

**SPIE.**  
**Women in**  
**OPTICS**  
**2024**





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Together we are fueled by curiosity and a desire to make a difference in the world, and our 2024 group of women in optics — now featured in a brand-new notebook format — is no different. We have followed diverse pathways to contribute to science and society in meaningful ways.

Each individual story is unique, but there are strong themes that bind these powerful experiences together. These engineers, researchers, and industry leaders share personal tales of finding joy and success in their work, addressing self doubt, requesting assistance when needed, and learning from failure along the way.

Most importantly, they emphasize the role we all play in furthering diversity, equity, and inclusion in STEM. These reflections remind us that we can all serve as supporters, allies, advocates, and mentors to others embarking on similar journeys.

As you enjoy these inspiring autobiographies and the wonderfully designed pages of this year's notebook, please ask yourself: what can I do to empower those who will follow in these women's footsteps?

**Olivia Fehlberg**

Design Engineer, Edmund Optics, Inc.  
SPIE Senior Member  
Chair, SPIE Early Career and Student Sub-Committee

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80 YEARS OF OPTICS

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 THORLABS

 TOPTICA

# January

## **SPIE.** PHOTONICS WEST

27 January–1 February 2024  
*BiOS Expo: 27–28 January*  
*Photonics West*  
*Exhibit: 30–1 February*  
 San Francisco, California, USA

## **SPIE.AR|VR|MR**

29 January–31 January 2024  
*Exhibit: 30–31 January*  
 San Francisco, California, USA

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# February

## **SPIE.** MEDICAL IMAGING

18–22 February 2024  
 San Diego, California, USA

## **SPIE.** ADVANCED LITHOGRAPHY+ PATTERNING

25–29 February 2024  
*Exhibit: 27–28 February*  
 San Jose, California, USA

11 FEBRUARY: INTERNATIONAL DAY OF WOMEN AND GIRLS IN SCIENCE

24 FEBRUARY: INTRODUCE A GIRL TO ENGINEERING DAY

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# March

## **SPIE.** SMART STRUCTURES+ NONDESTRUCTIVE EVALUATION

24–28 March 2024  
 Long Beach, California, USA

WOMEN'S HISTORY MONTH

8 MARCH: INTERNATIONAL WOMEN'S DAY

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## April

**SPIE.** PHOTONICS EUROPE

7-11 April 2024  
Exhibit: 9-10 April  
Strasbourg, France

**SPIE.** OPTICAL SYSTEMS DESIGN

7-11 April 2024  
Exhibit: 9-10 April  
Strasbourg, France

**SPIE.** DEFENSE+ COMMERCIAL SENSING

21-25 April 2024  
Exhibit: 23-25 April  
National Harbor, Maryland, USA

**SPIE.** FUTURE SENSING TECHNOLOGIES

23-25 April 2024  
Tokyo, Japan

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## May



International Day of Light

16 May

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## June

**SPIE.** ASTRONOMICAL TELESCOPES+ INSTRUMENTATION

15-20 June 2024  
Exhibit: 17-19 June  
Yokohama, Japan

23 JUNE: INTERNATIONAL WOMEN IN ENGINEERING DAY

# July

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# August

**SPIE** OPTICS+  
PHOTONICS  
18–22 August 2024  
*Exhibit: 20–22 August*  
San Diego, California, USA

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# September

**SPIE** SENSORS+  
IMAGING  
16–19 September 2024  
*Exhibit: 18–19 September*  
Edinburgh, UK

**SPIE** LASER  
DAMAGE  
September 2024

**SPIE** PHOTOMASK  
TECHNOLOGY +  
EUV LITHOGRAPHY  
29 September–3 October 2024  
*Exhibit: 1–2 October*  
Monterey, California, USA

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# October

**SPIE. PHOTONICS**  
 cjs **ASIA**

October 2024  
 China

**SPIE. PHOTONEX**

30 October-1 November 2024

*Exhibit: 31 October-1*

*November*

Manchester, UK

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# November

**SPIE. ASIA-PACIFIC**  
**REMOTE SENSING**

November 2024

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# December



**“Believe me, there is no glass ceiling. If you are dedicated and take responsibility for what you do, you can achieve anything.”**

I come from an engineering family, so I grew up with a technical mindset. As my mother, Małgorzata Kujawińska, is a professor with great passion for photonics, she was my inspiration from the science side; from my father, I got business inspiration. The connection between those two worlds was the goal I had in mind all through my studies.

As an owner of a production company with a large budget and extensive reporting activities that sells 3D scanners worldwide, I have many duties. These range from day-to-day activities to establishing product-development strategies. I like the diversity of my tasks, as well as working with people who are passionate about 3D digitalization.

The fact that we at SMARTTECH3D have developed all our hardware and software in house and have wrapped it into a product that is successfully sold worldwide is the biggest reward for me. I am so proud of the team spirit of SMARTTECH3D, seeing that we can make the world better with our products, and that we are working in so many different applications around the world.

The biggest challenge for me is the time-sharing between my family and my career. I've learned that time is flexible, and that planning and choosing the right people to work with are key to helping you connect those two often-colliding worlds.

I wish that somebody would remind me to set my priorities well, and to be able to let go of the small things. After years of experience, I know that, overall, your small mistakes do not matter if you are heading in the right direction. I feel that listening to our intuition is what makes us women in optics more efficient and more satisfied with our work.

If you feel a career in STEM is your way, go for it. We definitely need more women here with positive energy and organizational skills.

**Anna Gębarska**

Managing Director, Owner, SMARTTECH3D

Born in Poland / Resides in Poland

Educational Background: MSc in Engineering, Faculty of Industrial and Mechanical Engineering, Warsaw University of Technology, Poland

**“Remember, as engineer-extraordinaire MacGyver said: ‘A paperclip can be a wondrous thing.’”**

I never set out to work in optics and materials science. I assumed, based on my obsession with *MacGyver*, a TV series I watched as a child, that I could become a rogue scientist who spent my time solving crimes and exposing conspiracies through my science knowledge, a stick of gum, and, yes, a paper clip. Since that job was unavailable, I was inspired by my family, professors, and friends to pursue my ever-evolving interests, as they grew from art and film into astronomy, and then to optics.

My current field of study is optical materials science. I investigate the processing and properties of novel, multi-component chalcogenide materials for optical-device applications. I joined the faculty at Ursinus College after completing my postdoctoral work at the University of Central Florida. I’m grateful to be supported by my mentors, and I’m inspired by working with undergraduates to explore new areas, such as bioactive glass, entrepreneurial studies, and educational outreach. Outreach is a foundational part of my research, and I have worked deliberately to embed mentorship and support for women and gender minorities in STEM into my work.

My greatest accomplishment has been the creation of a close team of collaborators. Even though we live far away from each other and specialize in different fields, we support each other in meaningful and substantial ways. I also take pride in the relationships that I have built with students and enjoy seeing them explore their own passions.

When you do research at a small college, you have limited time and resources. However, this can be a motivating factor in coming up with creative ways to solve problems applicable to major research questions.

Find the people who appreciate you for who you are. Give yourself permission to make space between you and the people who don’t. Your people should be the ones who will champion you through life. Never discount or diminish someone else’s experience or perspective, and don’t accept inappropriate behavior. Ever.

Find the things that make you happy and try your best to incorporate them in your everyday life — and into your work.

**Casey Schwarz**

Associate Professor of Physics, Physics & Astronomy, Ursinus College  
Born in United States / Resides in United States

Educational Background: BS in Physics with Minor in Astronomy, University of Central Florida;  
PhD in Physics, University of Central Florida, United States





**“Obstacles are made to be conquered, and opportunities are meant to be seized.”**

I have always had a passion for science, but it was watching movies like *Iron Man* and *The Hunger Games* during middle school that truly sparked my interest in optical engineering: I was inspired by the idea that anyone can become a superhero by pushing the limits of science and technology. While I may not have superpowers like Iron Man or Katniss Everdeen, the endless possibilities in the optical-engineering field fill me with wonder and excitement.

In my current role as an optical-design engineer and cross-functional team leader, I work with a group to design, build, and qualify complex metrology sensors for the semiconductor industry. This leadership role has allowed me to gain a holistic understanding of our product and the complexities of managing a diverse team.

Transitioning from an engineering role to a leadership role has been both an amazing opportunity and a challenging experience. It required me to learn new management skills and gain new perspectives about the engineering process. While I still perform technical tasks, my leadership role has pushed me to see the bigger picture and find new ways to motivate my team.

One of my proudest accomplishments was leading a project that faced multiple supply-chain issues. Despite the challenges, I fostered an environment of clear communication and transparency to minimize risks and meet our product plan. As a result, we were able to deliver our integrated product in record time.

When I was younger, I doubted myself; sometimes I hesitated to apply to certain opportunities or positions because I thought I was not smart enough or lacked the skills to withstand the challenges. This is the advice I wish I was given as I was starting: imposter syndrome is a real issue, but it's important not to let self-doubt hold you back from pursuing your goals and seizing new opportunities. You have the ability to achieve anything you set your mind to, so don't let fear of inadequacy stop you from reaching your full potential.

While it's true that STEM fields have been historically male dominated, we are fortunate to live in a world that is rapidly evolving toward greater diversity and gender equality in institutions and corporations. Although there may be skeptics and moments of self-doubt, remember that you can always seek support from a mentor or trusted advisor. And, most importantly, you should pay it forward and help others around you.

**Cherine Ghazouani**

Team Leader & Optical Design Engineer, ASML

Born in Tunisia / Resides in United States

Educational Background: BS in Laser and Optical Engineering, University of Rochester, United States



*OptoSigma's Christmas party at Disneyland/California adventure: Cindy-Gong Harris in front/center with (back row, left to right) Brad Kaup, Dan Denison, Laury Hoganson, and (middle row, left to right) Saravuth Lor, Scott Rudder, and Mao Phavantha.*

**“To succeed in your career, you need to be proactive and work collaboratively with your team.”**

After earning my BS degree from Purdue University, I joined SpectraCode, a company founded by Professors Ed Grand and Dor Ben-Amotz, who provided me with invaluable mentorship and instruction on the intricacies of testing, building, and miniaturizing Raman spectroscopy systems.

My current primary area of focus lies in spearheading Project Avatar, a novel marketing campaign featuring a STEM-based comic-book series that seeks to engage our customer base and promote STEM education. Additionally, I handle business development responsibilities.

I am particularly proud of earning my Executive MBA while juggling a full-time job as well as the responsibilities of being a wife and mother. It required a great deal of dedication, time management, and sacrifice, but I was able to successfully balance my personal and professional commitments to achieve my educational goals.

The most significant challenge I faced in my career was signing a non-compete agreement without seeking legal counsel first. This led to a nine-month legal battle, during which I worked with attorneys to negotiate a release from the agreement. Despite the lengthy process, I learned valuable lessons about the importance of seeking legal advice and carefully reviewing contracts before signing them.

Don't be afraid to voice your opinions and ideas, and don't let anyone undermine your contributions. Additionally, building a strong professional network is crucial for your current position as well as your prospects.

Within the technical community, there are diverse opportunities to contribute. Don't think that being less technically inclined means that there's no room for you in the science and engineering fields.

**Cindy Gong-Harris**

Director of Marketing and Business Development, OptoSigma  
Born in United States / Resides in United States

Educational Background: BS in Management and Information Systems, Executive Master of Business Administration, Purdue University, United States



Photo © Carsten Behler Photography

**“Follow what your instinct tells you about the subject and location of your next career move.”**

Early in my studies, I was inspired by optics and lasers: it was a topic where it was easy to identify links between theory and experiments. Therefore, during my preparatory studies in France, I was drawn to the Institut d’Optique for further studies.

I took several courses on lasers and had the opportunity to go to Coherent as an engineering intern working on ultrafast lasers. This is where I

discovered this particular field — and where I found my passion for it. Then, during my PhD at the Swiss Federal Institute of Technology (ETH Zurich), I discovered my passion for research. In all these steps, I was lucky to have inspiring mentors who gave me incredible support: Alan Fry and Bill Tulloch at Coherent, and Ursula Keller and Thomas Südmeyer at ETH Zurich. They shaped the path that led me to where I am today.

As a university professor, I lead a research group with scientists at different career levels, from student assistants and senior scientists, to postdoctoral and doctoral researchers. I am responsible for the research direction these scientists take, their supervision, and the acquisition of research funds to carry out our research. I am also responsible for giving lectures to undergraduate and graduate students. In addition, I am involved in many decision-making bodies and panels for research.

I consider my biggest accomplishment to be the graduation of my first PhD student, who continues to have a stellar career in industry.

