

sometimes wished there were a nearby medical school. Though, since I graduated, Caltech has introduced a medical engineering program. This program seems like a great fit for the school, helping to bridge Caltech and top nearby medical researchers and physicians.

**ENGenious:** What advice do you have for the next generation of Caltech students?

**Dionne:** First of all, take advantage of all the opportunities you have on campus. Caltech is small enough that graduate students can acclimate themselves and figure out what resources exist, but [they have to] do it quickly because graduate school flies by. Try to serve on a colloquium committee. I served on the KNI colloquium committee and got to meet some great scientists, including Carlos Bustamante, John Pendry, Naomi Halas, and Stan Williams (while having some very nice dinners too!). I learned a lot about their research and enjoyed the networking opportunity.

Caltech holds an incredibly special place in my heart. In a nutshell, here is my advice: Use Caltech as a strong foundation for learning science and engineering. Make as many friends as you can and learn from your advisors. Also, know that when you leave, there's no such thing as goodbye. It's only "Until next time." Despite being miles away from Caltech, the community remains close and available if I need help or advice.   

*Jennifer Dionne is Associate Professor of Materials Science and Engineering at Stanford University.*



### The Milton and Rosalind Chang Career Exploration Prize

The Milton (PhD '69) and Rosalind Chang Career Exploration Prize encourages and supports recent Caltech graduates who would like to explore careers outside of academia through a career gap experience project.

This prize provides action-oriented alumni with the freedom to intentionally explore career opportunities or transitions outside of academia, and it helps alumni build and enhance their skills as leaders and advocates, such as in government and journalism. Projects could include volunteering, either within or outside their degree or field, or the pursuit of a bold, compelling, and innovative project that has the potential to make a positive impact on society.

The Chang Career Exploration Prize can provide up to \$65,000 in financial support for a career gap experience, a finite period of time (six to twelve months) during which an individual deliberately takes a break from his or her current academic or professional path in order to explore other interests, have a diversity of experiences, and develop new skills with the goal of optimizing career pathways.

In this first year of the program, the intent is to award the Chang Prize to one undergraduate and one graduate Caltech alumna/alumnus. Prizes are awarded at the discretion of Caltech and administered by the Office of Alumni Relations.

#### Eligibility

Caltech alumni who have received their BS, terminal master's, or PhD from Caltech within the past 10 years, with a preference for those who are five years or less from graduation, are eligible to submit their project proposal for the Milton and Rosalind Chang Career Exploration Prize. Current Caltech students who will receive their degree by the submission deadline are also eligible to apply.

For more information, visit [www.alumni.caltech.edu/learn-more-chang-prize](http://www.alumni.caltech.edu/learn-more-chang-prize).

## Alumna Julie Eng Reflects on Her Caltech Undergraduate Journey

Julie Sheridan Eng currently serves as the Executive Vice President and General Manager of 3D Sensing, a business segment of the global technology and engineering leader Finisar. Eng holds a BA in physics from Bryn Mawr College and a BS in electrical engineering from Caltech, and she earned her MS and PhD in electrical engineering at Stanford. She has published over a dozen papers and holds seven patents.

ENGenious editor Trity Pourbahrami visited Julie Eng at Finisar to learn more about her Caltech educational experience and her path to industry.

**ENGenious:** What inspired you to become an electrical engineer?

**Eng:** It was a somewhat non-traditional pathway. No one in my family was in engineering or high tech, but I was good at math and science. In junior high, my school required us to take county-sponsored math exams. I did very well and starting winning cash prizes. I realized [that taking these exams] was an easier way to make money than babysitting or mowing lawns, so I kept doing it. When I was a senior in high school, I did so well that I was invited to a banquet for the people with the top math scores, hosted by the American Society of Mechanical Engineers. I was told that engineering is a field that typically lacks women but is also a great major to get a good job straight out of undergrad, which was important to me.

I decided to try out engineering, but since I didn't know many engineers growing up, I decided to do what is called a 3:2 program. A 3:2 program is a partnership between a technical/engineering school like Caltech and a liberal arts college in which you complete three years of a science degree at the liberal arts school along with all its liberal arts requirements, then transfer to the engineering school for the final two years of study and complete all the additional classes required for an engineering degree. At the end of five years, you get two bachelor's degrees—one from the liberal arts college in science and one from the technical school in engineering. This helps the technical school add to and diversify its student body, and it helps students who aren't sure a technical school is the right choice for them have a broader educational experience before specializing. I don't think it's widely known, but Caltech has this program with a number of liberal arts colleges. I learned about it from my dad, who found it in the brochure for Bryn Mawr College. For me, it was perfect. I attended Bryn Mawr, an all-women's college 10 miles west of Philadelphia, as a physics major. I studied there for three years and then transferred to Caltech for the final two years. When I came to Caltech, I chose to study electrical engineering (EE), mainly because I had done an internship at Bell Labs in fiber optics and EE was the most relevant engineering discipline for fiber optics.



