

ECOLE POLYTECHNIQUE SCHOLARS PROGRAM: PARTICIPANT COMMENTS 2014-17

Catherine Day '19 - Biology Caltech/Biologie Ecole Polytechnique

I first heard about Ecole Polytechnique (l'X) in my high school French class while learning about the *grandes écoles* system, where students undergo two additional years of studies after high school before taking test in attempt to get into one of the celebrated *grandes écoles*. In short, l'X is the best technical school in all of France. As such, I set myself up to have high expectations of Ecole Polytechnique and of Paris. I'm happy to say that they more than fulfilled my hopes.

The structure of classes at Ecole Polytechnique is noticeably different from that of Caltech. Every class is accompanied by a *petite classe* where the emphasis is placed on solving problems rather than teaching new material. It's different from the homework given at Caltech as the point of the problems from the *petites classes* is that they are used for us to figure out how to apply the material to real life situations rather than just to learn the material. Because all of the problems are done in class with the professor, there is hardly any weekly homework to do. This sounds nice and all, but rather than being let completely off the hook, this style of teaching promotes a lot of individual accountability. There are no checkpoints during the trimester and students have the responsibility of keeping up with the class by themselves.

Because of the way classes work, there is quite a bit of time to invest in other activities. There are plenty of *binets*, or clubs, to join as well as a large variety of sports to choose from. At Ecole Polytechnique, their housing system is revolved around the sports teams, in which participation is required. Although I am not living with the Polytechniciens, I've found it quite easy to join the sports teams. I have been practicing with the girls' volleyball team and have also joined the rowing sports club (note that there's a lake on campus!). Proud to say that I've gone from not knowing how to row at all to being able to race across the lake!

In addition to having time to exercise, I've also been able to make time to travel to Paris, other regions in France and other countries in Europe. There is a never-ending list of monuments and museums in Paris to visit. My friends and I often just wander the streets of Paris, take a coffee in a random café and sit in the many beautiful gardens. There's always a *boulangerie* or a *crêperie* around the corner if we get hungry after walking around for a few hours. It's amazing how little by little, it's possible to piece together the city of Paris. Paris is no longer just a conglomeration of famous tourist sites, but is a beautiful city that should be explored fully.

Because Paris is one of the most travelled to cities, it's easy to fly from Paris to any other French region or country in Europe. In the span of the 15 weeks that I have spent here, I'll have travelled to Bordeaux, various cities in Normandy, Lisbon (Portugal), Edinburgh (Scotland), London and Cambridge. Travel within the Schengen area is unbelievably stress-free and I've found one of my favorite things about the European Union: my French phone plan will work when I'm travelling to any European Union country - without any additional fees. Aside from the benefits of the policies, it's been very liberating to be able to travel around to so many countries.

Along with my newfound appreciation for the European Union, I've also been able to learn much more about the individual countries in Europe directly from the residents of those countries. This year, all the exchange students were placed in one dorm together - consisting mostly of Erasmus (the exchange program of the European Union) students and a few other students from around the rest of the world.

Because we speak English with each other, it's true that my French skills haven't been improving as quickly as I expected. However, I wouldn't switch my dorm out for any other dorm. Instead of just learning about France and French culture, I've been able to learn more about Portugal, Italy, Germany, Spain, Switzerland and so many other countries. Every so often, we gather together for culture nights where we cook the cuisine of a specific country and it's always exciting to see the differences between the countries. The knowledge I've gained from talking with so many students from different countries more than makes up for my slower pace of French improvement. In any case, there's plenty of opportunities to converse with other students in French during classes and sports.

Coming to Ecole Polytechnique, I was quite apprehensive as I'm an inherently shy and withdrawn person. Caltech tends to allow students the liberty of interacting almost solely with their house and major over the span of the four years and I'll be the first to admit that I've taken advantage of the Caltech system these past two years. To study abroad though meant that I would be thrown once again into an environment that was completely unfamiliar, especially since there is the aspect of full French immersion. There was the worry that my French had deteriorated after two years of not taking class. I can't say that it has been easy sailing these past few months, but it's important to understand that part of self-development is stepping out of comfort zones. I've had to remind myself that it's fine that I needed someone to repeat what they said, or that the French students are more than likely completely willing to help, or that it's okay that there are times when I'd rather stay in my room and play music, but there are also times that I want to join the crowd to go partying. Studying abroad isn't just about the travelling and the studying, but it's also about building self-confidence and self-reliance. Of course, this journey can be taken at any study abroad program, but why not do so at one of the greatest schools and within reach of one of the brightest cities in the world?

