

Copenhagen Study Abroad Comments 2014-15

Nat DeFries '16 - Chemical Engineering, Caltech/Environmental Science and Engineering, DTU

I applied to the DTU program for several different reasons. I'm interested in living abroad at some point in the future, so I wanted to use the opportunity to investigate the pros and cons of Scandinavian and European culture. I have a passion for environmentalism and I wanted to take advantage of Denmark's focus on sustainable design and environmental engineering. I wanted to have a university experience different from Caltech's and the Denmark program is the longest, so you get to spend the most time abroad.

Copenhagen (with 1.2 million people in the urban area) feels rather small after having lived in Los Angeles, but there is a ton to see, especially if you're interested in design, and it's so much easier to get around! Public transportation serves the entire metropolitan area with a huge network of local busses and trains, as well as intercity and international trains and ferries. I've taken several day trips to Sweden, which sounds kind of ridiculous until you realize that it is only an hour's train ride away. And of course, Copenhagen is very easy to explore by bike or on foot.

And just a quick note on expense- Europe is said to be very expensive to live...but living in Copenhagen actually costs just a few tens of dollars more per month than does living in Los Angeles. (There are online cost-of-living calculators if you don't believe me!) Certain goods and services are more expensive, like restaurant food and transportation, but others are quite a bit cheaper, like groceries. You already pay for housing and tuition as normal via Caltech, so don't let perceived cost discourage you from coming!

I am currently taking four courses at Denmark's Technical University (DTU) and a Danish language class at Copenhagen University (KU). I've already fulfilled most of my Chemical Engineering core requirements so the courses I'm taking will count as option electives. I am pursuing the Environmental Track within the Chemical Engineering major, so I am required to take a certain number of Environmental Science and Engineering (ESE) courses. Unfortunately, Caltech doesn't offer very many ESE courses that match my interests well or that are useful to someone who wishes to go into industry. Conveniently, DTU has a very large ESE department that focuses very much on technical application, of which I'm taking advantage. In fact, three of my four courses are in the ESE department.

If you are also a Chemical Engineering major thinking about studying abroad,

remember to start planning your course schedule as soon as possible! Although DTU has a Chemical Engineering department as well, a lot of the courses you need to take at Caltech are part of a series. Missing out on a course in the series could spell disaster for the remainder. I would advise Chemical Engineering majors to study abroad senior year, when most of your required courses are simply track electives, not specific courses.

One of my favorite aspects of DTU courses is the focus on practical long-term projects and lab work, rather than weekly problem sets. Having to build a model or perform data analysis really helps one integrate concepts taught in lecture, while practicing programming and collaboration skills. Projects are also a good way to meet other students, both Danish and international. Compared to Caltech, students at DTU have a lot more freedom with regards to coursework. Grades are often based on only a few assignments, usually a semester project and a final exam, leaving any additional exercises, reading, and studying as optional but recommended.

The programs at KU and DTU in Denmark are the only ones where you have the opportunity to learn a foreign language. Both schools have summer language courses so that you can get a three-week head start on learning Danish (and spend an extra three weeks in Denmark). I've had quite a good time learning Danish and can have (simple) conversations at this point. It's a nice break from the rest of my technical courses. Of course, it is still incredibly easy to get around without speaking any Danish. Excepting some elderly and some very young people, everyone speaks English at or near fluency.

Sharon Wang '16 – Electrical Engineering Caltech/Electrical Engineering & Management Engineering DTU

Studying abroad at DTU has been an experience of a lifetime. Having lived in California my whole life, coming to Denmark has taught me to live on my own in a completely foreign place. I could not read anything in grocery store and I had no idea how to get from place to place. These challenges made me to realize how much I've taken for granted by staying in a familiar place close to home. This is exactly what I wanted, though. I felt the urge to get out of my comfort zone and broaden my academic and social horizons.

Living in Kampsax, the main on-campus dorm at DTU, has been an enriching experience. The dorm is divided into multiple buildings, and each one contains three "kitchens" that share a common hallway. "Kitchens" here are the equivalent of alleys back at Caltech. I live in kitchen 39, which is comprised of seventeen students. Since there's only space reserved for one international student in this kitchen, I am lucky enough to be surrounded by Danes. Because the Danish students live in the same room throughout their bachelor's (and

master's) programs, many of them have been here for many years and know each other very well. Consequently, it creates a warm and friendly atmosphere, and even though I'm an outsider, I really don't feel like one.

