The optics I make are used to study the universe, protect our troops, power our smartphones, and save lives.

AmeriCOM is proud to support optics technicians—the people who make the optics that power the devices that improve our world.

Ashley Hoffman, Optics Manufacturing Engineering Technician and first female to complete the Precision Optics Manufacturing Technician Apprenticeship.
2023 opens a new chapter for each of us

...and it’s fitting to frame the year with the inspiring stories of women who’ve forged their own paths to make a difference in our world through science, technology, engineering, and math (STEM). There have been bumps and challenges—and what many would describe as darkness—in our global community in recent times, but these problem-solvers, collaborators, and changemakers remind us that our future is full of light.

Take the time to soak in the full spectrum of their voices and journeys. Learn from their experiences of overcoming adversity and moving us forward. Harness their passion for creation and discovery.

May their narratives remind us to strive for equity, diversity, and inclusion in our classrooms, laboratories, conference rooms, and board rooms. May they inspire future generations of female pioneers in optics and photonics. And may they lead to many new, hopeful, and bright beginnings.

Jennifer Barton
Professor, University of Arizona
SPIE Fellow
2023 SPIE President-Elect

Educational Background: BS, Electrical Engineering, The University of Texas at Austin, Austin, Texas, United States; MS, Electrical Engineering, University of California, Irvine, California, United States; PhD, Biomedical Engineering, The University of Texas at Austin, Austin, Texas, United States
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**SPiE Photonics West**
28 Jan–2 Feb 2023
San Francisco,
California, USA

**SPIE Quantum**
part of Photonics West

**SPIE AR/VR/MR**
29 Jan–1 Feb 2023
San Francisco,
California, USA
Follow what you’re passionate about, regardless of what the stereotypes may be! Find those around you who will support you and your pursuit of your dreams.

—Meriame Berboucha (pg. 51)
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Setbacks, struggles, and even failure are completely normal and part of academic life. Never stop learning and never give up. You’ve got this!

—Anna Schueth (pg. 31)
You should be in the driver's seat when it comes to your career, not a passenger. You know best what feels right and what is the wrong move for you.
—Jennifer Church (pg. 47)
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**SPIE. ADVANCED LITHOGRAPHY+ PATTERNING**
26 February–
2 March 2023
San Jose, California, USA

**SPIE. SMART STRUCTURES+ NONDESTRUCTIVE EVALUATION**
12–16 March 2023
Long Beach, California, USA

spie.org/wio
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| SPIE.  
DEFENSE + COMMERCIAL  
SENSING  
30 April–4 May 2023  
Orlando, Florida, USA |        |         |           |
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A STEM-based career is extremely rewarding. You will not only grow in character but also contribute globally to your country and society’s well-being. Embrace STEM and discover how you can contribute to the world’s peace and happiness.

—P. Susthitha Menon (pg. 52)
Make mistakes: it may feel humiliating in the moment, but most likely your mistakes won’t kill you, and you’ll develop a resilience that will serve you throughout your life.

—Iris Erichsen (pg. 38)
Always allow yourself to grow as opportunities arise; be open to various positions; and be willing to face new challenges. Ask questions and actively participate in different activities. The worst that may happen is that you are told ‘no.’ If that happens, it just means that there is something better for you out there.

—Amrita Darji (pg. 43)
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INTERNATIONAL WOMEN IN ENGINEERING DAY

spie.org/wio
Not every choice has to be life-determining. We put a lot of pressure on ourselves to make the ‘right’ decision, but it’s also okay to just go for it. You can always change your mind. A lot of the most impactful decisions I’ve made in my life have led me to situations I couldn’t have predicted even if I’d wanted to! Trust yourself and your intuition and see where it takes you.

—Simone Eizagirre Barker (pg. 54)
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**PICK UP YOUR 2024 WOMEN IN OPTICS CALENDAR AT SPIE OPTICS + PHOTONICS THIS WEEK!**
No one on this earth is born intelligent or great. We only gain knowledge when we ask questions and clear our doubts.

—Jasleen Kaur (pg. 33)
For women, a career in engineering and technology is challenging, even in today’s modern world. But the kind of self-independence of performing research tasks and making innovative devices you have in STEM can be found in no other field.

— Faiza Iftikhar (pg. 44)
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You do not have to be the smartest or extraordinary by anyone else’s measures to be successful; your passion, your drive, and your support network will always ensure you shine.

—Clarissa M. DeLeon (pg. 29)
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<td>8-10 November 2023 Tokyo, Japan</td>
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Choose an environment that will nourish your growth so that you love what you do. Find where you will be happy day after day—and go there!

—Diana Mojahed (pg. 34)
Focus on learning. Learn new skills, learn from successes and failures, learn from people around you, and learn about yourself—a career in STEM is an exciting journey that’s full of possibilities and opportunities. Keep learning and dream big!
—Helen Li (pg. 45)
If you are interested in a career in STEM, go for it!

There are so many people who are rooting for you to succeed. Find a group of people who support you and love you for your strengths. There are thousands of roles within STEM so there is certainly room for you to thrive. It is a fun career path, and you will constantly be learning and exploring.

I work at Illumina with a team of interdisciplinary scientists and engineers, designing and building gene-sequencing instruments. These are used by doctors and researchers to decode DNA so that they can better understand diseases like cancer. We color code the DNA base pairs, take millions of images, and then “read” the sequence by interpreting these images.

I design cameras and LED light sources for the instruments. Illumina’s design cycle is typically three years from concept to customership, and the time goes quickly: we fit in several prototype builds and design iterations within that window. Every day is different and includes exciting challenges and opportunities. I spend half my time working in the lab, testing and building prototypes. The rest of my time is spent discussing new ideas, finding suppliers, and analyzing data. I enjoy the independence, flexibility, and diversity of my projects. Seeing people using the products I designed keeps me striving to innovate and create better products every day.

Every career has unique obstacles and challenges. These are especially complex when interpersonal issues are tied to technical challenges. I am currently working to trust my intuition, knowledge, and experiences. When I present ideas, the team might not be ready to discuss them. Earlier in my career, I took a lack of enthusiasm on the part of others to mean I was incorrect or didn’t have useful input. I have since learned that lack of engagement does not mean my ideas are not strong or relevant. Now I keep these ideas in mind and make sure to bring them up again when they are pertinent—and when the team is receptive.