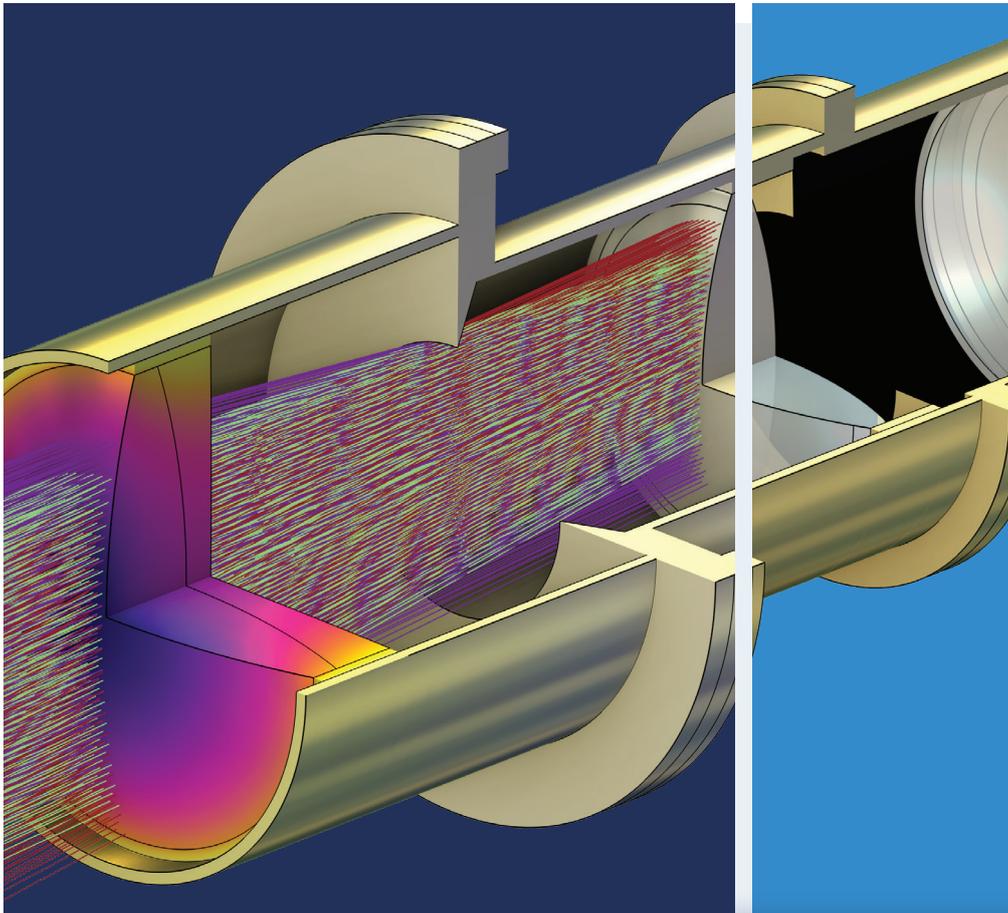
The biggest obstacle in my career is balancing family and work in a healthy manner. I am the proud mom of three small children, and I consider my career to be as important for me as my family. However, both come with compromises that can be incredibly challenging to navigate. I believe academia still needs quite a few changes in its culture make this easier for women, and we all have our part in achieving this. I have an incredible partner who makes incredible compromises to support my career; I navigate the rest with physical exercise and lots of coffee!

Be very careful with the responsibilities you accept and learn to say “No.” Be patient. Do not question yourself. Be sure you are taking enough risks and are getting out of your comfort zone. And be yourself.

**Clara Saraceno**

Professor, Faculty of Electrical Engineering and Information Technology, Ruhr University Bochum  
Born in Argentina / Resides in Germany

Educational Background: Diploma and MS in Engineering, Institut d’Optique Graduate School, France; PhD in Physics, ETH Zurich, Switzerland



# Shine Brighter in Optical Design

with COMSOL Multiphysics®

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» [comsol.com/feature/optics-innovation](https://comsol.com/feature/optics-innovation)



**“It doesn’t matter which way you choose and if you take a detour; it only matters that it’s feeling right.”**

I grew up in an area which is known as the Optical Valley in Germany. Carl Zeiss, Otto Schott, and Ernst Abbe are well-known names and shaped the past and presence of Jena. Perhaps it was because of that regional influence, that optics and the behavior of light constantly caught my attention throughout

my life. However, physics, mathematics, and biology were not my favorite subjects during school; I was not addicted to purely theoretical approaches and not made to be a scientist. Therefore, I chose to follow a more practically oriented study: business administration.

In my first job, I was fortunate enough to meet a lot of experienced and skilled people who encouraged me to deepen my scientific optics knowledge and to combine it with the strengths of my empathetic and driven personality. My current position as global sales director combines these two sides, putting me in a position to be able to moderate between customer needs, our technical capabilities, and the personal feelings of both parties. The overarching goal is always that our developed solutions help to create a healthier and better world, as well as empower our customers and ourselves.

My greatest career accomplishment has been to be a trusted and valued partner for my counterparts with PhDs in physics or engineering. At the beginning of my career, I was treated as an outsider; today, these academics come to me and ask for advice, often even regarding technical topics. The respect of my colleagues and customers is my driving force, and encourages me to deepen my knowledge even further every day.

In an organization dominated by physicists, sales is often not taken seriously. The product and the technical differentiation are seen as key to success. But in my career, I have experienced that sales and customer understanding often make the difference between success and failure. Throughout my career, this has been a constant obstacle, one which I have had to overcome again and again. Today, I am confident that the abilities of my team and myself are a key success factor of our strategic business unit.

Always believe in your own strengths and abilities.

### **Claudia Rabis**

Global Sales Director, JENOPTIK Optical Systems GmbH

Born in Germany / Resides in Germany

Educational Background: Master of Business Administration, University of Cooperative Education Gera and Eisenach, Germany



### **“It’s OK to fail; in fact, it’s a necessity for growth!”**

My inspirations are clear: Mom, Dad, and Disney! Mom was a schoolteacher; Dad was a family doctor for our small, border-town community. And Disney World is my happy place. I’ve managed to adopt my mom’s passion for teaching, my dad’s dedication toward patient care, and the “can-do” Disney spirit that drives my passion for research as an academic professor.

It’s pretty obvious how each of those has had such a profound influence on me. I am fortunate to have the opportunity to both teach and improve patient care, while using a creative twist to develop innovative biomedical-imaging approaches. As one of my favorite Disney characters, the Dreamfinder, once said, “One little spark of inspiration is at the heart of all creation.”

As an assistant professor at the University of Southern California, it’s my responsibility to advance the field of biomedical imaging by conducting innovative research, while also creating opportunities for my graduate and postdoctoral trainees to design and troubleshoot their own research projects. Our lab focuses on developing new nano-based optical imaging strategies that have the potential to offer physicians rich molecular information about their patients — information that may be used to personalize individual therapeutic regimens. I am also responsible for teaching classes that introduce our undergraduate students to various biomedical-imaging techniques that are being used to help improve patient care at the clinical and preclinical level.

My greatest accomplishment is sharing my love for molecular imaging and nanotechnology with my students. Watching them learn and grow over the course of their time in the lab is the most rewarding experience a professor could have. My students are my pride and joy, and it is exciting to think that their brief time in our lab could help inspire their own career paths, leaving a lasting impact on their lives.

As a professor, you cannot teach self-confidence. And as a student, you cannot learn it from textbooks. Self-confidence is something that is earned through experiences. So, my advice is to go out and flood yourself with experiences — and don’t be afraid to let yourself fail.

As a wise Golden Girl, Dorothy Zbornak, once said: “The bottom line is, if you take a chance in life, sometimes good things happen; sometimes bad things happen. But, honey, if you don’t take a chance, nothing happens.”

#### **Cristina Zavaleta**

Assistant Professor, Biomedical Engineering, University of Southern California  
Born in United States / Resides in United States

Educational Background: BS in Nuclear Medicine, University of Incarnate Word, San Antonio, Texas; PhD in Medical Physics, University of Texas Health Science Center, San Antonio, Texas; Post-doctoral training in Molecular Imaging, Stanford University, Stanford, California, United States



### **“Keep going! Nothing can stop you.”**

I am the eldest child in my family, so I took responsibility and led at a very young age. When I was 14, I had my first class in photonics and semiconductors. I found it interesting and had good marks for these classes. With new generations of photonics technologies, I found myself going in this direction.

There weren't many research groups working on vertical-cavity surface-emitting lasers (VCSELs) at the time I did my PhD, especially on indium phosphide (InP) VCSEL. I was a PhD student and post-doctoral researcher in this area at the Swiss Federal Institute of Technology before I moved to the US with Bandwidth10.

I was hired by a wonderful manager who helped me a lot to support a technology transfer effort from research to product. This was one of the greatest accomplishments of my career. I then succeeded with the product team at Bandwidth10 to bring to market innovative products based on the high-contrast grating tunable lasers at the 1060nm wavelength.

I am the mom of two wonderful boys. They were still babies (aged two and nine months) when we moved from Switzerland to the US without any other relatives; the US was a new country completely different from Europe and North Africa in culture, lifestyle, and food. I was alone with my kids for nearly two years during this time, as my husband was working in Europe. With all these changes in my life, and after approximately eight months of work progress, I gave a live demo and demonstrated the wide sweep rate of our tunable lasers. That sweep rate exceeded the customer's expectations! It was a true high point for me.

For young, aspiring women: be proud of yourself. A secret I used for motivation was to reward myself. Every time I was successful with results during my PhD and my post-doc studies, had good conference talks, obtained new funding to continue my studies, I would buy something precious for myself, mostly jewelry. Now, I have a collection that I take out from time to time to remind myself of each success.

#### **Dalila Ellafi**

Program Manager, Bandwidth10

Born in France, of Tunisian descent / Resides in United States

Educational Background: Engineering Diploma in Telecommunications, MS in Photonics, National Engineering School, Tunisia; PhD in Telecommunication: Laboratory of Physics of Nanostructures (LPN), Swiss Federal Institute of Technology, Switzerland / National Engineering School, Tunisia



Credit: SPIE/Joey Cobbs

## **“Our fields are eternally evolving, and that means there’s never a dull moment!”**

My uncle, a laser physicist, inspired me to go into laser physics. It helped that I was strong in math and physics, so it didn’t take much encouragement from him to apply for a new specialized degree in optoelectronics instead of a more general engineering program. It was, at that time, unusual with such applied degrees, but this meant we got to experiment with lasers and optics from the beginning. I fell in love with lasers during this course!

In my current marketing role, I am responsible for all activities that help drive sales of our lasers into our targeted markets. These range from leading and implementing the company’s marketing strategy to reaching new and existing customers via digital content and exhibitions. Most importantly, I’m responsible for our brand image. Auspiciously, my experience with lasers gives me a great understanding of the technology and its markets, helping me to achieve our marketing goals.

My greatest accomplishment is my PhD. After finishing my undergraduate degree, I worked for five years at university doing research before my professor suggested I put my research towards a PhD, so I have him to thank for making that suggestion!

I haven’t experienced many obstacles in my career, and I’ve pursued any opportunities presented to me. I’ve also stayed open to different career paths. At university, we were made aware of the most common roles, like going into research or considering a position in business. What I missed at university was more exposure to what types of business roles one could explore. But once I got into sales, after being in research for many years, I thrived and realized that I wanted to help run one of those companies.

I don’t believe I experienced much discrimination, but I think having a PhD for being more respected — especially in Japan. I had four women professors at university, even if there were very few women in my optoelectronics course. It’s so important to have female physics role models.

As far as advice for future generations of women going into photonics and physics: buckle up for an exciting ride! It’s hard work, but terribly rewarding and extremely satisfying. There are so many opportunities to explore, too, be it working or studying abroad, starting your own company, or working for a large corporation. Right now, photonics is really booming and opening many doors of opportunity.

### **Elizabeth Illy**

Head of Marketing, HÜBNER Photonics  
Born in Australia / Resides in Sweden

Educational Background: Bachelor of Technology in Optoelectronics — Optoelectronics Honours program, PHD in Laser Physics, Macquarie University, Sydney, Australia



### **“Follow your passion.”**

I was inspired to study physics after encountering a few of Brian Greene’s books at a local library after my freshman year of college. I was fascinated by all the unsolved mysteries of the universe, and I thought that it would be a privilege to contribute some answers. However, not everyone around me was supportive. Some friends thought that physics was too difficult for girls, and suggested accounting or nursing.

My social circle at the time, in small-town Texas, had not encountered anyone who majored in physics, or knew about its career trajectories post-graduation. Faced with

this pressure, I decided to major in electrical engineering as a compromise: engineering is also about exploring and implementing natural and physical laws, and a career as an engineer was something that my friends understood and supported.

But I couldn’t forget about physics, so I took courses on the side. I joined the Society of Physics Students, met others who were passionate about physics, and finally made the switch to become a physics major: I had found something I was passionate about, and had found a new support group who understood and could guide me on my journey.

To any young woman who is excited about STEM but has people telling her that she can’t do it for one reason or another, I hope my story can inspire you to feel encouraged and empowered to pursue it.

Now, as a PhD candidate at Columbia University, my primary responsibilities are to conduct original research in the lab, and to communicate my findings with collaborators and the broader scientific community. My research is on optically characterizing lanthanide-based upconverting nanoparticles. More specifically, when I shine lasers on these tiny particles, they convert the invisible light (infrared) into visible ones. In 2021, I was part of the collaboration efforts that discovered the photon-avalanching phenomenon in a certain configuration of these particles. This finding was published and featured on the cover of *Nature* magazine. It has many exciting potential applications including night vision, bioimaging, and sensing.

I find it exciting to go into the lab every day, knowing what I’m doing is novel, and that it could positively impact society in the future.

#### **Emma Xu**

PhD Candidate, Mechanical Engineering, Columbia University

Born in China / Resides in United States

Educational background: BS, University of Texas at Dallas; MS and MPhil, Columbia University, United States



*Working in optics requires strength, ingenuity, and innovation. As these Meadowlark women prove, a Ph.D. doesn't hurt, either. (Clockwise from top: Anna Linnenberger, Ph.D., Janelle Shane, Ph.D., Kelly Klutz, Ph.D.)*

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**“Believe in yourself, and don’t take ‘No’ for an answer.”**

My original dream was to work in astrophysics, something that required an optics degree. I got into a French prep school and got admitted to SupOptique. The curriculum included internships which I did at Coherent in the United States, working on ultrafast lasers and launching my very first product just a few months later. I was hooked! I then became program manager and tech lead on various ultrafast laser projects, both scientific and industrial. I moved on to being a program manager at Apple, and expanded my horizon to displays and camera depth, which led me to Meta in the VR optics field.

My current role as program manager for the pancake optics in Meta VR headsets requires that I understand all technical dependencies and all the risks; I’m responsible for proposing tradeoffs and solutions to complicated problems. I am always looking at ways to help my team to deliver the best products.