Drew Schaffer '18 – Physics Caltech/Physique Ecole Polytechnique

Ecole Polytechnique is, like Caltech, a small, intense tech school located in the suburbs of a massive city. Both have tight-knit communities and an emphasis on academics. But only at one of them will you be able to explore the City of Lights and eat fresh-baked pastries in the heart of France.

As a Techer coming to Ecole Polytechnique to study physics — in French! — I was at first quite anxious about the course-load over here: after junior year of Caltech physics I wasn't sure that I wanted to have the difficulty of doing that again in a foreign language. But it turns out that learning science in another language is pretty manageable. For example, in my particle physics class, almost all the technical vocabulary is the same as in English but with perhaps some tiny modifications: *électron, méson, atome*. This has meant that, along with the equations to help me along, I haven't felt lost or confused by this stream of French physics talk. Also, the class system is more hands on here, with two hours of lectures supplemented by a two-hour recitation where you work through problems with the professor, which helps you get an idea for the application of class material as opposed to Tech, where you're responsible for figuring it all out on your own. The entire grade is determined by the final exam, so while there are no take-home assignments during term you have to be a lot more careful and self-driven.

The social life here is pretty active, and you quickly make friends in your dorm: the kitchen is the big assembly place, as everyone cooks dinner here. Interacting with French students is really how you improve your French, though there is also a big international student community which mostly speaks English if you're feeling timid. I definitely feel that, thanks to my dorm, I very quickly had a crew of friends to hang out with here.

And then of course there's French food. I remember the first day I walked into the cafeteria and saw the rows of *éclairs* and cakes for the grabbing. And that's just the school cafeteria: in Paris, itself, every few minutes you cross an idyllic bakery with *millefeuilles* and *pains au chocolat* coquettishly arrayed in glass display cases. As a man of little self-control when it comes to food, I find that it's taking all my willpower here not to eat every pastry in sight. You really have to be careful: if the *Freshman fifteen* didn't get you as a frosh, the *Frenchman fifteen* may sneak up on you here. I've been diligently jogging so that I can maintain as high an input of *croissants* as possible while I'm here. Besides the bakeries, of course, you have little specialty cheese shops: there are currently six different types of *fromage* in my fridge. One of the funnest nights I've had here was when a friend from Tech who's studying abroad at Copenhagen came, and we bought a *baguette* along with a sampler of five different cheeses, and chowed down on the banks of the Seine.

In addition to its gastronomy, Paris is known for being a city of art as well: even after my time here I'm sure there'll still be museums I didn't get to see. As all public museums are free for students at French universities, I've been devoting my time in Paris to gaining an artistic education at the expense of the French taxpayer. My favorite is the Musée d'Orsay, with the world's largest collection of impressionist art: it took me five visits to feel like I got to know the collection. I haven't even started on the Louvre yet. In addition, there are lots of smaller galleries around the city, and the Latin Quarter is full of tiny movie theaters screening the classics of world cinema.

As for the downsides, it is true that Ecole Polytechnique, being located in Palaiseau rather than Paris proper, can feel a bit far from the action at times, but to be honest this isn't even that much of a problem: the campus is located around a 35 minute train ride away from the center of Paris, and from there everything is at your fingertips. Plus, there's a decent amount of campus life, so it's not like you'll be trapped in a ghost town if you choose to stay in Palaiseau. There are apparently hundreds of student clubs: I'm part of one that screens and debates artsy films.

Ecole Polytechnique is definitely a good place for those looking for a taste of French culture as well as rigorous academics and a smaller, more personal community. If you're looking for a chance to study in Europe as well as eat copious amounts of good food, Ecole Polytechnique may be the place for you

Anusha Nathan '18 – Bioengineering Caltech/Biologie Ecole Polytechnique

Three years ago, I applied to Caltech with the intent of studying abroad in France, and today I feel so thankful to say that dream has become a reality. I have always been enamored with the beauty of the French language and culture, and perhaps the most rewarding part of this experience was the opportunity to put my years of obsession to good use. It's the fact that people bite a chunk off of their baguettes when walking home from work, that crêpe stations line certain streets, that the *Tour Eiffel* is just 45 minutes away, and that the French people speak so beautifully that make you wish you could stay here forever.