I wish I had been told earlier in my career that it is much easier to be critical of ideas than it is to be constructive.

There are too many wonderful people who have inspired and encouraged me to call out just one or two. Sometimes, it can be hard to find them in the moment, but I’ve found there are always people supporting me and helping me find opportunities to grow.

Alexa Hudnut
Staff Optical Systems Engineer, Illumina, United States
Born in United States / Resides in United States
Educational Background: BS, MS, and PhD in Biomedical Engineering, University of Southern California, United States
You may feel vulnerable just because people around you are different.

You may feel lost just because you have not experienced something before. You may feel disregarded because you don’t succeed with something as you’d hoped. Believe in yourself, in your feelings, intuition, and strengths. Find people who’ve been through a given experience before. And remember: being in a minority—being different—does not mean you are inferior. Actually, it’s what makes you stand out.

I’ve always liked how physics demonstrates its beauty in everyday phenomena and allows observing cause-effect correlations between objects and processes. Beginning at the age of 13, I joined the International Physicists’ Tournament (IPT), a competition in research problem-solving and debating. This event fostered my dedication to science, perseverance, and creativity. My passion for physics kept me involved with the IPT for more than 15 years—as a participant, mentor, judge, and organizer.

Using my theoretical physics background, I am currently a researcher in optical communications. My research project involves deriving analytical models—equations and expressions—for signal propagation in optical fiber. This is vital for equipment designers and network operators; they need to know when the signal is corrupted and how it gets detected.

It was extremely challenging to get through the PhD thesis submission. This life stage includes various competing priorities as well as shifting your identity as you transition to your new, graduated self. It takes a significant amount of effort, as well as the support of loved ones. It is a time when you must believe in yourself, work hard, and sell your strengths.

Throughout my career, I have often doubted my worthiness. I’ve felt the need to defend my results and achievements, even when they weren’t being questioned. I discovered this originated from a desire to avoid risks, but I’ve learned that risks are unavoidable. Owning our expertise is a risk, and approaching an unsolved research problem is a risk. We must accept and embrace those risks.

Anastasiia Vasylchenkova
Research Fellow, University College London, Department of Electronic and Electrical Engineering, United Kingdom
Born in Ukraine / Resides in United Kingdom
Educational Background: BSc in Applied Physics, MSc in Nuclear Physics, Kharkiv National University, Ukraine; PhD in Optical Communications, PGCert in Learning and Teaching in Higher Education, Aston University, United Kingdom
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If this field is your passion, you will be able to overcome any barriers and obstacles.
You do not have to be extraordinary by anyone else’s measures to be successful: your passion, your drive, and your support network will always ensure you shine. At the end of the day, you can achieve your goals. ¡Échale ganas! [“Give it all you’ve got!”]

As a first-generation college student, I can’t really say who inspired me to choose optics as a field of study: I didn’t have that role model when I was young. But, there have been many times along my journey when people have inspired me to continue pursuing optics. Entering Montana State University as one of the only Latinas in electrical engineering was hard and I almost quit: it was the girls I taught at the Girls Inc. of San Antonio summer camp who inspired me to pursue my science and engineering degree. Seeing their excitement for science and engineering reminded me how much I loved it too. They pushed me to chase my dreams.

My role as a graduate student at the Wyant College of Optical Sciences provides me with the opportunity to grow intellectually and professionally—and get paid to do so! My advisor, Meredith Kupinski, has provided me the guidance and the opportunity to conduct my research project—studying the optical properties of wildfire smoke—for which I was awarded my National Science Foundation fellowship. In addition to my technical responsibilities, I take great pride in leading our Women in Optics club and spearheading our Recognize, Inform, Support, and Elevate (R.I.S.E.) initiative.

I often feel out of place as a Latina in optics, and that can result in increased self-doubt. But instead of letting my doubts overcome me, I now recognize that my experiences make me an asset: I can leverage my unique perspective to create positive change in my community. Initiating R.I.S.E. has given me the chance to provide to others what I needed as a student from an underrepresented group; it has shown me my power to make a difference.

I wish I had realized sooner that I should not measure my success by the framework of an institution that has not been built for me. My PhD journey should and does look different compared to other graduate students for numerous reasons, and that is okay.

Clarissa M. DeLeon
Graduate Student, National Science Foundation (NSF) Graduate Fellow, Wyant College of Optical Sciences Polarization Lab, University of Arizona, United States
Born in United States / Resides in United States
Educational Background: BS in Electrical Engineering, Montana State University, United States
Find your own interests and discover your strengths.

Study as many cross-field courses as possible in addition to the fundamental courses, and participate in specific projects that interest you as early as possible. Keep yourself open-minded; listen carefully; do not be discouraged, even in difficulties and failures; and keep your curiosity.

When I was a kid, my parents bought me many autobiographies about scientists, including Marie Curie’s. I was fascinated by her story, especially her practice of studying without sleep or eating and how she was not afraid but responded calmly when she encountered difficulties in life or scientific research. This left a deep impression on me. Since then, I have been particularly eager to learn mathematics and physics well, and I also hope that one day I can be such a scientist.

I am fortunate to have been able to continue working on the cutting edge of research in the semiconductor industry after my PhD. Currently, I am working in the Electronic Design Automation, or EDA, field at Siemens to develop software tools that generate lithography photomasks which are used to physically manufacture chips used in all types of electronic devices. With the big data available in both design and fabrication, we are trying to use machine learning (ML) technology to help advance semiconductor manufacturing with higher yield and faster speed.

The biggest challenge in my career used to be being a full-time working mom when my son was very young. No matter how bad the sleep was the night before, I still had to work during the day, take care of my baby back at home, and then go back to work while he slept. I was frustrated initially, but I gradually understood this was just part of my life, and learned how to prioritize different tasks. This helped me tremendously in life later on—both in work and daily life.

I used to be reluctant to let my teachers and peers know that I didn’t understand certain problems in order to maintain my appearance as a good student, so I rarely asked questions. One day, my PhD adviser, Dr. Franco Cerrina, told me seriously that there are no stupid questions but stupid answers. He encouraged me to share what I was uncertain about, discuss it with others, and have no fears about speaking up. I wish I'd understood this earlier.