**ENGenious:** Were there any EAS faculty who made a specific impression on you?

**Eng:** Definitely Amnon Yariv, my senior thesis advisor. He was in applied physics and electrical engineering. He had written a well-known book called *Optical Electronics* that I had studied at my Bell Labs summer internship, and I wanted to do a senior thesis with him. I talked to him, and he agreed to let me do my thesis in his group. That had a major impact on me.

I also remember Kerry Vahala. I took quantum mechanics from him. Kerry is a great teacher and very approachable. That is a great combination: someone who is very good at what they do, and good at explaining it, and approachable for students.

I remember Bill Bridges. I remember him because I knew he had invented the argon ion laser, which I thought was really cool, and was on the board of a famous laser company—but yet, he was so approachable and friendly.

**ENGenious:** How has your Caltech education influenced you?

**Eng:** One of the biggest influences my Caltech undergraduate experience had on me was

that it set me up to get into a great graduate school. Caltech was instrumental in this because I had access to many excellent technical courses. In addition, I had the opportunity to do research in a world-renowned group as an undergrad, which is an opportunity not everyone has. And because of the small size, you really get to know the faculty and interact with them. All these things helped me to have opportunities at the best graduate schools in my field. And probably the biggest influence Caltech had on my life was that I met my husband, Lars, at Caltech!

**ENGenious: What are some of your favorite memories of Caltech as a student?**

**Eng:** The people were great. Meeting Lars was, of course, a highlight. My thesis experience in Amnon Yariv's group was very positive.

Also, I have many fond memories of the Caltech Y. I was the activities chair of the Caltech Y. I remember Julie Bolster, who was leading the Caltech Y at that time. She was someone you could always go and talk to, which I always appreciated. As the activities chair, I planned events such as parties and spring-break trips to Mexico. It was a great way for me to get involved with campus life and meet people whom I otherwise would not have met because we were in different majors and in different years.

I also remember Jack Roberts, who was a chemistry professor I met through the Caltech Y. He was very friendly and genuinely interested in student life on campus. It was not until later that I learned how famous he was in his field. To me, he was just a friendly face on campus who cared about students.

**ENGenious: How was your experience as a 3:2 student at Caltech unusual?**

**Eng:** It couldn't have been more different, because Bryn Mawr is all women, but Caltech was probably only 10 percent women at the time. Plus, there is the difference in location. Bryn Mawr is East Coast, Caltech is West Coast. I also took a lot of liberal arts classes at Bryn Mawr, but when I got to Caltech, it was all technical courses. At Caltech, I got top-notch technical skills and training, course work, and exposure to high-level research. But I couldn't have made that decision [to go to Caltech] straight out of high school, so the 3:2 program was ideal for me. I would recommend it to anyone who has interests in both liberal arts and technical fields, or who wants to start with a broader education and then have an excellent technical education. It made me well rounded, and I gained excellent opportunities in my field of engineering.

**ENGenious: How would you describe your professional life and contributions thus far?**

**Eng:** I started off in fiber optics in the late '80s with an internship at Bell Labs. They were literally putting the first fiber-optics networks into the ground. After graduate school, I went back to AT&T and took a full-time job. After a few years, I realized I liked interacting with customers and being on the product side of things, so I moved into product development and began managing groups of engineers. After working on fiber optics at AT&T/Lucent/Agere for eight years, I moved back to

California to work for Finisar and run engineering for their data-communications business.

Now I've been with Finisar for 15 years, which is very rare in Silicon Valley. During this time, we've grown our revenue from \$130 million to \$1.3 billion and moved from being number eight in optical components to number one. We made some acquisitions, but most of the revenue growth was from our own product ideas and hard work. Today, we are the market leader in fiber-optic components, and we manufacture approximately 30 percent of the world's fiber optic transceivers. What that means is that if you use the Internet to search or send email three times, it's likely that your signal has gone through Finisar equipment. I'm very proud of helping to grow the engineering team at Finisar into one of the best and most respected teams in our industry and of helping the company become one of the top vendors in this field.

Most recently, I was asked to lead the 3D Sensing business, a new area for the company. This is a general management role, which is new to me. In this role, I manage engineering, marketing, and operations. I'm responsible for the profit and loss of the business. 3D Sensing is very interesting; it uses technology similar to the technology we use for fiber optics but applies it to new applications such as facial ID, which is being deployed in mobile phones, and in-cabin driver monitoring in automobiles. In the future, it can be used to aid in driver-assist or autonomous driving.