The large shared kitchen is the center of social life here in the dorms. Unsurprisingly, the Danes are amazing cooks. They don't have a board plan here, so most of them are accustomed to making their own meals every day. I'm often impressed by their culinary creations, which range from homemade pizzas to fresh spring rolls. My kitchen organizes a weekly food club where we make dinner together. Through my participation in the food club and spending time in our shared kitchen, I've tried many traditional Danish dishes, which often feature roasted pork and potatoes.

All the Danes in my hallway are very approachable and make an effort to include me in various kitchen activities. In particular, they like to make large batches of Danish pancakes and enjoy them together with thick slabs of ice cream and big spoonfuls of Nutella. On Thursday evenings, Saxen, the student bar in Kampsax, is open and a group of students from my kitchen often hangs out over there. Other times, they might go out to Copenhagen for a drink to celebrate the end of another long week.

Classes here at DTU differ greatly from those at Caltech. Most classes meet once a week in a four hour block either in the morning or in the afternoon. They often start with two hours of lecture that are interleaved with short breaks. Then, we move to a classroom headed by a teaching assistant to spend two more hours on group exercises and project work. The professors often show up to these sessions to help answer questions and explain how the exercise relates back to the material presented earlier in class.

I really appreciate the strong emphasis on group projects here at DTU. They give me the chance to use the tools and methodologies taught in class on real data, which makes it much easier to understand and see its applications to the real world. For example, in my financial engineering class, we practice building optimal portfolios in Matlab using historical stock prices. In comparison, I've taken two related courses back at Caltech, introduction to finance and applied corporate finance, which focuses on economic theory and corporate valuations using financial models, respectively. In general, I find that classes here are great supplements to the Caltech courses I've already taken. By taking a more practical approach, I'm able to apply the theory that I've learned at Caltech to many interesting problems the world faces today.

Moreover, the group projects have given me the opportunity to collaborate with both Danish and international students. Especially for the open-ended questions that we're asked to analyze, it is valuable to hear different perspectives and learn

about how things are done in other countries. For instance, in my environmental economics course, we strive to figure out how we can promote a greener growth path. Since many countries have taken different approaches to encouraging sustainable practices, our group's diverse backgrounds have helped us study many different possible solutions and learn from them.

Here in Denmark, I also have the time and opportunity to pursue various hobbies and leisurely activities. Unlike at Caltech, where I spend a majority of my time working on problem sets and trying not to fall behind, there is a much better school-life balance. Since the Scandinavian countries are well-known for architecture and design, I've been taking advantage of my time here to browse local furniture stores and handmade crafts shops. There is an amazing selection of home décor here, and I only wish I had a permanent home to decorate right now! In addition, I'm currently learning how to knit in my free time. After searching the city for my favorite ball of yarn, I've begun making my first scarf! I've also gotten much better at cooking through daily practice. Even though I'm still very slow at preparing a meal, it's starting to taste like food from home.

Above all, living in a foreign country has given me the opportunity to experience the world outside of the US. By condensing all of my classes into three (long) days in the middle of the week, I have four-day weekends to explore Copenhagen and the rest of Europe. So far, I've been to thirteen cities in seven countries, and I plan to add several more to the list before returning home. It has been incredible experiencing the look and feel of European cities firsthand. It's amazing to walk down beautiful cobblestone streets with lovely old buildings on either side, feel awed by all the magnificent, centuries-old churches, and taste local food in all these places of great historical and cultural significance.

Kurtis Carsch '16 – Chemistry Caltech/Chemistry DTU

These previous eight weeks at DTU have amounted to an incredible experience that has been an excellent complement to the Caltech education. During the first week, we were each assigned a buddy group of about ten people with a current DTU student and other new international students from different countries across the world. Much like frosh camp, we toured the nearby city, engaged in team-building engineering exercises, and met people of different cultures and backgrounds. I still see some people from my buddy group on a regular basis!

Living amongst the Danes in Kampsax (an on-campus DTU dorm) has been an interesting experience. First, because gap years to travel and work are encouraged, the Danes start university later than Americans. Even though I am 20 years old, I am younger than the other sixteen people in my hallway, including the first-years! I live in a fairly large single room and share a communal kitchen with the other people in my hallway. Unlike Caltech, we cook our own dinners and clean the kitchen every day! Nonetheless, my hallway does group-

meals each Thursday in which two people from the hallway make food for everyone who is able to attend. I've encountered numerous opportunities to eat traditional Danish food, which tends to be heavy in both potatoes and butter.