Every product I have helped launch has a special emphasis on all-new technologies. The rush and thrill of pushing these products to the finish line, announcing them to the world, and seeing the customers’ excitement make my work truly exhilarating.

Early in my career, I was by far the youngest engineer and usually the only woman on the projects. At times, I would get surprised looks when I would introduce myself. However, those would disappear quickly as soon as I presented my work!

I grew up in a small countryside village in Brittany, France, and I am the first in my family to pursue higher education. I would have never imagined being where I am today. Nothing is impossible; if you are interested in physics, optics, math, just go do it and don’t take “No” for an answer! There are always new mysteries to solve, which makes the world of physics and optics so fascinating.

**Estelle Coadou**

Technical Program Manager — VR Optical Engineering, Meta

Born in France / Resides in United States

Educational Background: BS in Optical Engineering, Institut d’Optique (SupOptique), France; MA in Optoelectronics, Polytechnique, Quebec, Canada

**“Life bounces you around, but eventually, if you have a passion, the bounces get you on the right track.”**

When I was 12 years old, on a school trip to France, we visited a nuclear power plant. It seemed so incredible to me that it was possible to create energy by splitting an atom

that I decided I wanted to study physics. Then, in secondary school where I took classical studies with Latin and Greek, I lost my motivation; the physics topics we studied didn't seem so interesting anymore. Then, an older friend took me to a physics lecture at the university, and, listening to the physics professor, I was hooked.

I currently have professional responsibilities in research, teaching, and management: I am head of an experimental group working in quantum simulation with ultracold atoms; scientific director of the Institute for Quantum Optics and Quantum Information; and a university professor teaching undergraduate and graduate students.

I think the achievement I am most proud of is that, together with my team, we have played a key role in opening a new field of research with ultracold quantum gases, namely the one using exotic atomic species belonging to the rare-earth family, which are highly magnetic and have several properties fully new to the field. This enabled the discovery of new quantum effects and phenomena which have an important impact in modern quantum many-body quantum physics. Today, this field is rapidly growing, gaining momentum at a fast pace because of the simplicity with which these systems can be created, and because of the incredible portfolio of new properties for quantum simulation. With my group, we have gone where almost no one had gone before; it was risky, but it is extremely rewarding to see the interest of the scientific community in this new direction today.

My biggest challenge has been, and partially still is, to understand, accept, and live with the concept of competition in a primarily male environment that requires that I must sometimes follow rules that are surprising to me.

I have been fortunate because, from my student time to my post-doc fellowship, I've had mentors who really gave me the right advice and support. I try to give my students this same type of advice today.

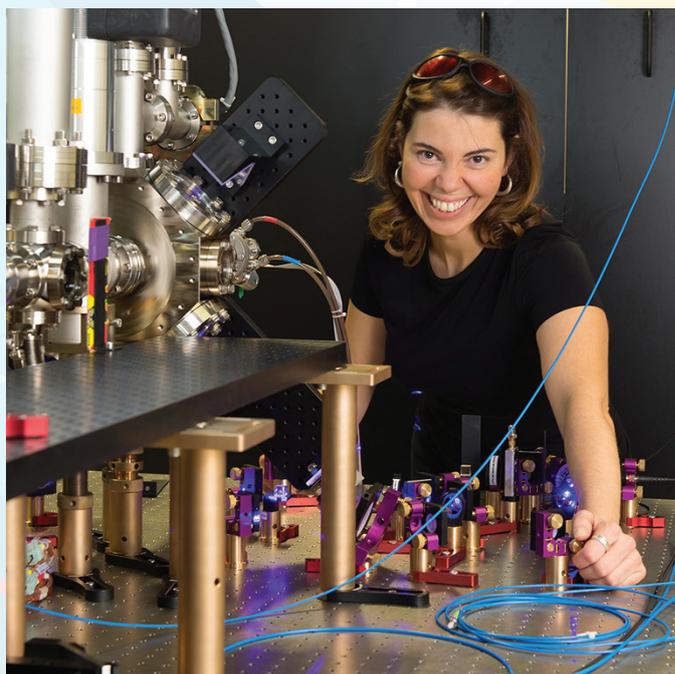
A southern Italian proverb translates to, “Where there is taste, there is no loss.” It means that when you follow a passion, you are never wrong! That is what my first mentor used to tell me since very early in my career path.

**Francesca Ferlino**

Professor, University of Innsbruck, Austria; Research Director, Institute for Quantum Optics and Quantum Information (IQOQI), Austrian Academy of Science

Born in Italy / Resides in Austria

Educational Background: Diploma in Physics, University Federico II, Naples, Italy; PhD in Physics, University of Florence, Italy





**“Engineering is team effort; innovative solutions often come from working in technically diverse and collaborative teams.”**

I was always intrigued by how things work. When my family immigrated to the United States, I was in high school, and mathematics and physical sciences were areas in which I could excel with my limited English proficiency, so engineering was a natural choice for college. After my first introductory physics course in electromagnetics, I knew a career in optics would be in my future.

As an undergraduate, I enjoyed the competitiveness of the engineering curriculum at the University of Illinois at Urbana-Champaign and was inspired — and challenged — by an undergraduate advisor who told me that very few people with my background made it through the program.

Over the span of my career, I’ve worked with a diverse team of photonic circuit designers, material scientists, and hardware engineers that brought transformative technologies to market. I’ve actively participated in all aspects of the project, leading from concept to manufacturing, and working closely with technical, business, and executive teams. Currently, I lead an advanced research team consisting of photonics, integration, and surface chemistry experts. We work with biochemists to develop next-generation chips and cell assemblies for single-molecule sequencing instrumentation.

I started my professional life as part of a team that introduced LEDs into every aspect of life, replacing incandescent light bulbs. We were responsible for making red and orange high-brightness LEDs manufacturable by developing and scaling a transparent-substrate based on a wafer-bonding process. This approach led to high-efficiency LEDs and paved the way for low-profile traffic signals as well as automotive and many other outdoor applications. The energy savings and lifetime increases are tremendous. I am proud of that achievement. I also take pride in having mentored my various team members and younger colleagues to be successful in their careers.

One challenge has been raising two children: creating a work-life balance while building a career can be challenging, and is even more difficult with children, requiring dedication, determination, and hard work. My husband understood and supported my career and professional aspirations.

I advise young women and girls to find their voice, the one that gives them the confidence to be comfortable to speak up and make space for themselves and others in meetings.

It is important to remember that as scientists, and especially women scientists, we stand on the shoulders of trailblazers. Paying it forward and mentoring or helping other women in the field is really important.

**Gloria Hoefler**

Vice President Engineering Research, Pacific Biosciences of California  
Born in Guatemala / Resides in United States

Educational Background: BS, MS, and PhD in Electronics and Communication Engineering,  
University of Illinois at Urbana-Champaign, United States



**“If STEM is your passion, you belong here. Don’t let anyone convince you otherwise, and don’t self-sabotage by constantly doubting yourself.”**

I found my first and deepest inspiration to work in biomedical sciences and engineering in my family. I was having pure fun while watching nature documentaries with my mother, solving puzzles with my father, paging through volumes of encyclopedias with my older sister, and performing daring explorations with my younger brother.

I am the principal investigator of the Biomedical Optics and Neurovascular Imaging Laboratory at Washington University in St. Louis. Our team is working on elucidating the complex interplay between oxygenation, blood flow, microvascular structure, and metabolism in health and disease. We develop and advance in vivo optical microscopy methods, integrating them with state-of-the-art molecular probes, and pursue new experimental approaches for preclinical animal studies in the brain and beyond. My core responsibilities are conducting this exciting research, training the next generation of researchers in my network, and contributing to the academic infrastructure with service and funding efforts that sustain our work.

I consider my greatest accomplishment in my career to be that I persisted. I had to endure various versions of explicit or implicit biases throughout my academic journey because of my gender, values, economic status, background, and appearance. Next steps were always challenging, and role models were scarce.

I am still going through the biggest challenge that I faced, which is to maintain the delicate balance between family, health, and work. Some days can get tough when these important aspects of life happen to be demanding all at the same. I try to keep a stoic perspective, and focus my mental and physical energy only on things that I can change. I strive to be the best version of myself and to not shy away from asking for help. I remind myself to not let my anxiety about obstacles overshadow the joy that comes from walking the path I chose.

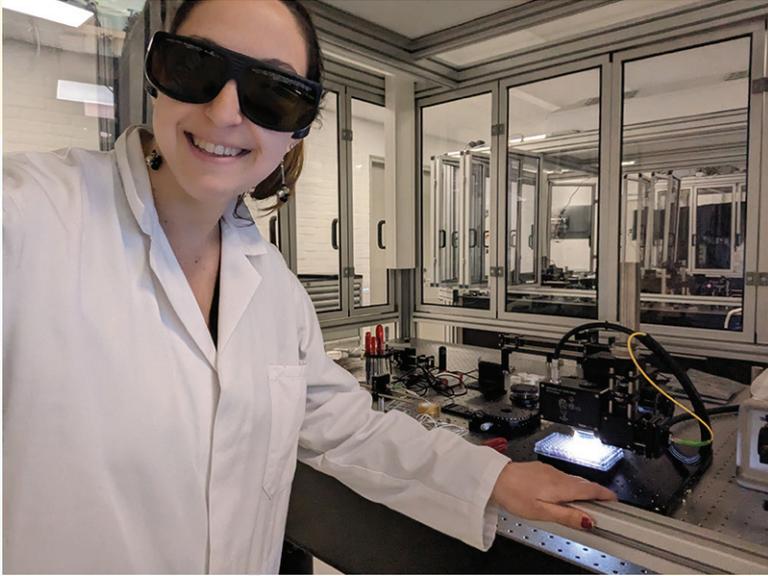
You can use the Pareto Principle (80% of outcomes result from 20% of all inputs) to triage your daily and long-term tasks in your life, while staying true to your principle of doing everything with care.

**Ikbal Şencan-Eğilmez**

Assistant Professor of Radiology, Mallinckrodt Institute of Radiology (MIR), Biophotonics Research Center (BRC), Washington University in St. Louis

Born in Türkiye / Resides in United States

Educational Background: MS and PhD in Electrical Engineering, University of California, Los Angeles; Postdoctoral Training in Radiology and Biomedical Imaging, Yale School of Medicine, Postdoctoral Training in Radiology, A. Martinos Center for Biomedical Imaging, Massachusetts General Hospital and Harvard Medical School, United States



**“It’s inspiring to know that I am making the world better with my work.”**

I always knew I would do something around science or engineering, but my love of physics was really sparked by my high-school physics teacher, Dr. Barkovitz. He was such a great teacher that he made all the topics stand out, but the unit on light and optics was my particular favorite. When I started learning more about optics at university, I was really inspired and certain that this was something I could use to make a difference in people’s lives.

My current work aims to develop imaging tools that can be translated into a medical clinic — something that doctors can actually use. A lot of my work is about developing new image-processing techniques; it also includes making changes to imaging systems to get more information out of images that doctors then can use to better understand and diagnose disease. I also work a lot with students: having the opportunity to watch them grow is definitely a highlight of working in a university setting.

My proudest moment so far was when my first paper was published. It was a culmination of so much hard work and frustration. Seeing it in print was amazing! I felt really accomplished.

My biggest obstacle in my career has been myself and my self-confidence. I knew that I liked doing research, but, before I did my PhD, I always worried that I wasn’t committed enough or didn’t have good enough grades to get into a PhD program. I was incredibly fortunate to find some great mentors who saw that I could do it and helped me believe that I could.

Don’t be afraid to e-mail professors and researchers whom you haven’t met to ask questions. They are just people, people who love what they do and would more than likely be very excited to talk to you about it. There is no reason to be nervous or intimidated.

If you’re thinking of pursuing a career in STEM, go for it! Working in STEM can be tough sometimes, but the successes are always worth it. We need more women in STEM because having a diverse workplace will lead to the best creativity and inventiveness.

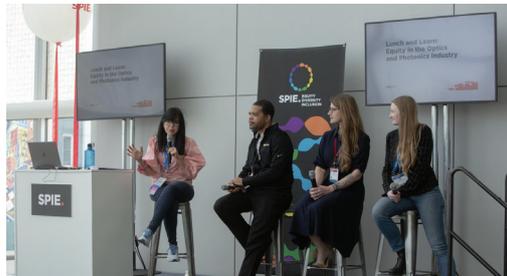
**Gavrielle Untracht**

Postdoctoral Researcher, Department of Health Technology, Technical University of Denmark  
Born in USA / Resides in Denmark  
Educational Background: BS and MS, Cornell University, United States; PhD, the University of Western Australia, Australia

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### **“Science has no gender, race, or creed!”**

As a young girl, I was a curious person and my mother encouraged me to have a career in STEM; she has a master’s in organic chemistry and helped develop my interest in science. It was fun to learn how the world works as a child!

In 2008, I lost my father due to cancer. His struggles inspired me to carry out cancer research, especially in the early detection of cancer. Since then, I have been proactive in the field of biomedical applications of vibrational spectroscopy for the early detection of oral cancer.

As a research fellow, my primary responsibility is to carry out a given research project as independently as possible, with the intention of becoming an independent researcher. Logistically, I handle the administrative issues of the project and liaise with the funding agency. Since the project involves planning, coordinating, and implementing processes with pathologists/clinicians for sample collection and cytological and histopathological assessment, I liaise with them too. In addition, I supervise, train, and support PhD or undergraduate students. Finally, I am responsible for maintaining and ordering the required laboratory equipment.