X (another name for Ecole Polytechnique) exchange program is the only one at Tech that is a full language immersion program. That being said, not having a perfect grasp of the French language should in no way deter you from applying to the Ecole. Perhaps the best way to learn a language is to be surrounded by it, and I've found that my French has improved immensely in just one month! Because the school draws students from all over the globe, administration, faculty, and students alike understand that French is not our first language and are more than willing to help us get better! Some classes are even taught in English, but I would definitely recommend taking some classes in French to get a real feel for the Polytechnicien lifestyle.

All of the French students have spent two years in *concours*, classes in math and physics, prior to coming to X in order to prepare for the entrance exam. As a result, each student is highly advanced in those two fields of study. It is for this reason that Ecole Polytechnique is a recommended exchange program for senior year. However, as a Biology major (and premed), I have found that junior year is the ideal time to come as the classes are at a slightly lower level than those at Tech. This worked perfectly for me as I could still learn the material while, at first, playing catch-up with the French language. All classes have a two-hour lecture followed by a two-hour *petite classe*, or recitation section, taught by the professor herself or himself, which often results in minimal outside work.

Everyone in France has heard of both Polytechnique and Caltech, so it was a nice change of pace from the often obscure looks with which I am met when I tell people in the States that I go to Caltech. Studying at a university that nurtured the likes of Becquerel, Cauchy, Coulomb, Poisson, and Fourier has its benefits: the academics are thrilling and invigorating; yet, we still have time to cradle other aspects of our being. Sports are obligatory for the "regular" degree candidate students in the engineering program, and they are one of the gateways to a fulfilling social life. Students in sports sections often eat dinner and go on vacations together, and it's a wonderful way for exchange students to meet the French students. I joined the rowing section, and every Tuesday and Thursday, I went rowing on the on-campus lake! I have never felt healthier, both physically and mentally, than I have at Polytechnique. I'm still not sure if I should attribute that to the numerous opportunities I have had to try new things on campus or simply to the Parisian air (except not really, since so many people smoke).

The *binets* are another great way to get involved on campus. They are essentially clubs, but there is a much greater variety of them here than at Tech. In fact, I joined the girls' soccer binet, and I had the chance to compete in *La Coupe de l'X*, a sports competition drawing students from the *grand écoles* all around Paris. There is something at Polytechnique for everyone, from the numerous binets such as painting, soccer, skydiving, and photography, and the chance to learn science in a different language has opened my eyes to the global world of STEM.

As a student in Europe, it's easy to get swept away by the sheer beauty of the surrounding countries, but I cannot count how many weekends I stayed near campus to participate in one of the many activities organized by Polytechnique itself, ranging from a treasure hunt in Paris to cheese tastings to soirées. That being said, take advantage of being a student in France! Go to the museums for free, visit the *châteaux* of the Loire Valley. Travel abroad: train to Triberg and Milan, take a chance with Eastern Europe.

All this aside, French bureaucracy is a bit much. I opened my French bank account (which is required to pay for housing) my first Friday at Polytechnique, and a month

and a half into the program, I still hadn't received my bank card. Our international student orientation was rescheduled from the first Monday to the seventh or eighth week of the program! The shining light is the friendly faces of administrators and students alike, all of whom are always willing to walk you to your destination or find out why your mail never reached you.

As time passes, my days here at Polytechnique will be something that I can only reminisce about, with a faint smile appearing on my face as I remember seeing the names of Polytechnicien alumni etched into the Eiffel Tower, rowing on the campus lake, going to military soirées, taste-testing chocolate in Paris, and strolling along the Seine. Amidst all of these events, I come back to my room every night fluttering my eyelids so very fast in disbelief that this dream of mine became a reality. I wouldn't trade this opportunity of a lifetime for anything, as my decision to come here was without a doubt one of the best decisions I have ever made in my life. The combination of studying at a world-renowned university, immersing myself in the French culture, and enriching my cultural sensibilities has undoubtedly made me a happier and more interesting person.