Socially, the Danes tend to be very reserved initially; however, they become extremely talkative when they know very basic information about you. The Danes speak near-perfect English as many of them have travelled to England, Australia, or USA for multiple months. Similar to Caltech, discussions on various aspects of science are always popular; however, I believe there is a much stronger interest in surrounding political affairs (including American politics). It has been a very popular topic to compare and contrast the American and Danish approaches to higher education (the Danes receive a stipend to enroll at university) and social welfare (the Danes receive cradle-to-grave health coverage).

Course-wise, I am using this opportunity to enroll in courses that are not directly offered at Caltech. I am enrolled in four chemistry courses: applied catalysis, synthetic biomolecular chemistry, the chemistry of metals in biological systems, and a PhD course on sustainable energy. One interesting aspect of the DTU curriculum is that the courses meet once a week for four hours, comprised of a two-hour lecture and a two-hour problem set session. I also commute twice a week to København for my Danish Language course, a very challenging course due to the complexity of speaking Danish. Thankfully, the Danes in my hallway have been extremely helpful in teaching me how to pronounce various Danish words. Additionally, I am conducting research in organometallic chemistry in which I received a recommendation from my previous research mentor to join my current group.

Meeting people from different countries, commuting via bike, improving my cooking skills, visiting iconic attractions such as Nyhavn, learning about my grandmother's culture, and living in a foreign country have resulted in an extremely enjoyable experience. Overall, I strongly recommend current Caltech students to consider study abroad opportunities.

**Michael Grappone '16 – Mechanical Engineering & Geophysics
Caltech/Mechanical Engineering & Space Science DTU**

When I decided to study abroad, I wanted to have a truly "abroad" program. I wanted to go to and see Europe as a whole, not just one place. The Copenhagen scholars program has delivered that to me perfectly. Since we are here for over 4 months and have a week-long break in the middle, we have an unprecedented ability to travel throughout Europe. I got lucky and don't have class on Mondays, so I have three-day weekends every week, which have allowed me to visit 6 countries thus far, and I hope to get that up to 10 before the end of the term.

One of the best aspects of this program has been the chance to make many new friends, not only with the Danes that we live with, but also with other international students, both here in Denmark and in other countries. I think I've added about 40 new Facebook friends in the past 2 months, of which only about 30% were Danes. I'm not a very good cook (ham and cheese sandwich, anyone?), so making friends was a necessity, in order to have some variety in my diet. This year we're living at DTU in Kampsax, rather than at Tietgen at KU, so our experience has been a bit different than past years. It's definitely fun to live with the Danes because we get more involved in the day-to-day student culture (for example, I bartended at the Kampsax bar last night). On the other hand, when it's raining and dark, there is very little motivation to go into København and go for some øl (beer).

The classes have significantly less work than at Caltech, so we have more time, but since instead of problem sets, we periodically have Ch 3a style, 15-page long lab reports for classes, there are some weeks where we lose a lot of time just to formatting a paper. The lectures are also set up very differently from those at Caltech. They are 4 hours long, but the classes are not like slightly longer Power Hums (4 hours instead of 3); they are split up into lecture and exercises. Here's a typical set up: 1 hour of lecture, 10 minute break, 50 minutes of lecture, 10 minute break, 1 hour 50 minutes of exercises. The exercise period is comparable to Caltech sets, but the problems are significantly shorter and less theoretical.

Overall, the program is incredible. The classes are noticeably easier than Caltech, which is both positive and negative because there is a lot more free time (especially to travel), but there's a lot more individual, non-graded work. It is true that everyone here knows English (the Danes better than most), but most of the time, they still speak their native language.

Monica Li '16 – Mechanical Engineering Caltech/Mechanical Engineering DTU

Studying at DTU has exposed me to new teaching styles, language, and more. While everyone here also speaks English, Danish is Denmark's first language. So I really felt that I was in a foreign country at first. After learning Danish at KU for a couple months now, I am starting to pick up words and phrases eavesdropping on the metro. Practicing the sentences I learn in class, I can usually get a response and then laughter from the Danes.

Then there are the more subtle differences, like the perspectives of people on politics, culture, and lifestyles. Things I never thought about are different here too, like water pressure (turn faucet slowly). And at a restaurant or store, people will not come up to ask how you are doing, which is actually quite peaceful.

I have the freedom to do many things I would not normally do at Caltech. DTU has an airsport club, where I paid the equivalent of \$20 to be flown up into the sky and be able to play with the controls of the glider. The social life here is more vibrant, and I have toured many the castles on this island in Denmark.

