. I was part of an immersion program where I would make only ChemE upper division courses with the local students. I was extremely excited to get away from Berkeley and have this opportunity to live in the so-called one of the most exciting cities in the world. Don't get me wrong, I LOVED London and still miss it every day. But the school? Not so much. I don't mean to say

that Imperial had bad academics, because they actually had some amazing professors who taught me so much. It's just the campus just wasn't... Berkeley.

Imperial is a much smaller school than Berkeley, about 8,000 students total. It's a STEM school, so I only made friends with people inclined in those fields. Because it has a smaller student body, there were not as many clubs to join. I ended up joining the ChemE society and joining the String Ensemble since I played violin. The big clubs on campus were mostly sports and cultural identity clubs. Also, Greek life is nonexistent

here. The campus is tiny and only consists of a few buildings and one library. It's also in South Kensington, one of the most expensive neighborhoods in London, which meant getting food off campus was extremely out of my budget.

I missed Berkeley a lot while abroad. I missed having friends who weren't

studying engineering, fraternity life, and especially the cheap but delicious food off campus. I also missed how there was always something going on on campus, whether it was a Greek theater show or a representative from Pixar giving a presentation. Berkeley is such a diverse campus, it's hard to get bored of it because there is so much going on. I realized while I was away that I shouldn't have taken Berkeley for granted while I was there.

When I returned to Berkeley for my senior year, I was even more excited than I was when I arrived 3 years prior. I say more excited because I wasn't as anxious as I was when I was a freshmen. This time, I was more excited to come back home. I am proud to call Berkeley my first home away from home. One thing I am going to miss after graduating is the energy and drive from the students. Hopefully, the odds will be in my favor and I will still have the opportunity to live here.

# Graduate School vs Industry



By **Aaron Schwartz**

One of the main issues I have been pondering during my chemical engineering undergrad whether I would want to work in industry or go to graduate school after graduating.

I had some experience doing research, but hadn't had the experience of working in a company to compare it to.

However, I know that I was interested in working on renewable energy technologies, which is I was excited last summer to be an intern at Next Energy Technologies in Santa Barbara.

The company worked on producing inexpensive thin film semi-transparent organic solar cells, with the overall goal of using their technology to help buildings generate their own power.

I enjoyed working for Next Energy Technologies because I had a project that I was completely responsible for. Even though the hours were long, the work that I was doing

seemed to have value. My project was determining how to minimize any degradation that could occur under atmospheric conditions. One the great things about working at a start up was the flexibility I had with my project. As problems came up I was able to try a myriad of ways to solve them, with a level of independence that surprised me.

The start up work culture of work until you finish your task, which often resulted in 10-12 hour workdays, was very different from the typical 9-5 job one could find at a larger company. When my project got monotonous I could always go and find someone working on something different and learn from them.

Outside of work, I also had fun staying in Santa Barbara. I had relatives in the area that I enjoyed being able to spend time with. In addition, there were a lot of great places to hike and beaches were biking dis-

tance form where I stayed, which was great. I even got to trying surfing for the first time (I cannot for the life of me catch a wave). So my summer was enjoyable outside of work.

Overall, while I had fun enjoyed working at a startup over the summer, I found that my experience did not help me narrow down what I want to do after graduating. Working at a startup seemed more similar to doing research in a lab than it did to working at a larger company. So I feel that I would still want to get some experience in an established company before I decide what I want to do after college. Still, working at Next Energy Technologies helped me explore the burgeoning of renewable energy, so I definitely found the experience to be worthwhile.

# Transition States



By **Lisa Yang**

**M**aking the transition from community college or high school to UC Berkeley is a difficult challenge that all new students face. For myself and I'm sure many others, the greatest challenge is acclimating to the increased work load and curved grading system. All throughout high school and community college, the grades I received seemed to be a direct indicator of how well I understood what I was learning.

However, all of that changed coming to Cal. Now, it's not enough to do just the minimum; you have to do more than and better than your peers in order to get those same grades that were once not so difficult to obtain. What's worse is the fact that exams are harder, problem sets longer, and you are in a completely new environment. Not only are you in a new school with new students who were also at the top of their classes, but you may also be in a new state, or even country. Deal-

ing with all these changes at once was very overwhelming and the best way that I found to overcome this feeling was by staying positive and focusing on my own growth.

The problem with the curved grading system is that you are constantly comparing your success to the successes of others. So you constantly feel like you aren't learning anything and that you aren't as smart as everyone else around you. This was something I struggled with my entire first semester at Cal.

Now in my second year here, I have learned to accept that the grading system for what it is and to not let how others score in class affect how I feel about my own work. I realized that my G.P.A., while still important, won't make or break me in my career. The transition to this state of mind didn't come easy. Especially when all my life, I was trained to base my self-worth on my success in school.

Transitions are temporary, but they

are also a very important step in your personal development. So I forced myself to let go of my old habits and expectations and to accept that this was a new situation which merits its own new approach. Eventually, I stopped letting the pressure of competition and grades affect me and learned to judge my success based on my own progress. Since, I have seen an improvement in my grades and in my overall happiness.

Now that we have reached the end of this fall semester, I encourage you to reflect on both your failures and your achievements. Maybe you didn't do as well as you would have liked, but praise yourself for sticking it out and not giving up. The fact that you have made it this far means that you deserve to be here. If you continue to push yourself and improve yourself, then you will make it out of this transition state just fine.

# Food Science Technology



By **Nathan Jin**

Chemical engineering is one of the most versatile fields, spanning petroleum, biotechnology, energy and consumer goods. However, many undergraduate chemical engineers don't look too far beyond the core industries for work opportunities, even though they are needed in a variety of fields.

In January of 2015, Jay, the 2014-2015 AIChE president and I had an idea to start a food science club. Jay was interested in developing athletic supplements, and I had been interested in food science for a long time since I had spent a long time in the kitchen baking with my sister growing up. We decided to go for it, and after reaching out to UC Davis, the department of Nutritional Science and the College of Chemistry, we founded Food Science and Tech at Cal.

Chemical engineering principles are essential in the large scale produc-

tion of food products, since many food products handle fluid inputs and require processing. But it's also a very interdisciplinary field- biology majors, chemists, nutritional science and more all have a stake in what goes in our food. As a result, FST brings together a variety of majors tied together by the common thread that we all care about our food. Sustainability, processing, science and nutrition are all key factors that must be taken into account when considering our food, and so we encourage an open discussion over a range of food-related issues. We bring in guest speakers from industry to cover a range of topics, like the science of ice cream, the experience of a startup, and sustainability issues as well as to recruit.

Starting a club is hard, but I would say if I learned something from the experience, it's to not be afraid to pursue something you want to do. Berkeley is a place that encourag-

es people to actively pursue what they love- but it doesn't just come to you. I'm glad we've had a range of support systems to help us achieve our goals. The department of Nutritional Science, especially Kristen Rasmussen, and the officers of UC Davis's Food Tech Club, as well as our faculty advisor Professor Judson King, have been especially helpful in our success. It's definitely been hard, and we've faced our challenges, but perseverance pays off.