In 2010, the Department of Science and Technology of the Government of India awarded me with a prestigious Women Scientist Scheme research fellowship. I received this independent grant just after finishing my master’s degree, and I successfully carried out the project without any formal research training. I consider this one of my greatest accomplishments to date.

During my PhD, I carried out pioneering work using oral single cells and Raman spectroscopy. This was a step forward to translating Raman spectroscopy into clinics, and I consider this to be my other greatest accomplishment.

Recently, the Irish Research Council awarded me a post-doctoral fellowship, which will boost my career to become an independent researcher. This is also among the greatest achievements of my career.

Previously, I had not felt supported in my career. But even though it felt as though things were against me, I kept confidence in myself. I faced all the challenges in relation to my projects, completing them successfully.

Being female, it is necessary to have confidence in yourself, as there are many people to pull you down. It does not matter what others think about you; it is important that you believe in yourself and take leaps in life.

#### **Isha Behl**

Research Fellow, Trinity College Dublin (TCD) and Technological University Dublin (TU Dublin)  
Born in India / Resides in Ireland  
Educational Background: M.Tech (Integrated) Biotechnology, D Y Patil University, Navi Mumbai, India; PhD in Biomedical Application of Raman Spectroscopy for Early Detection of Oral Cancer, Technological University Dublin, Ireland



**“Diversity and representation are extremely important.”**

When starting my bachelor’s degree, my goal was to use my love for physics to contribute as a medical physicist. While looking for an internship as a second-year engineering student, I met Professor Caroline Boudoux. It was the first time I had ever met a professor of engineering physics — and a biophotonics enthusiast — to whom I could personally relate.

I realized that the ambition I had set for myself could go much further! I started my biophotonics research in Caroline’s lab, while continuing to pursue a PhD in biomedical engineering through a collaboration between Polytechnique Montreal and the Wellman Center for Photomedicine in Boston.

I am now the director of business development at Castor Optics, a company developing and manufacturing fiber optics components. Because it is a small company, my responsibilities are vast and varied: I am responsible for the development and implementation of our business plan, management, and planning of our R&D programs, as well as the commercial and business strategy development.

I believe my greatest accomplishment is yet to come. The first year I joined Castor Optics, along with the team, we increased our sales by more than 40% by releasing new products and providing new customers with innovative and dedicated fiber optics solutions. I am now working with my colleagues to build a company based on three main pillars: innovation, valorization, and fulfillment. Not only are we working to provide our customers with innovative technologies that are fresh out of academic laboratories, but we are also providing our employees with a work environment that is stimulating, respectful, and where they can blossom as professionals.

The biggest challenge in my career has always been myself. I have taken a couple of leaps so far in my career and received tremendous support from my peers and family. Only my doubts about my capabilities have slowed me down. Fortunately, I have great mentors and an extremely supportive partner. Now aware of my self-doubting, I surround myself with an extremely competent team and do not hesitate to reach for additional training or resources.

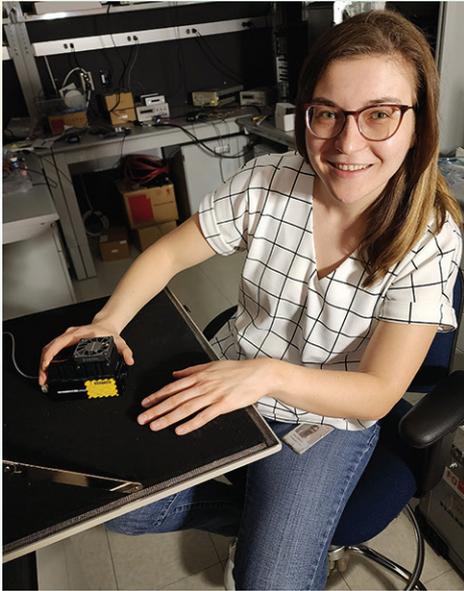
Believe in yourself, and you are not alone. Graduate studies specifically can feel extremely isolating. Do not hesitate to rely on colleagues for support: get involved in professional organizations to meet peers, and reach out to mentors to help you gain a broader perspective.

**Kathy Beaudette**

Business Development Director, Castor Optics Inc.

Born in Canada / Resides in Canada

Educational Background: Bachelor of Engineering Physics, MAsC, and PhD in Biomedical Engineering, Polytechnique Montreal, Canada



**“Failure provides you with valuable experience, lessons, and insights that better prepare you for your next challenge.”**

I always had a fascination with natural sciences. Multiple science teachers fueled my curiosity, providing encouragement for me to pursue a science career. At university, I was drawn to physics by my instructor, Dr. Neepa Maitra, with her wonderful explanations for different natural phenomena. My summer-research advisor, Dr. Jacob Trevino, introduced me to photonics and, prior to graduation, he provided valuable insight that allowed me to leap into industry and landed me my job at Hamamatsu.

I now lead Hamamatsu Corporation’s efforts in quantum technologies. In this role, I wear many hats, providing technical support to our customers, both original equipment manufacturers (OEMs) and academic researchers, while working with R&D teams in Japan on next-generation photonic devices and solutions for the quantum-application space. In addition, I spend time engaging with the quantum and photonics community, participating in panels and webinars, as well as in quantum consortiums.

I’m very proud of starting the quantum technologies project at Hamamatsu from scratch. Over the past four years, it’s been a journey of grit, endless learning, and re-learning about the field; collaborating with colleagues from the US and Japan; and turning our ideas into tangible actions.

My biggest obstacle came during my undergrad years. I was not excelling in my physics classes, and I began to doubt myself as well as my career choice. The people in my study group provided support in tackling the course material as well as emotional support that fueled my persistence. I am grateful to still have these people as good friends today!

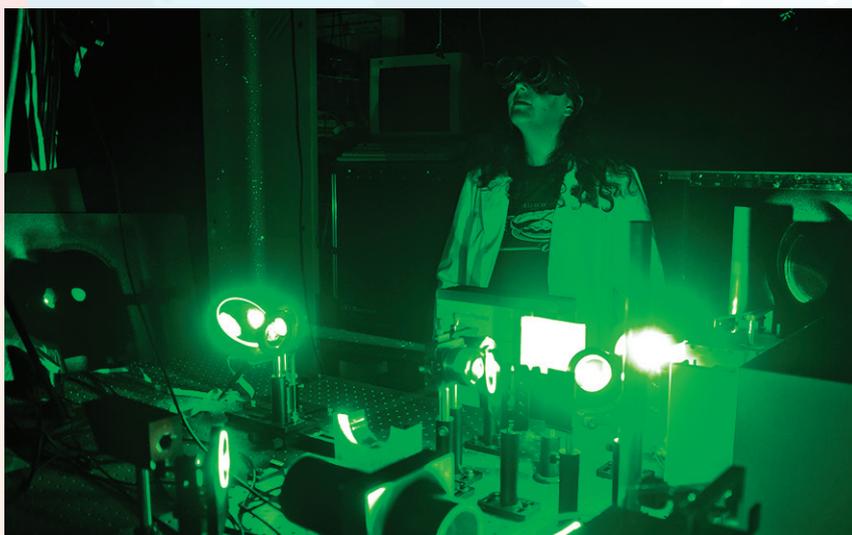
Don’t be afraid of failure. Don’t let one bad grade or bad experiment stop you from pursuing a career in STEM. If you failed, it means you challenged yourself and pushed yourself outside of your comfort zone. Failure leads to growth.

To others interested in the field, my advice is, “Network, network, network!” You can start at any stage of your career, the earlier, the better. Build relationships with different people you come across in the STEM community: professors, researchers, science communicators, peers. Your contacts are a huge resource when it comes to finding new opportunities, connecting with mentors, navigating difficult situations, and providing a glimpse into different careers paths.

**Klea Dhimitri**

Applications Engineer — Quantum Technologies Lead in North America, Hamamatsu Corporation  
Born in Albania / Resides in United States

Educational Background: Bachelor of Arts in Physics, Bachelor of Arts in Mathematics, Hunter College of City University of New York (CUNY), United States



**“Your differences make it all the more important for you to be in that meeting room.”**

I was terrified to take my first physics class in high school: I did not love my previous science courses, and physics was what Einstein did! After some supportive coaxing from my family, I found myself sitting in my first physics class, watching the teacher use math to explain the world around us, and I was hooked.

During college, I discovered that optics was one of my favorite subjects, thanks to Drs. Amy Sullivan, Arthur Bowling, and Gary Gimmestad: they showed me how lasers could be used to study the world and air around me with the use of Light Detection and Ranging (lidar) systems. In graduate school, I worked with the late Dr. Vincent Wickwar to probe the outer reaches of the atmosphere with lidar, in areas far beyond where most ground-based systems can sense.

In my current role as a research scientist at the Georgia Tech Research Institute, I work with a team of engineers and scientists to develop new optical remote-sensing instruments to study all of the atmosphere, from the air we breathe down in the troposphere, out to what most consider space, where the rarified air and charged particles of the ionosphere interact. In my applied-research role, I not only study the atmosphere to better our understanding of this complex system, but also to use that knowledge to address challenges in national security and to better the human condition.

While a career in physics is challenging on many levels, the biggest obstacle in my career has been myself, from my teenaged-self deciding I had to be Einstein to succeed at physics, to my current-self, still questioning whether I'm the right person for the job. Despite the support of family and many colleagues, gaps in my coursework or the fact that I am often the only woman in the meeting room lead to me to a lot of self-doubt.

What I am realizing now, and hope I can pass on to young women starting their own STEM careers, is that you can always learn what you don't know, and your differences are valuable strengths that you bring to the table.

**Leda Sox**

Senior Research Scientist, Electro-Optical Systems Laboratory, Georgia Tech Research Institute  
Born in United States / Resides in United States  
Educational Background: BA in Mathematics-Physics and French, Agnes Scott College; PhD in Physics, Utah State University, United States



**“The strength of science is the diversity that makes up its community.”**

I wanted to understand and explain complex problems: that’s what first drew me to math and physics, pursuing what I thought would be a career in theoretical physics. However, a series of research internships and social engagements would shape my career path into something completely different.

Today, I am the executive director of Optonique, a non-profit organization aimed at developing Québec’s and Canada’s photonics industry, increasing its economic benefits, and leveraging the potential of light-based technologies. I lead a team of technical experts and value-driven individuals; I work with policymakers and catalyze collaborations which bring together industry, academia, and government in Canada and beyond.

Two experiences were particularly influential: being a student advisor to Québec’s Chief Scientist, Dr. Rémi Quirion, and, later, a member of Canada’s Chief Science Advisor Dr. Mona Nemer’s inaugural Youth Council. In these roles, I contributed to including and amplifying the voices of next-generation scientists and researchers in decision-making and policy development, shaping the landscape and funding of science in Québec and Canada.

One of the biggest challenges I faced was pivoting away from a technical career I spent years building. Why leave a position as a clinical medical physicist for non-profit management? It took a lot of self-reflection as well as guidance from valued mentors. I realized that my experiences and skillset made me uniquely equipped to work at the interface of science, industry, policy, and diplomacy. With this career path, I believe I can have the most impact on both the optics community and society.

I wish I had known earlier the importance of taking care of myself to better take care of others. We, as women, tend to take on many (unpaid) responsibilities. Because we want to make things better and more accessible for those following in our footsteps, we consistently put our own needs aside. Now, running and reading are fundamental to my self-care routine and personal growth, shaping me into a better manager, colleague, and person.

It takes all sorts of personalities and perspectives to produce original research and drive innovation, and there are many different and fulfilling ways to contribute to the advancement of science. If you’re passionate about a career in STEM, go for it! You’ll make great things happen, and you’ll be inspiring others to do the same.

**Madison Rilling**

Executive Director, Optonique (Québec’s Photonics Industry Cluster)

Born in Canada / Resides in Canada

Educational Background: Joint Honors in Mathematics and Physics, McGill University; MSc in Medical Physics (CAMPEP-accredited), Université Laval; PhD in Physics, Université Laval, Canada



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**“Pursue your passions and interests, and don’t be afraid to seek out help and support when you need it.”**

I was drawn to my field by a combination of curiosity, passion for discovery, and a desire to contribute to society through advancing knowledge and technology. As a child, I was fascinated by rainbows. Later, I discovered the role that physics, and more specifically optics, played in explaining these magnificent arcs of color. I also realized that with optics, I could both satisfy my curiosity and conduct useful experiments. Additionally, I was fortunate to have the unwavering encouragement of my parents and my family, who have always supported me in my academic and career choices.

As a university professor in physics and chairperson of my physics department, my main activities include teaching undergraduate and graduate courses in physics; conducting research activities; and mentoring and advising students. I also serve on various committees, participate in conferences, and work with colleagues at my university and across the world to advance our collective goals and objectives.

One of my most significant career achievements has been establishing my research laboratory in biophotonics, which focuses on optical engineering, at my university. I have had the privilege of supervising and mentoring numerous graduate students who have gone on to become researchers, consultants, and educators in their own right. The fact that the majority of these students are women makes this accomplishment all the more meaningful; I am proud to have helped empower and inspire the next generation of female scientists.

When I was first starting out 20 years ago, I wish someone had advised me to be more proactive in seeking out opportunities for collaboration and networking. I firmly believe that building relationships with other researchers and educators is incredibly important.

Overall, I feel incredibly fortunate to be able to work in a field that I am passionate about, and to have the opportunity to share my knowledge and expertise with younger generations. I look forward to continuing to contribute to my field in meaningful ways while creating a more inclusive environment for the future of research.

My advice for young girls or women who are considering a career in STEM is, “Surround yourself with people who encourage you, and don’t be deterred by any perceived barriers or obstacles.”