In addition to the fun and exploring in Denmark, I have more independent from studying abroad. In some of my classes, only the final and a final project are graded; the weekly problem sets are there to help you understand the course material and do well on the final. At DTU we are not on a board plan, unlike what I'm used to at Caltech. I can't grab food from open kitchen whenever I want. It sort of makes me feel like an adult, buying groceries and making meals (which range from potatoes and carrots to ice cream with Nutella, depending on the day). I have also learned how to get around via public transportation, which is convenient. By the swipe of a card, I can get to almost anywhere I need, such as Danish class on another campus.

Studying abroad is also a fantastic way to travel Europe! We had a week off for Fall break, and can travel on weekends. So far, I've visited Stockholm, Paris, and London and plan to see a couple more before the semester ends. Though I'm missing the regular doses of sunlight, boba and chicken pad thai, hearing about what Europeans think about the USA and how we are stereotyped definitely makes up for it.

Valerie Pietrasz '16 – Mechanical Engineering & Planetary Science/Mechanical Engineering & Space Science DTU

I chose to study abroad in Denmark because I wanted to go somewhere completely different from home. And I made a great choice: as I'm typing this, I'm wearing multiple pairs of socks because my toes are cold, waiting for the bread I just helped bake to cool, and listening to the Danes in my hallway rambling in Danish about their day – all experiences I never would have had at Caltech.

Being in a new country, I've made so many lifelong friends from not only Denmark, but all over the world. Together, we've struggled to figure out even the most mundane tasks, such as grocery shopping (what is the difference between druesukker and rørsukker? why are all these labels in Danish?!) and getting from point A to B (so wait, we take bus 150S to Nørreport, then get on the metro toward Vestamager and get off at Islands Brygge?). And in Denmark, my life isn't centered around the when my sets are due like it is at Caltech; instead, it's centered around spending quality time with the new friends I've made. Whether I'm learning to speak Danish (læser at tale dansk), getting lost in Copenhagen, or just figuring out how to cook properly, Denmark is nothing like what I expected – but I can confidently say it's different in all the right ways.

The DTU program is great because while we're in a new world, we're still at a technical school, surrounded by scientists and engineers in an environment that encourages collaboration and the pursuit of knowledge. On the flip side, the Danish language course I'm taking is by far my favorite course; practicing my pronunciation with the Danes can be a bit humiliating, but so much fun! And I am completely in love with Copenhagen: it's full of beautiful old architecture hundreds of years older than the United States mixed with modern design. And the best part is, because we're here for a semester instead of just a quarter, we can spend more time getting to know our new friends, travelling around Denmark and Europe, and taking a break from school to party or just relax.

Kiara Simpao '15—Chemical Engineering Caltech/Chemical Engineering DTU

It's been two months since I arrived in Copenhagen, and my time here so far has been quite the adventure. There are many aspects of the Danish lifestyle that are different from the way I've lived through the past several years in California, and I've come to admire the refined mix of calmness and intensity in the way people live their lives. Though the Danes seemed hard to approach at first, I've gotten to know some of them well over many discussions about politics, travel, and the not-quite-occasional banter about the American TV shows that play on Danish channels. Copenhagen is a very compact city, which adds to its charm: though the public transportation system is efficient and I use it a lot, exploring the city on foot and getting a bit lost every now and then has given me a lot of time to bask in how beautiful the city is and to find hidden gems in unexpected places.

I am currently taking four classes at DTU and a Danish Language class at KU. I've fulfilled most of my chemical engineering core requirements, so my classes at DTU, for the most part, will count for track electives at Caltech. The classes at DTU go at a relatively slower pace, which I've taken as an opportunity to take classes offered by other DTU departments. These have required some catching up and refreshing my memory of concepts I didn't think I'd see again as ChemE, but it's been reassuring to realize how much I've actually learned the past couple of years and how the things I've learned are widely applicable. The structure of the classes, which is a mix of lecture and exercises, has helped keep me up to speed, since I can ask the professor or other students questions about concepts that aren't familiar. Studying abroad during senior year as a ChemE is doable with some planning, though it also requires sufficient willpower to not drop too many core classes during sophomore and junior years. Amidst all these technical classes, the Danish Language class is a welcome change of perspective, though not necessarily one that is less rigorous, since seeing a word in Danish and hearing it said out loud can be rather confusing. I really like learning languages, so I welcome the challenge. Most of my classmates in this class are non-

technical majors, so it's also been a great place to meet people who have different interests.

Lastly, studying in Copenhagen has been a wonderful opportunity to explore other parts of Europe. Having never been to Europe before, the idea of taking a train for a few hours and ending up in a different country that speaks a different language is fascinating, though at times rather disorienting. Traveling has allowed me to meet people in different stages of certainty regarding their chosen path, which has opened my mind to the many possibilities of what I can do after my time at Caltech.