**ENGenious: What have been some defining moments in your career so far?**

**Eng:** One of the big moments was the summer I spent at Bell

Labs after my junior year in college. That was my first experience with fiber optics and research. Another defining moment was when I made the decision to attend Bryn Mawr, and then Caltech, and then Stanford for graduate school. Going to AT&T right after graduate school was also a pivotal decision. I learned a lot about fiber optic technology there, and also how to make real products.

**ENGenious: How is a Caltech education viewed by your industry colleagues?**

**Eng:** A Caltech education is viewed very favorably. Most people know that Caltech is a difficult school to get into and also that it is a preeminent research university at the scale of a college. If students seek out the opportunities, they can conduct research at a very high level. If a Caltech resume comes across my desk, I view that very favorably because I know this person had a great education, they are smart, and they have had great opportunities.

**ENGenious: Did you find anything lacking in your Caltech education?**

**Eng:** Sometimes it was not easy to be there when it was only 10 percent women. Really, it isn't easy to be anywhere where you're different from other people. Bryn Mawr was all women, but men from other nearby colleges could take courses there, and for them, I don't think it was that easy either sometimes. When there's a small number of people who for whatever reason feel different, you run the risk of missing opportunities for all students to engage. Also, [at Caltech] there was a sort of unspoken hierarchy

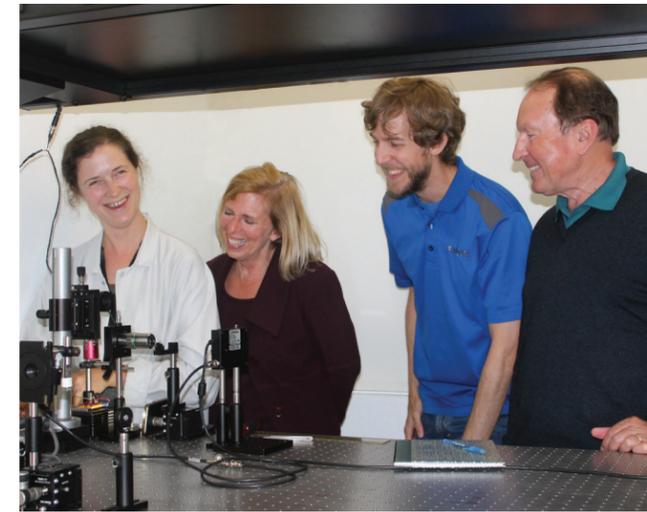
of disciplines—specifically that science and engineering are much harder and more worthy majors than business or liberal arts. But if you've ever taken a philosophy course with a class full of philosophy majors, you realize that can be as hard as any engineering course you'll ever take! I think students would benefit from a more-balanced view of the worth of all fields. This could provide a wider diversity of experiences and help students grow into broader-minded people.

**ENGenious: Was your educational experience different as a woman at Caltech?**

**Eng:** Coming from a women's college, I had [learned to have] no fear of taking initiative, because at an all-women's college, the women do everything. So, of course I'm going to ask a question in class, of course I'm going to go get involved with the Caltech Y, of course I'm going to seek out a well-known professor if I want to do my thesis with him. I think I got out of Caltech as much as I would have independent of my gender. However, I think that if I had come in as a freshman, it would have been a lot harder. My parents were not scientists, but many other students had that sort of scientist upbringing. I probably would have felt intimidated by them, or out of place. It really helped to have done a 3:2 program and come in as a junior.

**ENGenious: What advice do you have for the next generation of undergraduates?**

**Eng:** You are lucky to be at Caltech! It is a world-class research university on a college



Left to right: Finisar members Anna Tatarczak, Julie Eng, Patrick Gregg, and Chris Kocot

scale. Take advantage of the world-class course work and research opportunities and get to know the professors. I would also encourage students to take part in internships. My first internship was at Fermilab, where I realized I didn't want to be a particle physicist. But when I did my internship at Bell Labs, I loved that there was an application for my work. Learning what you do and don't like in a real work situation is very important, and you can meet people who can be influential in your life. Also, I'd suggest that students try to broaden themselves. Don't be too narrow. The workplace of today involves interacting and working with different types of people and across disciplines, and you need to have a broader view to do this well. For women, I'd give the same advice but add that when you are looking to join a company or a university, look to see if there are any women in high-power positions. If there are, that's probably a positive sign. ■ ■ ■

*Julie Sheridan Eng is the Executive Vice President and General Manager of 3D Sensing at Finisar.*