Cedric Flamant '15 – Physics Caltech / Physics Ecole Polytechnique

Out of all the Caltech students who have studied abroad at Polytechnique, I might be justified in saying that I have looked forward to it the longest. In fact, I even left a note in my Caltech application explaining that I was excited by this particular exchange program. Finally having realized this aspiration, I can say from experience that studying abroad at l'Ecole Polytechnique is an incredibly enriching experience, both socially and academically.

Here at Polytechnique, I have met wonderful people that I might never have had a chance to meet. Through sports and classes, I've met plenty of the students here, who are called Polytechniciens. Due to the prestige of Polytechnique, many of these students are likely to become CEOs, eminent scientists, and government officials, so if you're into networking, this is a good place to be. There are also a few dozen other exchange students from all over Europe who are eager to befriend you as you all adapt to the new environment together. As you start to form a group of friends here, dinner becomes a time to look forward to. The dorms have kitchens which are managed by each sport section and are constantly stocked with a variety of food. So, it is extremely easy to cook and dine with friends since there's no shopping or planning to worry about. Plus, the kitchens are cozy, friendly environments where you will often see other Polytechniciens playing games or watching movies.

One concern that a Caltech student might have with studying abroad is the academic rigor of the other school. After all, at Caltech you get used to a heavy

workload and very challenging courses. So, for all the challenge-seekers out there, Polytechnique is definitely worth your while. Polytechnique is considered to be the most prestigious and selective school of France, and the students are selected through an extremely competitive entrance examination. Everybody in France knows Polytechnique, which is an interesting (and somewhat fun) change from the slightly esoteric reputation Caltech has in the US. To name-drop a bit, notable professors and alumni from Polytechnique include Becquerel, Liouville, Mandelbrot, Fourier, Navier, Ampère, Poisson, Cauchy, Carnot, Hermite, Poincaré, and Lagrange. Personally I have found the academic level here to be quite satisfying. The difficulty of the material is roughly on par with Caltech's; in fact, some of my courses feel like a perfect continuation of my previous studies. However, the teaching approach at Polytechnique is quite different than at Caltech. In general, Polytechnique has a strong focus on mathematics – an alumni who eventually became a professor at Caltech warned us that “at Polytechnique, every subject is an excuse to do mathematics.” The more abstract approach to physics often encountered at Polytechnique has been complementary to what I've learned at Caltech, and ultimately it solidified my desire to study theoretical physics in graduate school.

Finally, let's address some of the more pragmatic questions you may have about studying abroad at Polytechnique. This program is recommended for your senior year, and I think it works out perfectly for physics majors. The junior year physics courses at Caltech on graduate-level quantum and classical mechanics are the high-level tools you need for more specific studies. By the end of junior year you have a “full toolbox” to tackle fields like condensed matter, elementary particles, and astrophysics. Furthermore, in the physics option, by senior year you will have essentially finished all your specific requirements. Hence, you won't run into any curriculum-meshing issues when you get back to Caltech.

Also, one of the biggest worries about the Polytechnique exchange program is the French level required. ***I really want to stress that it isn't an issue and shouldn't impede you from trying for this fantastic opportunity. If you can communicate to some extent in French and are willing and excited to learn more, you are perfectly suited for the exchange.*** Since 1995, Polytechnique has been welcoming more foreign students and as such a lot of the infrastructure has been adapted to novice French speakers. In two of my classes, there are 2 or 3 foreign students who came here without knowing any French at all. Of course, you will get a lot more out of the program if you have already taken a few years of French, but it goes to show that there's nothing to be afraid of.

The Ecole Polytechnique exchange program also has plenty of cultural and traveling benefits (you'll be in Europe and right next to Paris!), but I'm sure it has been covered in the comments of my other two exchange-mates. All in all, I highly recommend the Polytechnique exchange, especially if you are interested in France and French culture!

Margaux Lopez '15 – Mechanical Engineering Caltech, Mécanique Ecole Polytechnique

Paris is an incredible city, but I've been able to explore it so much more deeply by actually living here. I've picnicked on the banks of the Seine, corroborated the fact that Berthillon's is indeed the best ice cream in Paris, gone bouldering in Fontainebleau (the biggest bouldering site in the world!), and made friends that I look forward to coming back and visiting.