Yuansheng Ma
Distinguished Product Engineer, Siemens
Born in China / Resides in United States
Educational Background: PhD, University of Wisconsin-Madison, United States
I encourage you to follow your heart and trust your gut.

If your passion is STEM and you really want to pursue a career in this field, then absolutely go for it. Believe in yourself and find someone, or even several people, who support you. Moreover, it is important to have great mentors throughout your entire career. There are a number of great online STEM programs and organizations such as “Cybermentor.” Finally, I would like to emphasize that setbacks, struggles, and even failure are completely normal and part of academic life. Never stop learning and never give up. You’ve got this!

Ever since I was a little girl, I’ve been curious and loved science. At the age of seven, my parents gave me my first microscope, and I started to make my own little experiments, including my first lab journal. I am driven by an intrinsic curiosity that was supported by my parents at all times. However, I did not have one specific scientist as a role model, let alone a female one. Therefore, I started mentoring high-school girls in STEM over 10 years ago. In 2021, I was even awarded the “STEM Ambassador of the Year” by the mentor program “Cybermentor.”

My primary responsibilities are research work in the imaging lab, as well as student supervision and teaching. I am working on a so called “VENI” post-doc project, funded by the Dutch Research Organization NWO. I examine very large optically cleared (transparent) post-mortem human brain and prostate cancer samples, while working with partners in industry, the local hospital, and university to develop novel light-sheet imaging protocols.

To date, there have been many challenges in my career that I’ve had to overcome. During my PhD, my father passed away, and during my post-doc, I lost my baby, which was very hard. My supervisors were very supportive, which is crucial and of utmost importance. Moreover, I had to take a sick leave due to pregnancy complications, which caused additional time pressure to finish my PhD.

The advice I wished I would have received earlier in my journey would have been that it is very important to create a healthy work-life balance from the beginning. Burnout is real, and the competitive work environment in academia is tough. There is simply nothing more important than your physical and mental health.

Anna Schueth

Post-doctoral Researcher, Maastricht University
Born in Germany / Resides in the Netherlands
Educational Background: Diploma in Biology, Georg-August University, Goettingen, Germany; PhD, Maastricht University, Maastricht, the Netherlands
“Never hold back on an idea. Big or small, any contribution to science and technology can lead to great things.”

Anna Sansan Wang, Senior Product Marketing Manager at MKS

sales@newport.com • www.newport.com
Believe in the power of self-confidence.

No one on this earth is born intelligent or great. We only gain knowledge when we ask questions and clear our doubts. If you are putting hard work, perseverance, and sincerity into your work, no one can stop you. If anyone is bullying or criticizing you, take the criticism gracefully.

I am a doctoral student working in the futuristic and exciting domain of photonics. I am focused on developing integrated pointed probes in optical fibers that are easy to fabricate as well as efficient to work with. The probes are cavities which can hold microresonators to work as sensors. The work is challenging: light always fascinates me because of its mysterious and surprising nature. Though the results after experimenting are not always in favor, part of my job is to keep trying. I believe research is not limited to dedicated office hours; instead, a researcher is always on duty—whether that means keeping oneself up-to-date on the work that is being carried out, or documenting the results.

If I had to identify a person who inspired me to choose a career in science, I see my grade-school science teacher, Mrs. Rajdeep Gautam. It was because of her that I developed my zeal to study science and pursue a doctorate. I must also mention my PhD mentor, Dr. Samir Mondal, who inspires me to be a better researcher every day. Obtaining a PhD was my decision, but I am pursuing it because of his guidance and faith in me. He has taught me valuable lessons like patience, optimism, the importance of focused goals, and, most importantly, honesty towards work. I can’t forget to mention my family who has not only nurtured me with love but has also taught me the importance of scientific temper in life. Due to such mentors, I have become a better version of myself today.

The biggest challenge I have faced in life and career is my introverted nature. I was bullied in my school days which made me a less confident and introverted person. I was always hesitant to speak to a new person and had so many fears of judgement. This further worsened the situation of not getting the right guidance when I started working on my PhD in photonics. But I learned to speak up about my ideas and doubts with fellow mates and mentors. Every person who has either criticized me or appreciated me made me a better person and has made this journey beautiful.

Jasleen Kaur
PhD Student, Academy of Scientific and Innovative Research (AcSIR), Central Scientific Instruments Organisation (CSIR), India
Born in India / Resides in India
Educational Background: BS in Science, MS in Physics
Do what you love, and love what you do.

Life is short, so follow your heart—at the end of the day, your life and career are your choice and responsibility. Choose an environment that will nourish your growth. Find where you will be happy day after day—and go there!

My aunt took me to her laboratory when I was four. I spent time at her workplace doing little experiments like mixing water with food coloring in test tubes. I was fascinated by the sights and sounds of the lab, and by the scientists. After that, I drew myself as a scientist in a laboratory every day in preschool. I was convinced that the only thing I wanted to do, ever, was to be a scientist. Little did I know at the time how lucky I was to have discovered my lifelong passion for research.

Today, in my postdoctoral training at MIT, I lead a project to develop a new type of microscope: a microscope on a chip. I model the microscope with my advisor and labmates; the design goes to a foundry which fabricates it; and, after a few months, the foundry sends us our chip to test. We hope to use this microscope to diagnose diseases: its small size and low cost allow it to be used in more settings than a traditional microscope.

My biggest obstacle came when I was entering the last year of my PhD and needed to test my imaging system on patients in an institutional review board (IRB)-approved study. We were in COVID-19 lockdown, so I had to wait until our university’s hospital opened for research. I rode my bike to the hospital every day, afraid that New York City might go back into lockdown. I originally promised my thesis committee I would image 25 patients; with the help of our clinical team, I imaged 100 patients. Laser-like focus and persistence were my best friends through that time.

I wish someone had encouraged me to investigate all aspects of medical-device adoption for clinical use. There is a lot to learn besides the science: How do new medical devices get approved? Who brings these innovations to market? Exploring the full scope of translation at an earlier stage would’ve given me more insights.