**Marie Abboud Mehanna**

Full Professor, Chairperson, Department of Physics, Saint-Joseph University of Beirut — Faculty of Science

Born in Lebanon / Resides in Lebanon

Educational Background: BS in Physics, Saint Joseph University of Beirut, Lebanon; MS in Lasers and Matter, Paris XI University; PhD in Physics, Paris VI University and Ecole Normale Supérieure; Habilitation to Supervise Research in Physics, Paris VI University, France



### **“Ignore all stereotypes as well as peer or family pressure.”**

I am beyond happy to have a career where I can contribute to human knowledge and society: my research focuses on the diverse ways that the interaction of light and matter (spectroscopy) can assist disease diagnosis. The combination of physics and medicine allows me to approach clinical problems from different aspects and apply my expertise to what I am most passionate about: human health.

I am a postdoctoral research fellow at the National Hellenic Research Foundation, where my daily routine consists of conducting experiments in the lab, analyzing data, supervising students, publishing, and writing research grants. I am also an academic teaching fellow in a physics department, teaching undergraduates.

I hold a keen interest in mentoring students and young scientists, and work to improve female visibility in science through various organizations (YWCA, Greek Women in STEM). I am also involved with R.E.A.L. Science, a networking platform which connects STEM scientists with schools, providing students with career advice and inspiration.

Coming from a small Greek island, studying and working abroad was an unfamiliar path. It took a long time and effort to be able to pursue a PhD in physics and work in research institutions around the world, and I am proud that I made it through. However, I consider the greatest accomplishment in one's career to be the impact you make on other people's lives. If I have managed to make a positive impact even in one mentee's or student's life over the past 15 years, then I consider this to be my biggest success.

Changing research fields combined with “imposter syndrome” have been the biggest challenges. Pursuing a PhD in physics despite my background in pharmaceutical sciences was particularly challenging; maintaining my motivation, even when things were going wrong research- and funding-wise, was crucial.

“Imposter syndrome” is something most of us struggle with. Two things helped: hard work and my network. Hard work acts as a safety net because when you do your best, it's harder to blame yourself for failure; talking to your network provides a realistic perspective.

The thing to consider if you are interested in a career in STEM is how much you want it. Initiate and maintain contact with scientists you find inspiring or look up to. (It is surprising how eager people are to help when they are asked.) In turn, don't forget to be honest and kind when given the chance.

#### **Martha Vardaki**

Postdoctoral/Academic Research Fellow, Institute of Chemical Biology, National Hellenic Research Foundation

Born in Greece / Resides in Greece

Educational Background: BSc and MSc in Pharmacy, University of Patras, Greece; PhD in Biomedical Physics, University of Exeter, United Kingdom



**“Keep an underlying sense of ‘Wow — this is so cool!’ as a reminder of why you’re in your field.”**

My generation was the first in the family to attend college. I wasn’t sure what engineers did, just that they needed math and science skills, and that there were a lot of opportunities. I had math and science abilities, but it took a while to find a subject that I really liked. The more I learned about light, the more it amazed me. My senior elective courses were optics-related, and I told a recruiter that I wanted to work in that area. He told me that those positions needed an advanced degree, not to “limit yourself so much.” I decided two things: 1) I would go to graduate school, and 2) he didn’t know what he was talking about if he thought optics was limited!

As an application engineer, I help customers apply our optical-software products to design lens and illumination systems. I teach these engineers how to use the software and help them resolve any issues. I’ve worked with CODE V customers as they design systems ranging from cell phone cameras to the James Webb Space Telescope. Our customers design leading-edge systems, so they have challenging questions and require precise answers. Technology keeps evolving, so there are always new problems to solve.

My biggest challenge and greatest accomplishment in my career are the same: getting my PhD in optics. In the middle of my program, I had health issues which interrupted my studies. With the support of my advisor, family, and friends, I was able to persevere and complete my degree.

When I was starting out, I wish I’d been advised to find a mentor. There’s always a lot to learn about your job, but another perspective can help you prioritize and see the bigger picture.

I’d advise others considering a STEM career to explore various opportunities: choose a field that you enjoy. There will be subjects and problems that are difficult; learn when to persevere, and when to ask for help. Become comfortable asking questions, even when you feel that you should know the answer. Ask the question so that you do know the answer.

More women are working in science and engineering now, but these are still male-dominated fields. A lot of engineers are more introverted than extroverted, and women’s voices are generally quieter than men’s. Get comfortable speaking up: your thoughts and contributions are important and needed.

**Mary Kate Crawford**

Staff Application Engineer, Synopsys

Born in United States / Resides in United States

Educational Background: BS in Electrical Engineering, Pennsylvania State University; MS in Electro-Optics, University of Dayton; PhD in Optics, University of Rochester, United States



**“Be yourself. Believe in yourself. Be persistent.”**

From a very young age, I was curious about the origin of things. When I took my first physics class in high school, it seemed to me that physics was the best way to answer many of the big questions I had about the origin of the Universe, humanity’s place in it, and the fundamental workings of nature. I came to learn that science does not have the complete answer to all my questions. But science — astronomy, in particular — continues to motivate me, because it deepens my appreciation for the Universe, and it has allowed me to work with some incredibly inspiring, creative people.

As a professor, I work with graduate students, teach, and cultivate my research program. My primary field of research is star formation. I study “stellar nurseries” — the birthplaces of stars — in the Milky Way and in other galaxies in the Universe. I use telescopes and theoretical tools to figure out how stellar nurseries form and evolve and go on to give birth to stars. In addition, being an artist has positively contributed to my science.

I’m the founder and director of Onaketa, an organization that provides free educational services for black and brown youth. Onaketa’s core program is free STEM tutoring for these students. I consider my work with Onaketa to be some of my most meaningful and important work, because it is all about giving young people opportunities to be their best, and showing them that there are people who care for them.

Make sure to have fun with your journey!

**Nia Imara**

Professor of Astronomy, UC Santa Cruz; Founding Director, Onaketa; Artist

Born in United States / Resides in United States

Educational Background: BAs in Physics and Math, Kenyon College; PhD in Astrophysics, UC Berkeley; Postdoctoral Fellowship in Astrophysics, Harvard University, United States



### **“Become comfortable with being uncomfortable.”**

An esteemed engineering fellow at Johnson & Johnson, Russ Spalding, significantly influenced my career trajectory: his infectious enthusiasm, scientific curiosity, and unwavering determination to find solutions to complex problems inspired me to finish a master’s degree in optics. He noticed my natural ability for identifying solutions that others may overlook and provided invaluable mentorship throughout my career journey. His influence on my professional development is beyond quantification.

As an optical systems product manager working in a life-science field, my responsibilities involve overseeing the development and success of cutting-edge optical systems and modules driving the advancement of DNA sequencing technology. I collaborate with a team of engineers, scientists, and sales professionals, ensuring that our products fulfill the demands of our customers and markets.

Throughout my career, I have leveraged technical expertise and relationship-building skills to facilitate the development of innovative technologies that have a tangible impact on our daily lives. My unique multi-cultural background and ability to act as a liaison between different functional units has enabled me to break down barriers between industries and contribute to the development and commercialization of a wide range of products. My track record includes optical metrology of contact lenses, inspection systems for wafers and photomasks, high-precision photolithography mirrors, and optical modules for DNA sequencing systems.

Navigating a male-dominated workspace as a non-native speaker and a woman can be challenging and occasionally isolating. It may feel as if you don’t fit in, or your contributions are not appreciated enough. However, I am excited to witness an increasing number of talented women entering the field of optics. It is inspiring to see women embracing leadership roles and contributing significantly to growth and innovation in the industry.

Looking back, I wish someone had imparted the wisdom that my journey to various positions doesn’t necessarily serve as a roadmap to the next level. I have learned that being the best in your current role doesn’t necessarily guarantee advancement. It is crucial to identify the skills and knowledge required for the next level and seize opportunities that aid in developing these skills.

Self-doubt is commonplace, especially in fields where there may be fewer women or girls represented. My advice would be to seek opportunities that can be achieved with focus and determination. It is also important to find mentors and career coaches who can provide guidance and support in your professional and personal journey.

#### **Olga Sachkouskaya**

Product Manager, Life Science Optics, IDEX Health & Science

Born in Eastern Europe/ Resides in United States

Educational Background: BS in Physics, University of North Florida; MS in Optics, Minor, Business, University of Rochester, United States

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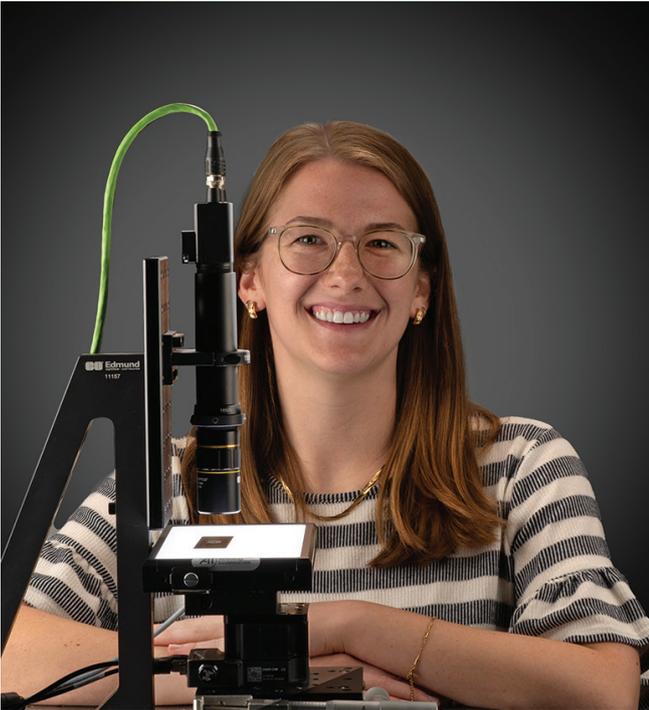


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### **“It’s OK to ask for help from others.”**

My mother was diagnosed with breast cancer in 2009 and battled it for 14 years. I was always captivated by the medical technologies

used to fight the disease, and this played a huge role in my decision to study biomedical engineering. After graduation, I found myself working at an optics company where I could apply my knowledge in biomedical engineering while developing my skills in optics in order to help customers develop life-saving medical technologies.

My job is a bit unique as I am in the Engineering Leadership Program at Edmund Optics. I have the opportunity through this program to rotate through different departments to figure out where I am best suited, based on my interests and strengths. Currently, I am working in our Imaging Business Unit with a focus around microscopy. I have the opportunity to develop a business strategy for our microscopy products, learn how to bring a product line to the market, and test our products in the laboratory.

I think my greatest accomplishment in my career so far is the awareness around life sciences that I have created within my company. I am recognized as a subject-matter expert in this area after being at Edmund Optics for only two years. I’m very proud of this achievement, and hope to grow my reputation in this area across the wider optics community.

My biggest career challenge thus far has been having the confidence in myself to accept that I am where I am supposed to be. Coming from a non-optics background and being a woman in a male-dominated field has felt like a hurdle since I started working. What has helped me the most has been finding mentors who support me through my career, as well as making sure to speak up when I need guidance.

As engineers, we often feel that we should be the ones solving every problem, seeing it through to the end. In reality, our coworkers likely have already run into that problem themselves and have overcome it. That is why it’s important to ask for help, and I have found that I actually learn more by doing so.

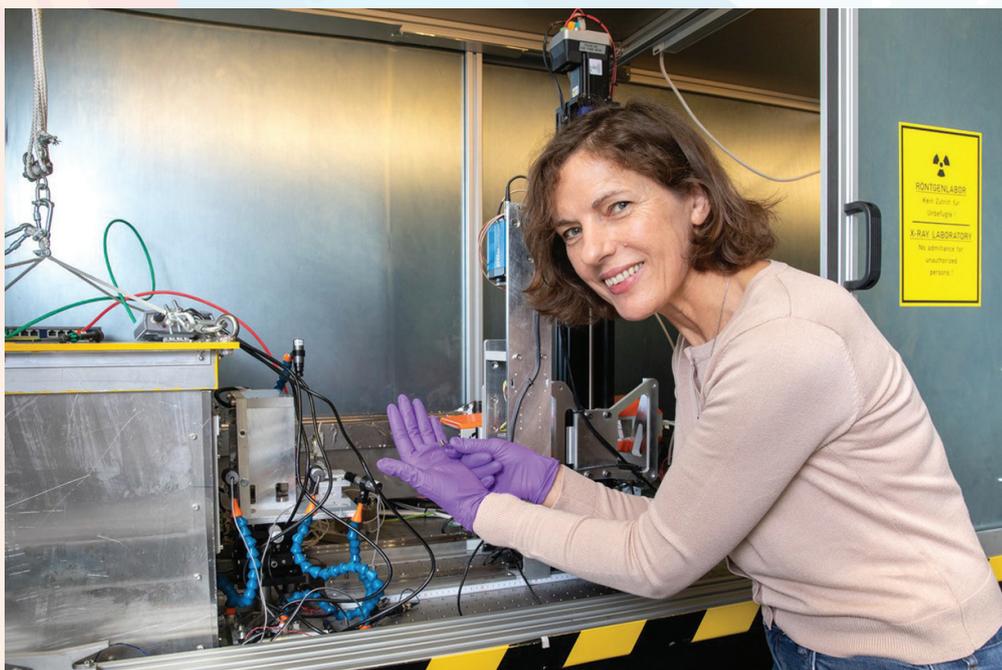
My advice to women who are considering a career in STEM is to see if you can turn what you are passionate about into a career. Finding passion in your work can be very rewarding and makes you dig that much deeper into topics in which you are interested.

#### **Rebecca Charboneau**

Optical Engineer, Edmund Optics

Born in United States / Resides in United States

Educational Background: BS and MS in Biomedical Engineering, Rowan University, United States



**“You have to be willing to sometimes step out of your comfort zone and jump into the unknown.”**

Even though my father had no high-level education, he was very inventive and was not afraid of challenges. He awoke my interest in observing the world around me, encouraging me to think about fundamental questions. Both my parents were very hard working, so I learned early on what it takes to achieve your goals.