At first it was a bit overwhelming to speak almost exclusively in French, but I have greatly improved just in the first month of being immersed in the culture and I am now completely confident in my abilities to navigate my way through the system. Talking to fellow students in French was the most intimidating part because when everyone is talking at once it can be really hard to follow the conversation, but everyone was really patient at the beginning and now I'm perfectly comfortable conversing with them smoothly as well. It's hard to really become fluent in another language without living it, and studying at Ecole Polytechnique is an incredible opportunity to really immerse myself in French culture.

The student life is quite vibrant because the school is somewhat geographically isolated; I have to take the train for about thirty minutes to get to Paris. There are parties or activities almost every evening, and students cook dinner together in kitchens that are located in the dorms. Students live according to what sport they practice, so as a member of the rock climbing section I eat lunch and dinner every day with the other climbers in the climbing kitchen. Since students are sorted into sections by sport (similar to the house system at Caltech), it is really important to choose a sport in the beginning and get to know students in that section. I felt really welcomed by the French students in the climbing section and I love getting to improve my climbing skills every week.

Academics are about the same level as Caltech except with less work. Since none of the classes have required homework, the final grade is based on one exam or project at the end of the semester. At first I was very intimidated, but the teaching style is quite different here and the professors do their best to communicate well with the students and answer any questions we may have. Recitation sections, led by another professor, give students a chance to do practice problems and apply the concepts learned in lecture. It's interesting to compare the two teaching styles and I really appreciate the effort put in by the professors here to teach well.

French bureaucracy can be a pain to handle, but it's definitely worth it in the end. There are always difficulties in adjusting to a new place but the experience in navigating this different culture and making new friends will definitely help me adjust more smoothly to a new work environment after I graduate. Learning to be independent is incredibly important and what better place to do that than Paris!

Yubo Su '16, Physics/Computer Science Caltech, Physics Ecole Polytechnique

La Ville Lumière, City of Lights. So Paris is often called, and so much as a brief walk along the Seine during the heart of the night testifies to Paris's deep synonymy with a grandiose romanticism. As the river dances in the warm dusk cast by the elaborate streetlights, as castles and palaces stand guard over the delicate streets, as far in the distance a particular tower saturated with flickering lights stamps on the scene in big twirling letters "Paris," one wanders about the roads, infatuated with the seemingly ephemeral beauty of the archaic landscape. In this first half of my stay at Ecole Polytechnique (also called "X"), I've had the opportunity to visit many other cities, but none have struck me the same way as did my first evening in the capitol of France.

X finds itself a single forty-minute metro ride away from the heart of Paris, in a town built around the hallowed institution. If not yet clear, X sits atop a brutal meritocracy, and their classes present a correspondingly difficult challenge. I came to X to take math and physics classes, the two fields on which the two years of French prep school between high school and admission to X focus the vast majority of their attention. So while many of my friends who are also abroad, both from Caltech and other schools, are able to travel wanton about Europe, I come home from each vacation to a sobering reminder of what work awaits me.

However, X is made significantly more manageable by its educational system. First, it replaces homework with mandatory, guided practice sessions, *petites classes*, where the professor leads the students through a tailored set of problems to reinforce the lecture earlier in the day. Second, while one might expect only a lecture or two (out of four) to be in English, many of the *petites classes* are held in English to cater to the copious numbers of foreign graduate students. Third, the numerous students to whom I've posed questions have been gracious almost to a fault in their explanations.

I would be remiss to discuss my time at X without mention of the innumerable nuisances. Whether the bank account I finally set up halfway through my stay, or the unbelievable difficulty I have in paying for things with an American Visa card (I've been told Mastercard works fine), or the unworldly number of often redundant certifications required by the various departments, to name but a few grievances, France has certainly been no smooth ride. However, one learns to adjust, both by the hearty friendliness of the students here and by simple practice.

Most rewarding for me personally has been the chance to experience firsthand the culture about which I'd learned for eight years, to learn the language that for so long was just an agglomeration of vocabulary in my head. And even amidst the somewhat taxing travelling schedule I've set for myself, my heart remains

somewhere in Palaiseau, where from a dorm room, on the campus of one of the finest schools in the ever so quaint world of France, every magical day starts.