**Diana Mojahed**  
Postdoctoral Associate, Massachusetts Institute of Technology (MIT), Department of Materials Science & Engineering, United States  
Born in United States / Resides in United States  
Educational Background: BS, Biology and Physics, Tufts University, United States; MS, Biomedical Engineering, Columbia University, United States; PhD, Biomedical Engineering, Columbia University, United States
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Dream big.

Do whatever you can to fulfill your dreams. Do not limit yourself when it comes to achieving your goals. And as Drake says, “Smile and let everyone know that today, you are a lot stronger than you were yesterday.”

My interest in engineering and science dates back to my childhood. I have always excelled in sciences and received numerous science awards in junior high school. My main fascination with science was tied to my curiosity about how things work. I was keen to see the facts, especially about instruments. The person who inspired me to choose science as a career is my father—he is a doctor, and he motivates me to understand the reason behind any incident. I completed my degree in electronics and earned my PhD by applying silicon photonics in biosensing applications to help in the early and accurate detection of diseases, with my PhD titled “Modelling and design of silicon optical waveguides for biosensor applications.”

I have been working as a researcher in silicon photonics and their applications in biosensing for the last five or so years. Previously, I worked as an assistant professor in electronics and communication engineering. I joined as an assistant professor under the National Implementation Project Unit (NPIU) to teach the technical undergraduate students in remote and rural areas of India.

I have faced many obstacles during my career, mainly from society. Luckily, my family members—especially my parents—are very supportive. I overcame those barriers because of my strong determination toward my goals and the support of my family.

Extracurricular activities have helped me keep an open mind and gain valuable experiences. My abilities in terms of organizing, communication skills, and working in a team, have been strengthened through my role as a volunteer for conferences and webinars at my workplaces. I feel enjoyment by participating in sports: I have taken part in many sports competitions and won several awards. I have also earned a blue belt in karate. I value these activities as they allow me to realize the importance of working in a team, being a good leader, and having self-confidence.

Rukmani Singh
PhD candidate in Department of Electronics Engineering, Indian Institute of Technology (ISM) and faculty in Department of Electronics and Communication Engineering, Madan Mohan Malviya University of Technology
Born in India / Resides in India
Educational Background: B.Tech in Electronics and Communication Engineering, Sri Ramswaroop Memorial College of Engineering and Management, Lucknow, India; M.Tech in Electronics and Communication Engineering and PhD in Electronics Engineering, Indian Institute of Technology (ISM), Dhanbad, India
There are a lot of interesting things to learn, know, and do in STEM.

Before being involved in these fields, make sure that you have an interest in what you are going to do. It is extremely important to follow your interests if you want to stay in an area for 30, 40, or even more years. If you are not sure if your passion is in what you are going to do, then trying and practicing is also a good way to find where your true talents and interests lie.

I studied mechanical engineering by coincidence for my bachelor’s degree. Nevertheless, studying subjects like mechanical principles, mechanical design, and electromechanical drive control was very interesting to me. During my Master of Science studies, I got the chance to see a laser in the lab and learn how it works, as well as how one can produce microstructures on an optical fiber using a femtosecond laser. This was truly amazing and attracted my curiosity. Therefore, I decided to start my academic research in optical manufacturing.

I currently do research in optical manufacturing, optical metrology, and optical design. I also supervise graduate students in my group. I give a lecture every semester, and am responsible for managing optical nanofabrication laboratories.

The biggest obstacles that I have faced in my career are the difficulties I encountered in advancing my research in optics, which was more physics-oriented and required a knowledge base that I lacked. As my background was mechanical engineering, the courses I took were mainly related to traditional mechanical engineering. To overcome these difficulties, I started learning by myself—for example, reading topic-related books and attending corresponding lectures to gain knowledge in the subject as much as possible. On the other hand, I also asked for help from colleagues already working in optics. They were a big help whenever I had problems understanding any information or principles, and helped me troubleshoot the problems I encountered.

Looking back at my educational journey, I wish someone would’ve told me to do something that sparks my interests and passions sooner. It’s important to think about what you want and plan your career path (or personal development) in advance, in order to be a person prepared for the future.

Lei Zheng
Postdoctoral Researcher, Leibniz University Hannover, Hannover Center for Optical Technologies
Born in China / Resides in Germany
Educational Background: BS, MS, and PhD in Mechanical Engineering
Have fun and love what you do!

Take the time to figure out what you really want to do, even if that means taking detours.

If you're not sure you can do something, try anyway. Never believe those who tell you that you are not good enough. Fight for your interests, and if necessary, find others to fight with you!

Make mistakes: it may feel humiliating in the moment, but most likely your mistakes won't kill you, and you'll develop a resilience that will serve you throughout your life.

Physics and mathematics were always my favorite subjects in school. Since my parents’ house is close to a very good university with a renowned department of physics and mathematics, I decided to study physics there. From the day I arrived, a whole new world opened up to me, awakening an urge to understand how things work and to use physics and mathematics to answer unsolved questions. I decided then that I wanted to do this for the rest of my life, and that hasn’t changed.

A university career as a physics professor was almost impossible for a woman in Germany at the time of my doctorate, and is probably still not easy to achieve. I decided to move to the US, work as a postdoc in scientific research, and pursue a scientific career there. In the process, however, I also came in contact with research and development in industry. After two years, I realized that I wanted to solve problems in “real” life and see how people used my developments. And so I moved into industry and took a job with a company that developed measuring equipment for the optical industry.

My current roles of head of engineering and member of the management board require me to use my skills beyond physics and math. I hold key conversations about development ideas, assemble ideal teams, ensure that proper resources are available, develop and implement strategy, monitor finances, and address unexpected challenges such as those presented by the COVID-19 pandemic. I must look beyond the science to the bigger picture of projects, developments, and the larger organization.

Iris Erichsen
Head of Engineering and Special Projects and Member of Management Board, TRIOPTICS GmbH, Germany
Born in Germany / Resides in Germany
Educational Background: Diploma in Physics, PhD in Natural Sciences
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Mentorship is really important.