In my current job, I lead a group consisting of PhD students, postdocs, and technicians. Our focus is designing and fabricating innovative X-ray lenses. Our goal is to achieve close to perfect X-ray lenses that can focus high-energy X-rays to a few nanometers.

I changed my science field a few times, and I think it is important to remain flexible and open to new opportunities. After working as a beamline scientist at the synchrotron radiation facility at the National Synchrotron Light Source (NSLS), and being employed by the University of Chicago in the United States, I switched to the development of multilayer coatings for extreme ultraviolet (EUV) lithography at Lawrence Livermore National Lab. Based on analysis methods I developed, I was selected to join a team to search for organic matter in cometary dust brought back to Earth by NASA's Stardust mission, and this was a very exciting project. I am most proud of my innovative multilayer mirror that was the enabling instrumentation for the first demonstration of single-shot coherent X-ray diffraction imaging with an X-ray Free Electron Laser (XFEL).

Growing up, my biggest challenge was to stop worrying about what others might think about me because I had different interests than most of the girls and women in my social circle. It was empowering to finally meet women with similar experiences who I could talk to, and to realize I was not alone.

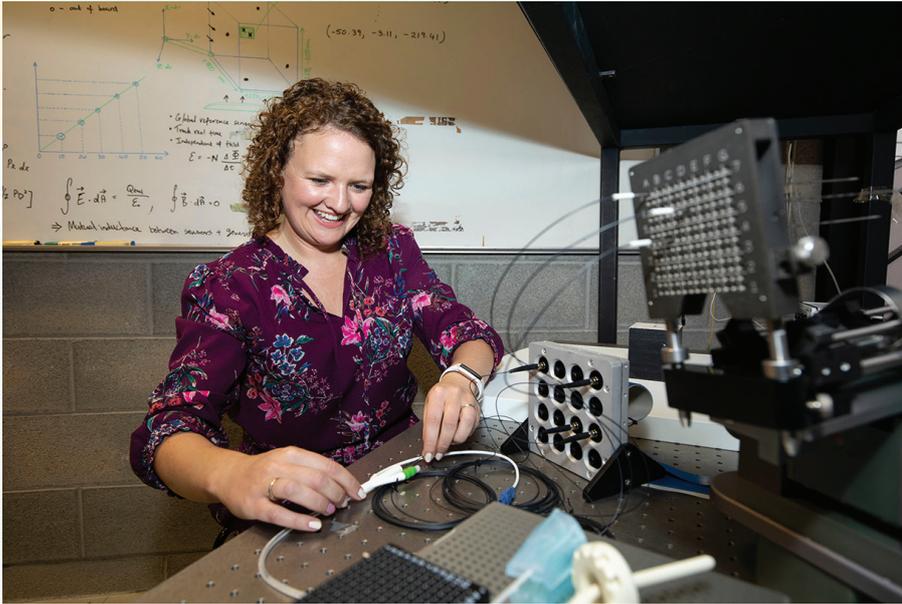
Life without challenges would be boring for me. They bring frustration, but it is all forgotten when you finally come to a solution or discover or invent something new.

**Saša Bajt**

Group Leader, Center for Free-Electron Laser Science (CFEL), Deutsches Elektronen-Synchrotron (DESY)

Born in Slovenia / Resides in Germany

Educational Background: Diploma in Physics, University of Ljubljana, Slovenia; PhD in Natural Sciences, Ruprecht-Karls Universität, Heidelberg, Germany



**“When the right balance between work and family is achieved, we are more productive.”**

Growing up, my father, as a civil engineer, was a huge influence on me. I always wanted to be an engineer and was very much supported in this. Luckily, I was never exposed to the perception or stereotype that a woman can't be an engineer. I also had a strong desire to help people, leading me to focus my research career on photonics sensors for biomedical applications.

I am a Royal Society – Science Foundation Ireland University Research Fellow, leading a team that focuses on the development of optical fiber-based sensor systems for the diagnosis, assessment, and treatment of cancer tumors. I am also the coordinator of a European research project, “ORIGIN,” which is developing a multipoint photonics system for real-time in vivo dosimetry and radiation source localization for brachytherapy.

Being awarded the Royal Society – Science Foundation Ireland University Research Fellowship has been one of my greatest career achievements to date, providing me with the freedom to establish my research agenda and explore new areas of interest to me.

As a mother of two, I work part-time, which has provided plenty of obstacles in trying to balance a research career and family. I have learned over time to understand the limitations on my time, and that it is important to set priorities.

I always enjoy organizing outreach events in schools and find it so rewarding to watch the children learn new things and explore the world around them in a new light. It is important that we break the stereotype of scientists and engineers at a young age and show young girls the variety of careers available to them.

My advice to anyone interested in STEM is pursue your passion; don't be afraid to fail or make mistakes; and remember that gender does not define your abilities.

**Sinéad O’Keeffe**

Research Fellow, Dept. of Electronic & Computer Engineering / Health Research Institute,  
University of Limerick

Born in Ireland / Resides in Ireland

Educational Background: BEng and PhD in Electronic Engineering, University of Limerick, Ireland

**“Your true efforts always have the power to get the best results — and inspire the people around you.”**

My grandparents are teachers, and my parents are civil engineers. From a very young age, I saw how my grandparents were an important part of their students' lives, when former students visited them as successful people. I saw the impact of my parent's work when I traveled on the roads they helped build. The impact of their work on society inspired me. I decided that I, too, should improve and contribute to the lives of people around me and the world I live in, perhaps by becoming a doctor.

Ultimately, I chose biomedical engineering and, today, I solve healthcare problems using optics.

My responsibilities as a PhD research scholar in a biophotonics lab include conducting research experiments and providing teaching assistance. I am developing a device that combines the advantages of multiple optical spectroscopic techniques for quickly identifying cancer and its margins during surgery. I also develop chemical samples called phantoms, which mimic the optical properties of cancerous tissue samples, using them for testing.

I consider choosing a research career in STEM, and being able to pursue it, an achievement in itself. I have been very fortunate to have parents who support me in every decision.

The biggest challenge in my career was during my master's semester exchange program, when I started transitioning into optics from biomedical engineering. Learning something completely new while being away from my family was very challenging, but I didn't give up. This challenging atmosphere taught me so much, that I chose to pursue my doctoral studies, primarily involving optics.

When I first started, I was unsure about pursuing research as my career and tried different career options before I understood my true passion lay in STEM research. Though the experience and knowledge I gained while working in other professional roles were good and beneficial in my research, I wish someone had told me to be confident in my decisions, to stop hesitating, and pursue what I wanted confidently.

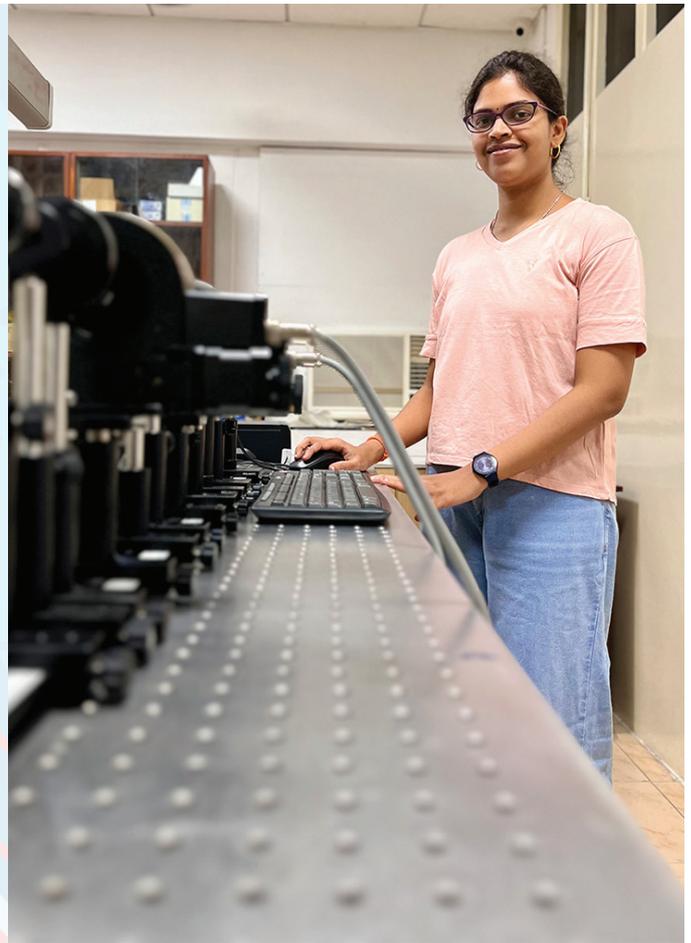
I firmly trust that perseverance and giving one's best effort will fetch the best results. It is OK to fall sometimes, but ensure you never fail to get up. Follow your passion confidently, work hard, and give out your best in whatever you choose to do. Strive to be a kind human being and make the world a better place to live.

**Subitcha Jayasankar**

PhD Research Scholar, Department of Applied Mechanics and Biomedical Engineering, Biophotonics Lab, Indian Institute of Technology Madras, India

Born in India / Resides in India

Educational Background: B.Tech and M.Tech in Biomedical Engineering, Institute: SRM Institute of Science and Technology, India





**“Any decision is just a choice, and there are many roads that lead to the same place. Don’t let perceived pressure weigh you down.”**

I am a first-generation neuroscientist who grew up in a small village with no reference of what it is to be a scientist. However, I always have been curious about the world we live in. Many of my influences and inspirations were books I read, as well as my favorite kid’s show, *The Magic School Bus*. I found myself eager to discover how a certain phenomenon came about, and what its purpose was. That curiosity flourished with all the biology and physics classes in school and bloomed in the middle of high school when I had the opportunity to do an internship in the city hospital and connected with real scientists for the first time.

As a junior leader who is starting my independent career, my primary responsibility is to lead and manage a research group. My daily duties include mentoring students; coming up with research ideas; building research networks; attending conferences; and writing papers, protocols, and grant proposals that support our research.

My main research interest is understanding how brain blood vessels develop and interact with other brain cells during the neonatal period. I employ the quote “Seeing is believing” by using advanced optical-imaging techniques to study how the brain works. Every day brings new data, new ideas, and new challenges, but it is a very rewarding job. Being the first to see and know something before anyone else is fascinating.

My most difficult decision was deciding the next step after my PhD. I ended up moving out of my home country to the United States for a postdoctoral adventure. It turned out to be the best decision of my life. I was extremely lucky: I found a supportive mentor and amazing team players who stimulated my intellectual curiosity without being overly competitive. This professional and personal experience shaped my way of thinking, and I am very grateful for not letting fear of the unknown prevent me from seizing this enriching experience.

I am a believer in all of you! So, my best advice is this quote: “Believe you can, and you are halfway there.” Believe and work hard but try to have fun in the process. Take your time, and don’t compare yourself with others! Celebrate every milestone; don’t wait to celebrate just the successes. Life is not only successes: not “winning” is also a lesson in growing!

**Vanessa Coelho-Santos**

Junior Leader (Assistant Researcher), Institute for Nuclear Sciences Applied to Health (ICNAS) and Coimbra Institute for Biomedical Imaging and Translational Research (CIBIT), University of Coimbra

Born in Portugal / Resides in Portugal

Educational Background: BSc in Biotechnology, MSc in Cellular and Molecular Biology and PhD in Aging and Chronic Diseases (Inter-University), Coimbra, Portugal; Post-doctorate at Seattle Children’s Research Institute and University of Washington, Seattle, United States

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**“ My experience as a Student Conference Support grant recipient at SPIE Medical Imaging 2023 was one of my greatest professional experiences. The various events allowed me to meet people from different places and research groups, including other students and professionals with experiences in different contexts but with aspects similar to those I deal with in my work. In addition, we were very well welcomed. ”**

—Arthur Costa, Lund University, Sweden

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### **“Appreciate your uniqueness.”**

Curiosity about fundamental science and the intention of benefiting human beings with technology inspired me to work in photonics, where fundamental science and real-world applications are closely connected.

I currently contribute to the hardware development of augmented reality. Specifically, I work on the photonic design of the waveguide combiner for the near-eye display.

My study opened new possibilities in the interdisciplinary area of nanophotonics and free electrons. I did my PhD thesis on dielectric

laser accelerators (DLAs), which utilize dielectric nanostructures to modulate laser pulses to accelerate electron beams. The goal is to build an efficient and compact particle accelerator on a chip. With a high acceleration gradient and a compact size, DLAs have a wide range of applications in scientific research, industry, and medical diagnosis and treatment.

The biggest obstacle that I have faced is lack of confidence. It took me a long time to overcome this obstacle, and it is a life-long journey to keep cultivating and solidifying my self-confidence. It's important to care for your mental as well as physical health; to step outside your comfort zone; and to continue to build your knowledge and competence.

It is also important to have a long-term goal in career development. It can guide you in making career choices. On the other hand, it is equally important to keep in mind that life is never a straight line. Be open-minded about things that you are passionate about, things that may diversify your experiences and leverage your uniqueness.

I wish someone had told me to allow myself to take bigger steps earlier on. When I started exploring a new field, I concentrated too much energy into building the technical foundations, rather than understanding the high-level principles. Thus, the mindset of taking small and solid steps sometimes delayed my progress of achieving an ambitious goal or exploring a new field quickly. I found that, in taking bigger steps, I learned much faster and developed a broader range of skills. Give yourself the chance to take on such challenges — it helps you move towards your long-term goal faster.