Mentorship has been really important at almost every stage of my career, from my undergraduate thesis advisor to my PhD advisor and my managers at Meta. None of those mentors were women, though they were all strong allies and champions of diversity and inclusion. We should all work towards a common goal of increasing the representation of women and other underrepresented groups in the field of optics. If we take a chance on ourselves and practice allyship, we can work together to increase this representation. I am thrilled to partner with Meta and SPIE to support valuable mentorship programming that reduces barriers and bridges gaps to collectively achieve this goal.

I am very fortunate to have several family members, male and female, who pursued careers in STEM fields. An undergraduate major in physics and a PhD in optical sciences seemed like a very normal thing to do—I never felt that my major or career path were in any way special or abnormal.

I landed in the field of optics completely by accident! For my undergraduate thesis, I built a diode laser, which helped me land a junior level position at Spectra-Physics Lasers after graduation. I realized pretty quickly that I needed to improve my technical depth, so I applied to the Optical Sciences program at the University of Arizona. Soon after starting there, I joined the Polarization Lab as a researcher. I began as a master’s student, but I was so fascinated by polarization optics that I quickly converted to a PhD track.

When I first joined Meta, I was hired as an optical systems engineer by an amazing manager who embedded me with his team in order to support a technology transfer effort from research to product. That was one of the most rewarding and fun experiences of my career.

Since then, I have built a small, specialized team that focuses on the design and simulation of polarization-based optical systems for virtual reality products, and I am the technical lead manager for polarization design. I feel so privileged to have the opportunity to work on such interesting technical problems with such exceptional colleagues, and to support my amazing team members.

Navigating motherhood while continuing to lean into my career and maintain a sense of self is probably my biggest challenge. I have two wonderful young children, so every minute of the workday has to be as efficient as possible. I’ve learned to ruthlessly prioritize, and that it’s ok not to open up my computer for two (or more) hours every evening. It’s really easy to push ourselves too hard when we care so much about what we do.

Hannah Noble
Technical Lead Manager, Polarization Design, Meta
Born in United States / Resides in United States
Educational Background: BA in Physics, Reed College; PhD in Optical Sciences, University of Arizona, United States
Learn to have choice in your life.

If you have enough knowledge and possibility to have a choice, choose work that you will love. In the everyday rush, always find the time to stop, grab a coffee or tea, and think about whether you are going in good direction; don’t run blind. Something that may look like a unique possibility may not be as good as you think. Take a chance to try and, if you feel that it is “it,” go ahead; but if you don’t feel it, just step back and choose another possibility.

And to all women who already know their paths, I would like to quote the words of Marie Angelique Arnauld: “Perfection consists not in doing extraordinary things, but in doing ordinary things extraordinarily well.” Remember to like what you do at work—and after work as well.

I’ve always had a curiosity of how the world works. I’ve also always wanted to be independent, and to choose what I will do. I liked physics from the very beginning in primary school because it was well-defined and easy to follow; the rules were the rules. I had wonderful teachers, and no doubts about continuing with applied physics.

After completing both undergraduate and PhD studies, my adventure with science and physics continues today. I currently lead a research group; lead the Laboratory of Optical Information Processing; teach students; make experiments and plan scientific development; and serve as vice dean of our faculty. This means that I need to coordinate my work in between scientific research, didactics, and organizational activities, which is possible only with a good team of co-workers.

The biggest challenge in continuing my career was to believe that I can be independent and can make decisions about my research and scientific path. It was also related to the responsibility I have for overseeing my research, my team, and my students. When I realized that I could make decisions on my own, I made a huge step forward in my head. I had to start believing in me.

**Agnieszka Siemion**
Assistant Professor with the Optical Information Processing Laboratory, Faculty of Physics; Head of Laboratory of Optical Information Processing; Vice-Dean for Students Affairs, Warsaw University of Technology, Poland
Born in Poland / Resides in Poland
Educational Background: MS in optoelectronics and PhD in physical sciences, Warsaw University of Technology, Poland
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Nicole (she/her), CNC Laser Team Leader at Sydor Optics

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Always be yourself!
Always allow yourself to grow as opportunities arise; be open to various positions; and be willing to face new challenges. Ask questions and participate in different activities. The worst that may happen is that you are told “No.” If that happens, it just means that there is something better for you out there.

My father is my biggest inspiration. He is a physicist who worked as a technician. He always taught my siblings and me that no work is big or small; each job has an important role in the flow and success of any product line or industry.

I work in the research and development (R&D) department for the Excelitas Single Photon Counting Module (SPCM) product line. We work closely with customers to meet their individual requirements. We are also always looking to improve the product line, whether it be test benches, electronic improvements, or performance improvements.

I consider obstacles or challenges as learning opportunities. Working for the Excelitas SPCM product line made me realize that there is so much more than what can work theoretically. There are many factors that must be taken into account, but it is still possible to deliver a product that is close to perfection.

Do not underestimate yourself. Trust yourself in every project you start or undertake. There will be times when you may make errors and even fail at certain tasks. However, you will likely improve over time and gain knowledge and confidence by continuing to try.

Amrita Darji
Member of Technical Staff R&D, Excelitas Technologies
Born in Canada / Resides in Canada
Educational Background: BS in Electrical Engineering, Concordia University, Montreal, Canada
Learn good time-management skills for better multitasking.
Set your targets and plan to achieve them. The road towards your goals will always be wavy, shaky, and bouncy. Try to remain focused, positive, and patient. Always be the best version of yourself in contributing to society and the world. You are a role model for other girls who want careers in STEM.

I have always been interested in performing tasks through devices to save time. My curiosity encouraged me to pursue a career in science and technology. Electrical engineering and optics equipped me to use light for building optical devices, which help solve various healthcare, agriculture, and food industry problems.

I am a PhD student and researcher in photonics and optics. I work on optical sensors with applications in the agriculture and healthcare sectors. I am also a faculty member in the electrical engineering department of a public-sector women’s university, where I teach optics and supervise the graduate and undergraduate students’ research projects.

As a teacher I feel a great responsibility to educate and inspire through my professional career and achievements. I also encourage and guide my students to pursue their dreams of being female scientists and engineers, to break the cultural norms of disparity in career options for girls.

The first obstacle I faced was choosing engineering as my career. I belong to a culture in which it’s much more acceptable for women to be medical doctors than engineers. But my parents, mainly my father, supported me in studying electrical engineering. The other obstacle I faced was stress arising from working in multiple domains simultaneously—research, career, personal life—especially when I lost my mother in the third year of my PhD. Being a married woman with two daughters, managing my research and family simultaneously was challenging. But I learned to be emotionally stable for the things I don’t have, and fulfilled my responsibilities with good time-management.

For women, a career in engineering and technology is challenging, even in today’s modern world. But the kind of independence of performing research tasks and making innovative devices that you have in STEM can be found in no other field.

**Faiza Iftikhar**
PhD Student, Department of Electrical Engineering, Syed Babar Ali School of Science and Engineering, Lahore University of Management Sciences, Pakistan
Born in Pakistan / Lives in Pakistan
Educational Background: BS and MS in Electrical Engineering, University of Engineering and Technology (UET), Lahore, Pakistan
I firmly believe that interest is the foundation of learning, and learning is essential to success.

So, congratulations! With your passion for STEM, you’ve got a great start! Let’s focus on learning. Learn new skills, learn from successes and failures, learn from people around you, and learn about yourself—a career in STEM is an exciting journey that’s full of possibilities and opportunities. Keep learning and dream big!

It feels natural for me to follow my parents’ footsteps and have a career in the field of science and technology. My childhood excitement for DIY projects with my dad seems to be the early precursor to it. My inspiration started in my family, and grows with each experience and with the incredible people I’ve gotten to know throughout my education and career.

My primary responsibility is to lead my team to design and develop laser and optical solutions for our laser processing systems, and to successfully implement and transition the solutions to manufacturing environments. I work with our product team and advanced research team on near-term and long-term product roadmaps and technology development.

My biggest challenges have come with transitions such as my transition from academia to industry. I was aware of the necessary mindset shift, but I learned to navigate industry culture as I went along. My second major transition was from engineer to a management role. It was a process to adjust and shift my focus from technical details to team development and growth. I enjoyed the challenge and find it immensely rewarding to understand the true meaning of leadership.

Helen Li
Director of Engineering, Laser & Optics, MKS Instruments, Inc.
Born in China / Resides in United States
Educational Background: PhD in Optics, University of Michigan, United States
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Perfectionism can be limiting.

A lot of us strive for perfection as we push forward in our schooling and careers. For me, I was never happy with how I scored on standardized tests or that I didn’t graduate with a perfect GPA. I thought it was the end of my career before it even began. I think it is easy to dwell on these situations or get caught in a negative feedback loop about how you wish you’d done something differently. You cannot fix the past; it is better to figure out what is a mistake, then learn from them and move forward. If you can learn to laugh at yourself a bit and not be so hard on yourself for something that is innately human, everything is much easier.

My parents supported my curiosity and drive to learn everything I could about the world around me. My middle-school and high-school science teachers picked up where my parents left off. They were all amazing women who helped support my interests, including after-school chemistry experiments or presentation preparations for science-fair projects.

My responsibilities vary, but they have one thing in common: Something is not working the way we want it to, and we need to fix it and/or improve it. I am constantly interfacing with a broader team of experts, and together we evaluate new materials or processes for the next generation of semiconductor technology. Some days I am running experiments; some days I am evaluating data; and some days I am training other scientists and engineers.

My biggest obstacle was graduate school. It’s a daunting commitment to spend an additional five years of your life in school, especially in your mid-20s, learning to become an expert in your field of study. There was a lot of self-doubt, stress, and questioning as I completed my work. There always seemed to be an easier path if I walked away. The most difficult part was working through these personal challenges and continuing the journey. If I had chosen a different path, I would not have gained the confidence I have today.

When looking for career advice and support, there are a lot of negative opinions disguised as advice, and it can be difficult to figure out a way forward. You should be in the driver’s seat when it comes to your career, not a passenger. You know best what feels right and what is the wrong move for you. Don’t feel obligated to follow advice that clashes with your goals because it came from a well-known professor, scientist/engineer, or entrepreneur. Instead, seek out mentors who support you—people who want to work with you—so you can achieve your goals.

Jennifer Church
Advisory Engineer, International Business Machines (IBM)
Born in United States / Resides in United States
Educational Background: BS in Chemistry, University of Massachusetts Amherst; PhD in Chemistry, Rensselaer Polytechnic Institute, United States
Focus on what you want to work on every day, what you would like to develop in your work, and what challenges you want to overcome.

And remember obstacles are only there to overcome—never to stop us.

My first and foremost source of inspiration to work in engineering has undoubtedly been my father. He is a very resolute person who always manages to solve problems or repair things that have stopped working. This awakened my desire to learn more about electricity, mechanics, and engineering, and encouraged me to learn how to look for solutions and improvements to day-to-day problems.

My work consists mainly of two areas: on the one hand, I teach subjects related to photonics and electronics. On the other hand, I am involved in the research of novel fiber optic lasers and optical systems for the measurement of different parameters, such as temperature, strain, etc.

The biggest obstacles I have encountered in my work have been the lack of job stabilization and the insecurity within the research world. I have spent more than 10 years of my working life with different types of temporary contracts, which created a constant situation of uncertainty.

The main advice I would have liked to have received when I started my engineering studies was to ignore people who told me that I would not be able to achieve my goals.

**Rosa Ana Perez-Herrera**
Associate Professor, Universidad Pública de Navarra [Public University of Navarra]
Born in Spain / Resides in Spain
Educational Background: PhD in Telecommunication Engineering, Universidad Pública de Navarra [Public University of Navarra], Spain
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In primary and high school, I always wanted to know much more about everything I heard in the lessons. This curiosity led me to a scientific career with an orientation in engineering. I had also an inspiring female teacher who amplified my curiosity even more.

I lead a large research group focused on applied science and technological developments in the field of photonic nanobiosensors. The application of our technology in real clinical diagnostic and environmental controls is one of my main objectives. As group leader, I select the research topics, look for the financial support (this is the hardest part!), establish collaborations with hospitals and industries, supervise PhD and post-doctoral students, and pursue other related activities. I would like to highlight that nearly 85% of my group are women, as I firmly support female talent.