The path towards a successful career can vary from person to person. With the awareness and appreciation of your uniqueness, you may have more confidence in exploring your path towards your career goals. To those interested in STEM, I'd say keep your enthusiasm and persistence: you will enjoy yourself and shine in your field.

#### **Zhexin Zhao**

Research Scientist, Reality Labs Research, Meta

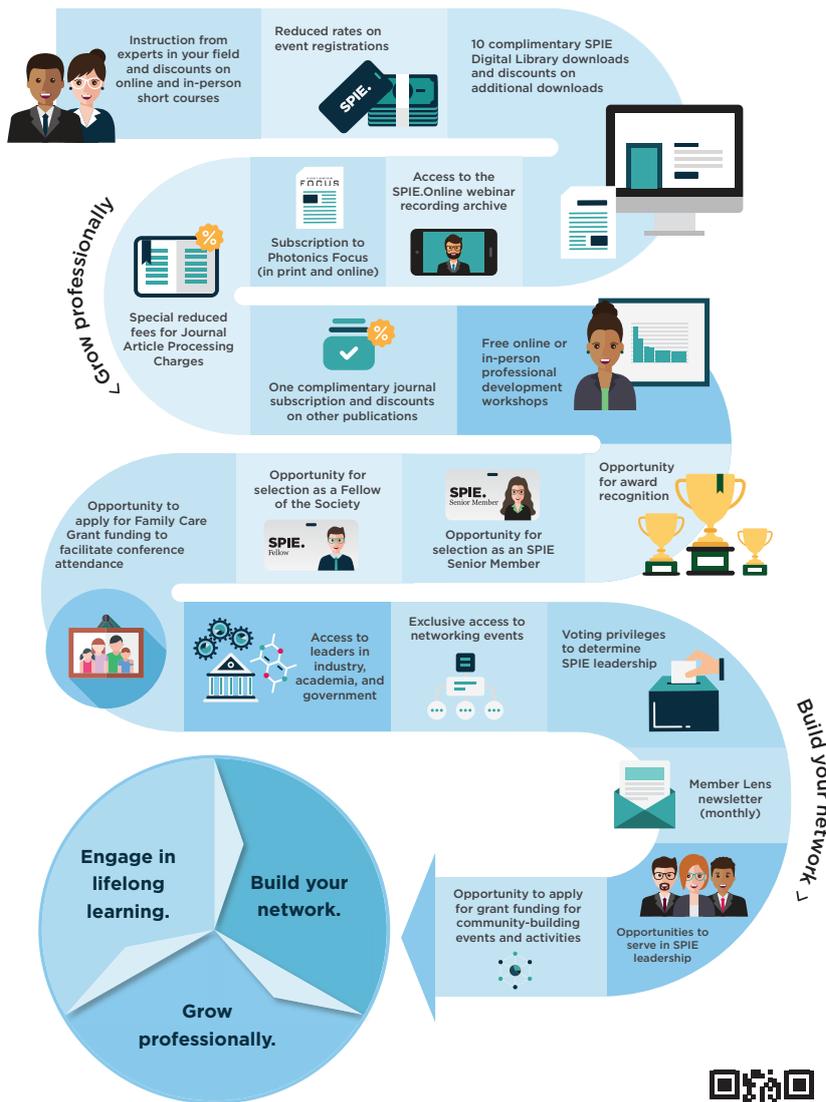
Born in China / Resides in China/United States

Educational Background: BS in Electronic Engineering, Tsinghua University, China; MS and PhD in Electrical Engineering, Stanford University, United States

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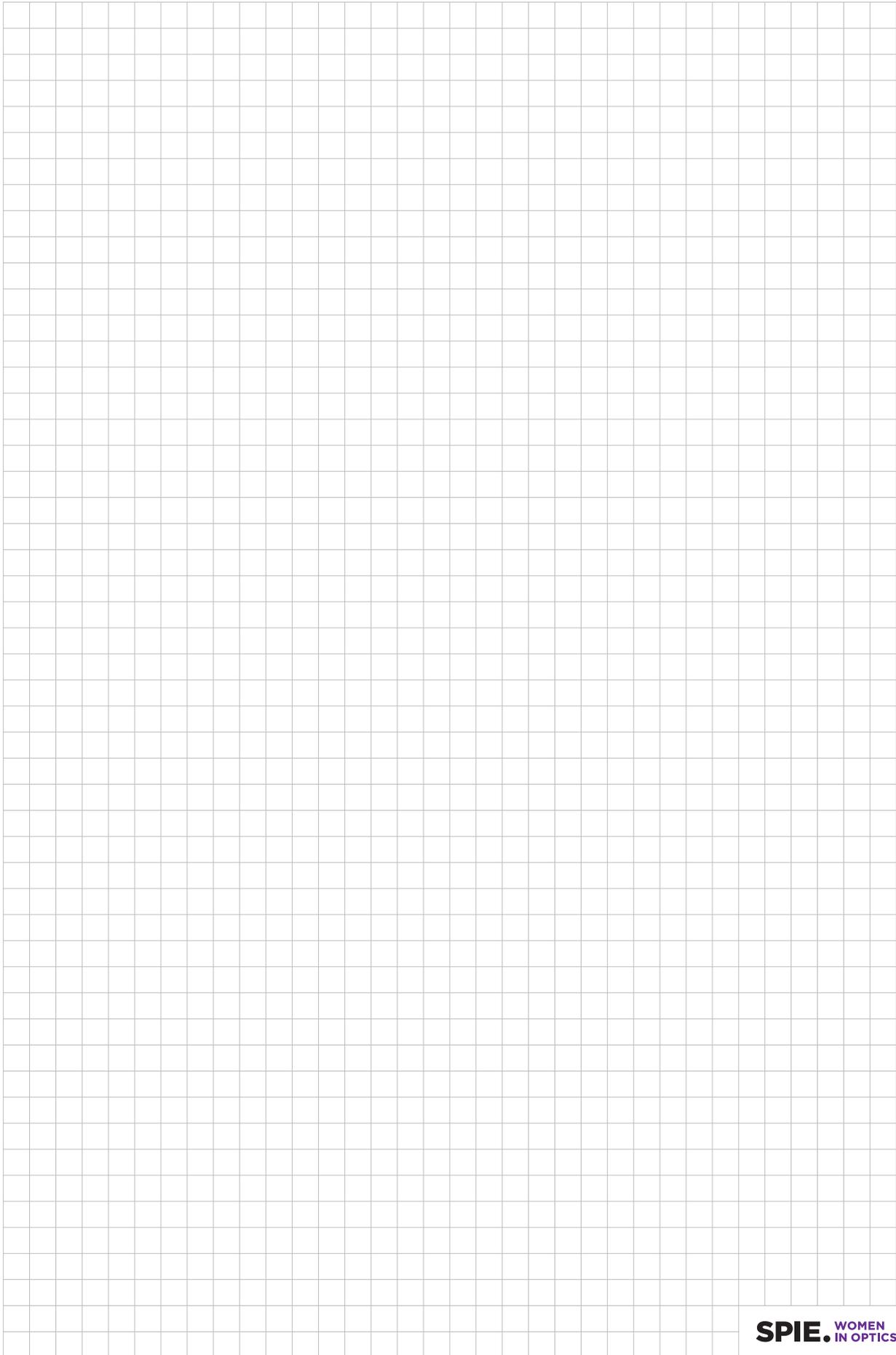


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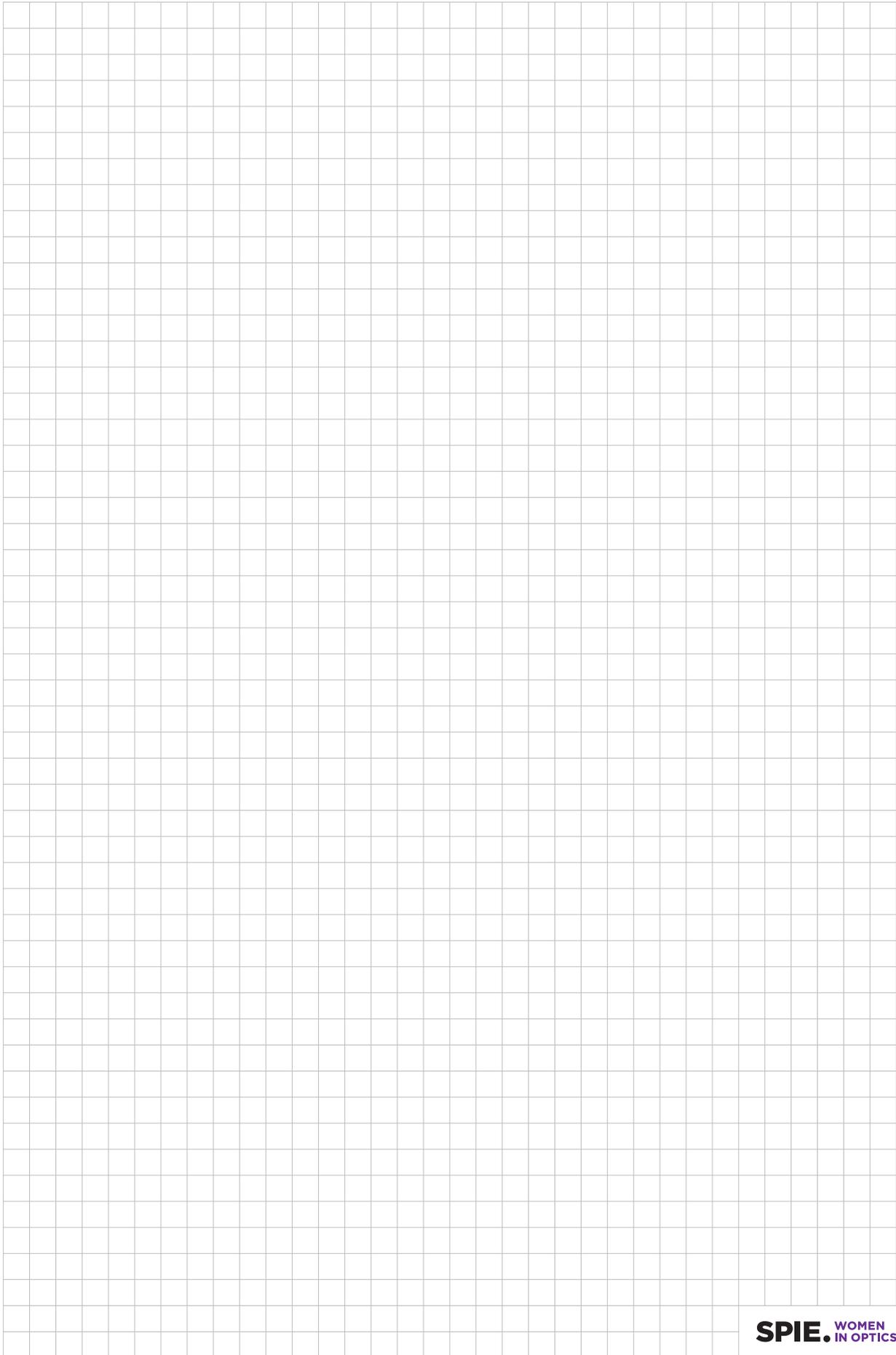
—Cherine Ghazouani