The main obstacle I faced in reaching this point was starting an independent scientific career from scratch without financial help, without mentoring or assigned staff. The fact that I was a woman didn’t help, since many colleagues tried to make it so that I’d be directed or supervised by a male scientist, as if I weren’t capable of doing it myself! It has been a very difficult road, but with vision, perseverance, determination, and a l-o-o-o-o-o-t of hard work, I was able to establish myself.

In my book A Female Scientist Jumping Fences (Una Científica Saltando Vallas), I describe many of the obstacles I have faced. Most of them (smaller and bigger) can be summarized in two words: gender bias. If you are a woman and you start to stand out, obstacles appear everywhere. But at the same time, the obstacles and challenges made me react and become more aware of the value of the female scientist and the rights that we have. Only we, women and scientists, can change the course of the standards established by a patriarchal society.

Laura M. Lechuga
Full Professor, Catalan Institute of Nanoscience and Nanotechnology (ICN2) - Nanobiosensor and Bioanalytical Applications Group, Spanish National Research Council (CSIC)
Born in Spain / Resides in Spain
Educational Background: BS, MS in Chemistry, University of Cádiz, Spain; PhD in Chemistry, University Complutense of Madrid, Spain
YOU CAN achieve your dreams! And you are TALENTED!

When I was about 15, I had a serious illness that took me out of education, and most of my teachers lost faith in me and my ability.

My headteacher even told me I would never go to university. It was hard to lose the support of those around me, so I worked hard on making sure I could believe in myself and my ability. I ended up in one of the best universities in the world. One of the major lessons I learned from a young age is that your belief in yourself and your abilities is so important: you might have people who don’t believe in you, but that doesn’t mean you can’t achieve your dreams.

My physics teacher supported me as the only woman in the class and took us on a trip to the Rutherford Appleton Laboratory where I fell in love with medical physics. I instantly knew that it was the subject for me, a mix of three things I loved: helping others, math, and physics! If I hadn’t had such a supportive teacher, I don’t think I would have chosen the subject.

I work with high-power lasers to try and recreate the conditions found in space to help us learn more about the interiors of planets like Uranus and Neptune that can help us with fusion studies—getting clean, abundant energy!

I describe myself as a minority in a minority, or #MinoritySquared, since I am not only a woman but a woman of color. On top of that, I am very feminine and typically I’m the only one in the room that looks like me, so it can be hard to have role models in my field. But I have to stay true to myself. Sometimes this can be hard, but I remember that I might be that role model to someone else, so this keeps me going. I believe that being yourself helps increase the quality of your work too!

Follow what you’re passionate about, regardless of what the stereotypes may be! Find those around you who will support you and your pursuit of your dreams.

Meriame Berboucha
PhD Student, Plasma Physics, SLAC National Accelerator Laboratory, and Imperial College London, United Kingdom
Born in United Kingdom (nationality: British/Algerian) / Resides in United States
Educational Background: MRes and BSc, Imperial College London, United Kingdom
A STEM-based career is extremely rewarding.
You will not only grow in character but also contribute globally to your country and society’s well-being. Embrace STEM and discover how you can contribute to the world’s peace and happiness. If you are already in a STEM-based career, remember to motivate other women to join you as well, as we reap what we sow.

My parents were my early inspiration to become involved in a STEM-based career. My father taught mathematics, and Mom was a mathematics teacher who later became a bank officer. My school teachers and university lecturers further instilled the love of science and engineering in me. They molded me to pursue excellence in everything I delved into and taught me that the sky is the limit for achieving my dreams. The euphoria of solving a mathematics equation and/or a science problem continues to entice me still today.

I work as a senior research fellow in plasmonics and optical biosensing. My main responsibilities are teaching postgraduate courses; supervising Masters/PhD students; securing research grants; publishing research journals/patents; delivering talks in conferences; and providing services to my university/society.

My research is related to the interaction of photons and electrons for optoelectronic effects. This includes solar cells, optoelectronic devices, and biomedical sensors.

One of my biggest challenges was when I was given the task of coordinating transdisciplinary research involving engineering and medical/health sciences at my university. I had to work with scientists outside my area of expertise. We had many meetings to understand the technical terms of our individual fields in order to find a transdisciplinary engineering solution for the medical/health sector. Another challenge is finding the correct balance between family and career. In this aspect, time management and the support of friends and family are crucial.

When I first started out, I wish someone had told me that the most important criterion for success is to believe in myself, in whatever I do. I welcome successes and failures equally, as both experiences build and mold me to be stronger in character.

**P. Susthitha Menon**
Associate Professor (Senior Research Fellow), Universiti Kebangsaan Malaysia (UKM) [The National University of Malaysia], Nanophotonics and Quantum Electronics Laboratory (NQEL), Institute of Microengineering and Nanoelectronics (IMEN)
Born in Malaysia / Resides in Malaysia
Educational Background: BSc and MSc in Electrical, Electronics and Systems Engineering; PhD in Microengineering and Nanoelectronics (Optoelectronics), Universiti Kebangsaan Malaysia (UKM)
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Maria Theodoridou
Ultrafast & Laser Reference
Production Physicist at TOPTICA
Don’t be afraid to pursue what you’re interested in without having a plan!

Not every choice has to be life-determining. We put a lot of pressure on ourselves to make the “right” decision, but it’s also okay to just go for it. You can always change your mind. A lot of the most impactful decisions I’ve made in my life have led me to situations I couldn’t have predicted even if I’d wanted to! Trust yourself and your intuition and see where it takes you.

Science is sometimes seen as a rigid or even dry subject, but this couldn’t be further from the truth! Being a scientist requires creativity and constantly challenging what you think you know.

I’m a very curious person, and what I love about experimental sciences is that you get to work on answering questions that haven’t been asked before, which leads you to learn about things you never expected.

I work in an optics laboratory using lasers and magnets to study the quantum-mechanical properties of new materials and how we might be able to control these using light. My day-to-day routine involves running experiments to test our understanding of these materials and analyzing and discussing data to see what we want to try next.

Research involves constantly being faced with failures—when you’re working on something that hasn’t been done before, you have to try a lot of things before you get the outcome you want. This can get really frustrating, and it’s easy to take it personally when things don’t work. But every time that happens, you still learn something that leads you closer to figuring it out. Earning a PhD is about learning to face the unknown.

One thing that I wish I had done sooner in my career is think about what I need from my daily life. Is it having a slow start in the morning before going to the lab, or do I prefer taking a long lunch break? Do I need to set up a to-do list for the week or have a more detailed daily plan? What activities outside of work are non-negotiable for my wellbeing? Everyone is different, and figuring out what works for you is key to creating a lifestyle you enjoy. Burnout and stress cycles can only get you so far; unsustainable working habits are just not worth it in the long run.

Simone Eizagirre Barker
PhD candidate in Experimental Physics (graduate student), University of Cambridge, Cavendish Laboratory/Department of Physics
Born in Spain / Resides in United Kingdom
Educational Background: MRes (Master of Research) in Nanoscience and Nanotechnology, University of Cambridge; Master of Chemical Physics, University of Edinburgh, United Kingdom
Pursue your dreams; do what you really like and enjoy doing it.

With constancy of purpose and self-confidence, you will be able to achieve all your goals. Also, it is very important to choose a nice and stimulating work environment and to create a good network of colleagues.

As a child, I wanted to become a teacher. I liked learning new things and explaining them using the blackboard, and at the same time I was waking my interest in science, especially for physical phenomena. During secondary school, I decided that I wanted to study physics. Since then, I have enjoyed the continuous learning and experiences this decision has offered me.

I am a professor in the physics department of the Universitat Autònoma de Barcelona, and my responsibilities are divided into three major activities: research, teaching, and management. I lead a research group working mainly on the study of the interaction between light and matter. We investigate in the fields of photonics and atomtronics, the design of efficient devices for light and atoms in quantum simulations, i.e., the use of controllable quantum systems to mimic condensed matter systems and engineer new ones.

I also teach in the physics and nanoscience and nanotechnology undergraduate programs and in two masters programs (photronics, and quantum science and technology), and I had management positions as coordinator of studies and as deputy dean. In addition, I am involved in outreach activities. I really enjoy the close contact with young students at different levels: primary and secondary school students in outreach activities, undergraduate and master’s students in my teaching, and PhD students doing research.

A scientific career is full of challenges, and this is what makes it so attractive and stimulating. The job is really demanding but, at the same time, very rewarding and addictive. Overcoming all these challenges allows for growth at both professional and personal levels.

I wish someone had advised me to trust in new and ground-breaking ideas, not to be afraid to carry out decisions, and not to be afraid of saying something wrong. Science requires of a lot of trial and error; it is a learning process in which all ideas are welcome and essential to making progress.

Verònica Ahufinger
Associate Professor, Universitat Autònoma de Barcelona, Physics Department
Born in Spain / Resides in Spain
Educational Background: BS in Physics, PhD in Physics, Universitat Autònoma de Barcelona, Spain
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Believe in your ability, and don’t be afraid to speak out when you encounter bias in the workplace.

Try to grow an independent personality as early as possible since nobody is going to hold your hand throughout your life. Overcome emotions and learn to balance between rationality and perception.

Stop overthinking and gain practical experience from different projects. Don’t wait for a degree or a job to describe a path for you. Instead, be ready to tailor yourself to a specific discipline.

STEM is a rapidly evolving field, and you should get prepared to commit yourself to lifelong learning. It’s vital to keep a good attitude.

Be confident in communication and try to create a network of peers and mentors in your field. Try to join professional STEM organizations, attend various STEM workshops, network with others, and expose yourself to new research opportunities.

I was born in an engineering family. When I was little, my father often took me to the science museum, where I was deeply attracted to the mysteries of science. In my teens, my physics teacher completely changed the way I looked at and thought about the world. My curiosity has always motivated my passion for science.

As a graduate student, I have been working on computational microscopy and translational biomedical imaging techniques that can aid intraoperative diagnosis of positive surgical margins during cancer surgeries. We aim to reduce patients’ suffering from second surgeries and improve the current standard of care in surgical pathology.

The biggest challenge I have faced in my career has been a lack of self-confidence. In my first 20 years, I was taught to behave like a perfect girl who has to obtain greater achievements than her peers. However, this changed at the beginning of my graduate studies. I couldn’t get an ‘A’ grade in my coursework, and I often failed in experiments those days. As a consequence, I got stuck in self-accusation and self-doubt for a long time, which significantly affected my mood and motivation.

After seeking help from my supervisor and senior labmates, I accepted that uncertainty and failure are normal states in research life, even for experienced researchers. Since then, I have re-recognized myself and accepted my imperfection. I’ve established goals and plans, learned from others, and gained experiences from each failure.

Yan Zhang
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Embrace who you are.

For some time to come, women in STEM will still be the non-majority. Being different from others is a powerful tool for getting noticed. However, you have to be proud of this difference for it to work. You must not hide; you must wear your difference proudly, no matter what it is.

One of my physics teachers helped me discover the power of physics. During our physics labs, he made us do unorthodox lab experiments. This professor loved hands-on experiments that made us experience the rules, not just learn them. I liked the way we could experience the problem, not just memorize the theory for an exam. This new teaching method really resonated with me and it’s because of these lab experiments that I did see myself doing physics as a career.

I always knew I wanted to have a position of responsibility in a photonics company. I currently have two focus areas: business development and sales. My business development responsibilities range from strategic planning to partnership development, to structuring innovation in my company. I like to start a day and not know how it will end. I thrive in the chaos. The goal of all these tasks is to make sure my company has a good plan to achieve financial success. Another portion of my job is to oversee sales and supervise the sales team. I like to teach what I have learned practically to the team. After each quarter, we have to start from zero sales again; it’s a wheel that is always turning.

The path to obtaining these responsibilities has not always been clear to me. I started in marketing and moved to sales and business development. I had to always be on the lookout for opportunities that were sometimes hidden, and sometimes create them myself. I had to find allies who helped me prove my strengths and worth to obtain a position with more opportunities. Finding my own path to obtain the position that I wanted was the biggest obstacle for me.

Career paths are multiple and difficult to know when you start your career. Get involved as much as possible to gain the maximum experience during your studies, to help you experience what you like and what you don’t like. Experiences will help you believe in yourself and find your true self. Be proud of yourself.

Marie-Christine Ferland
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