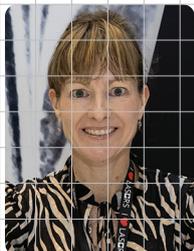




**“It’s OK to fail; in fact, it’s a necessity for growth!”**

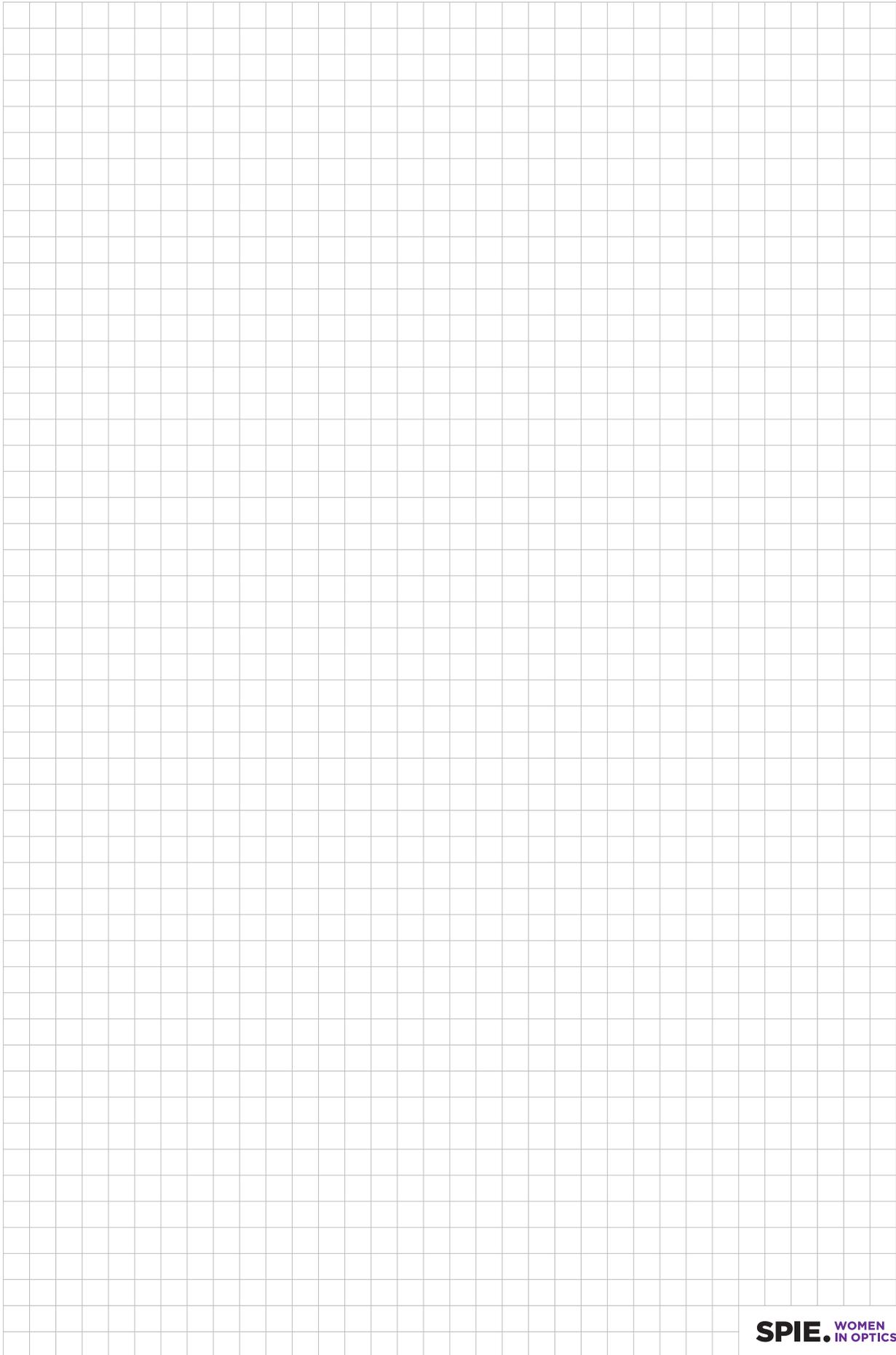
—Cristina Zavaleta





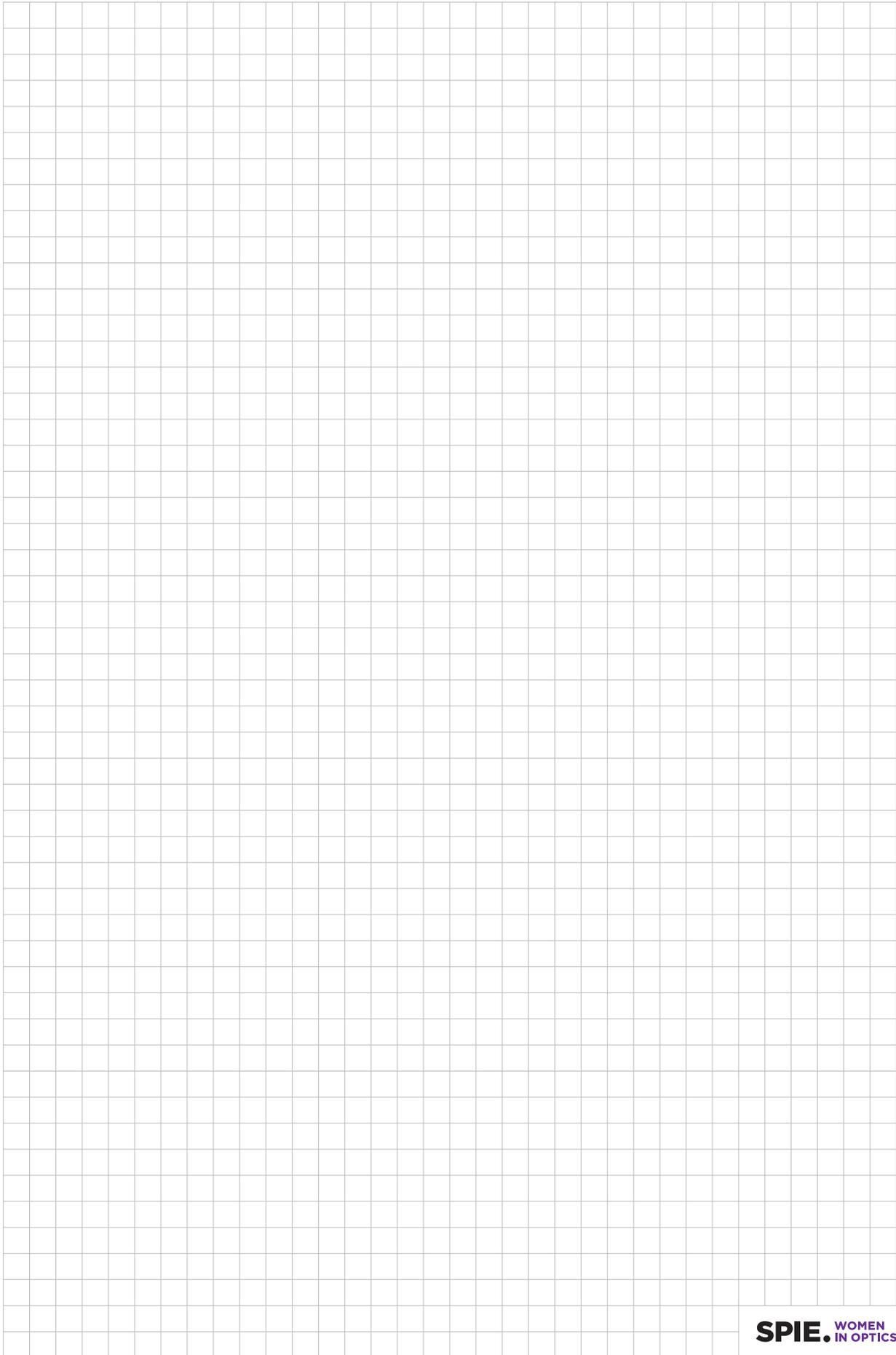
**“Our fields are eternally evolving, and that means there’s never a dull moment!”**

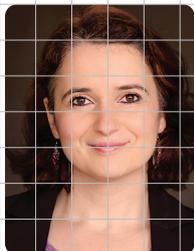
–Elizabeth Illy





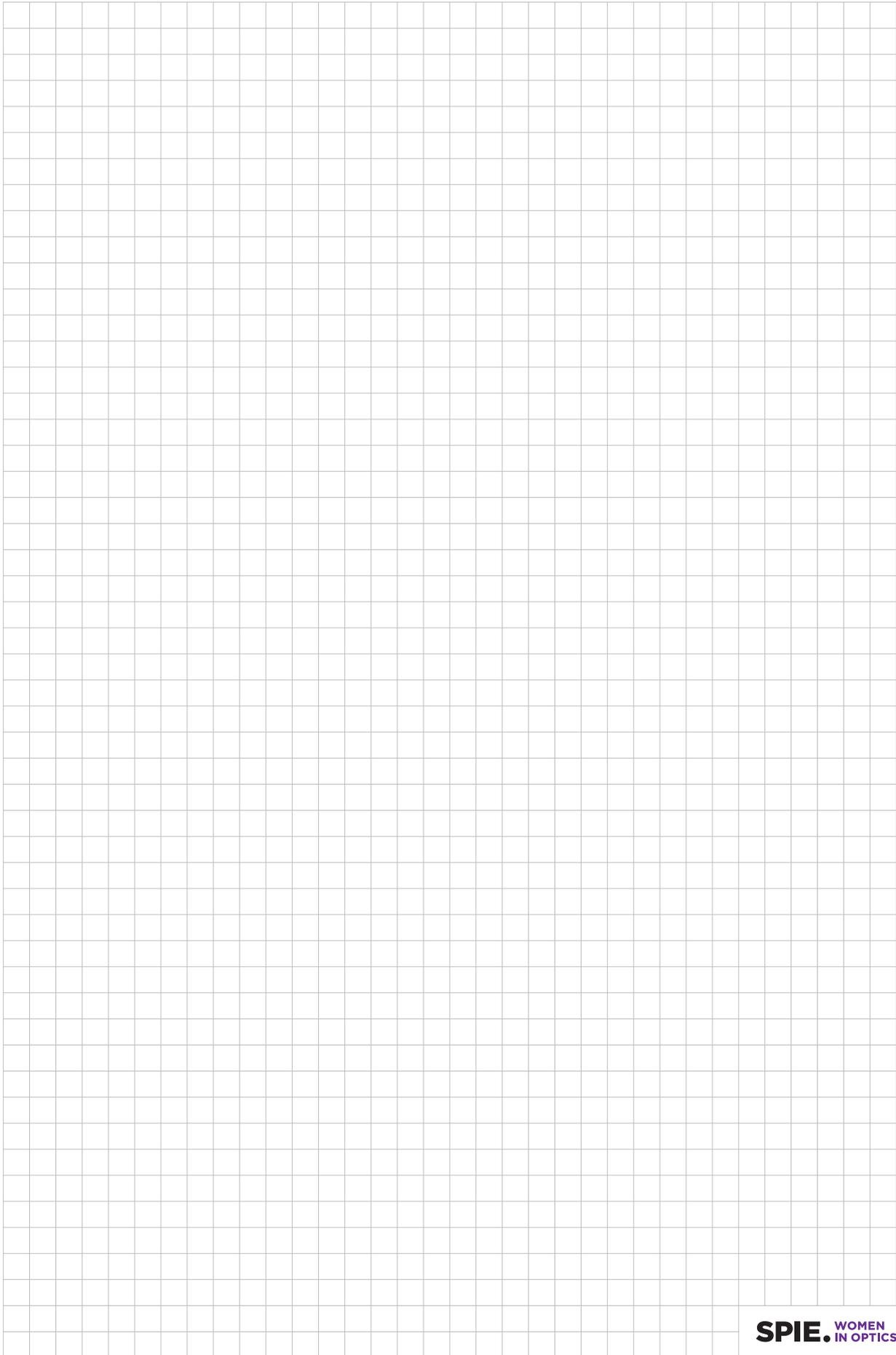
**"Follow your passion."**  
— Emma Xu

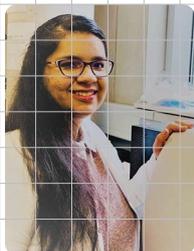




**“Believe in yourself,  
and don’t take ‘No’  
for an answer.”**

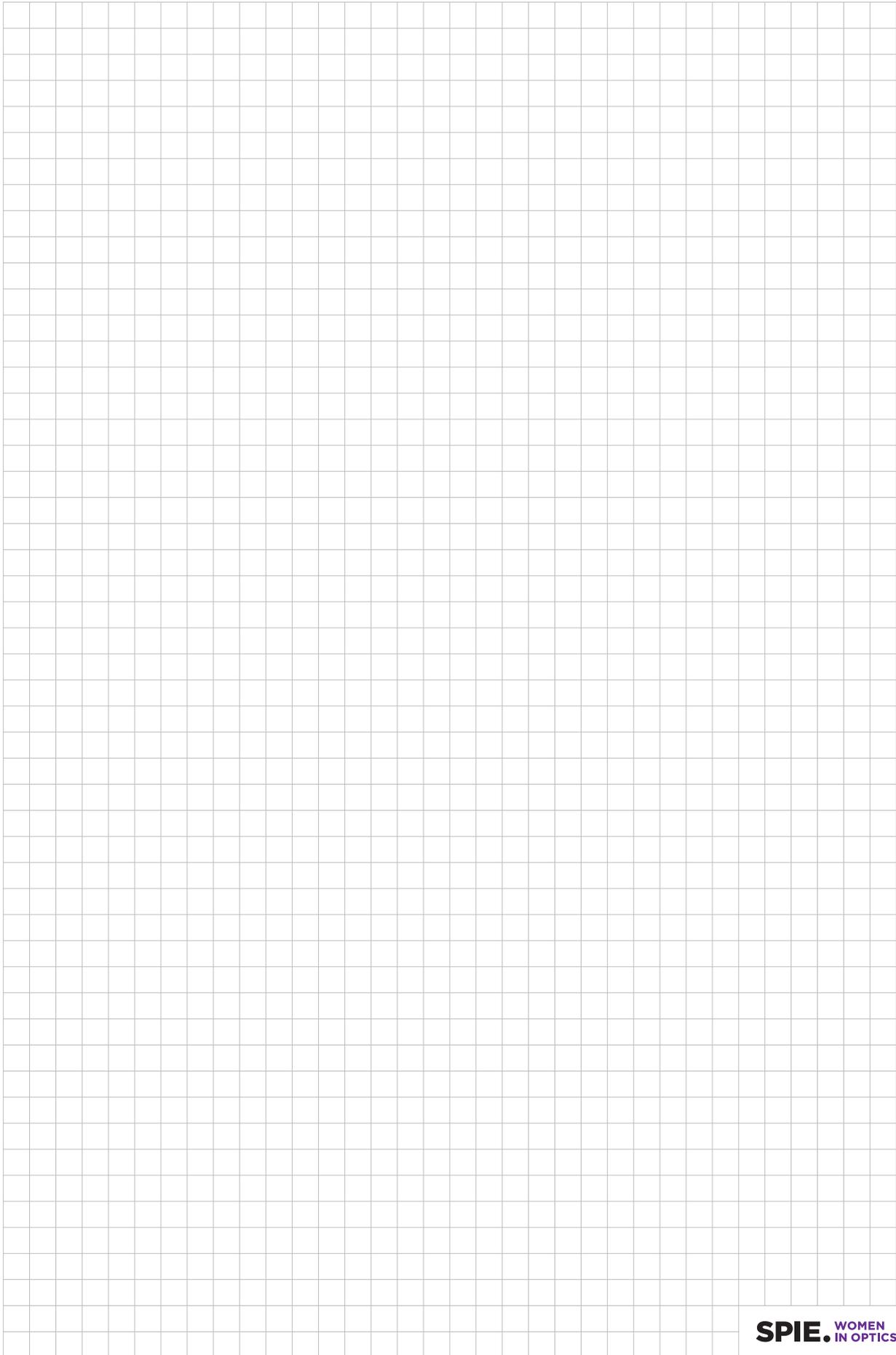
—Estelle Coadou





**“Science has no  
gender, race,  
or creed!”**

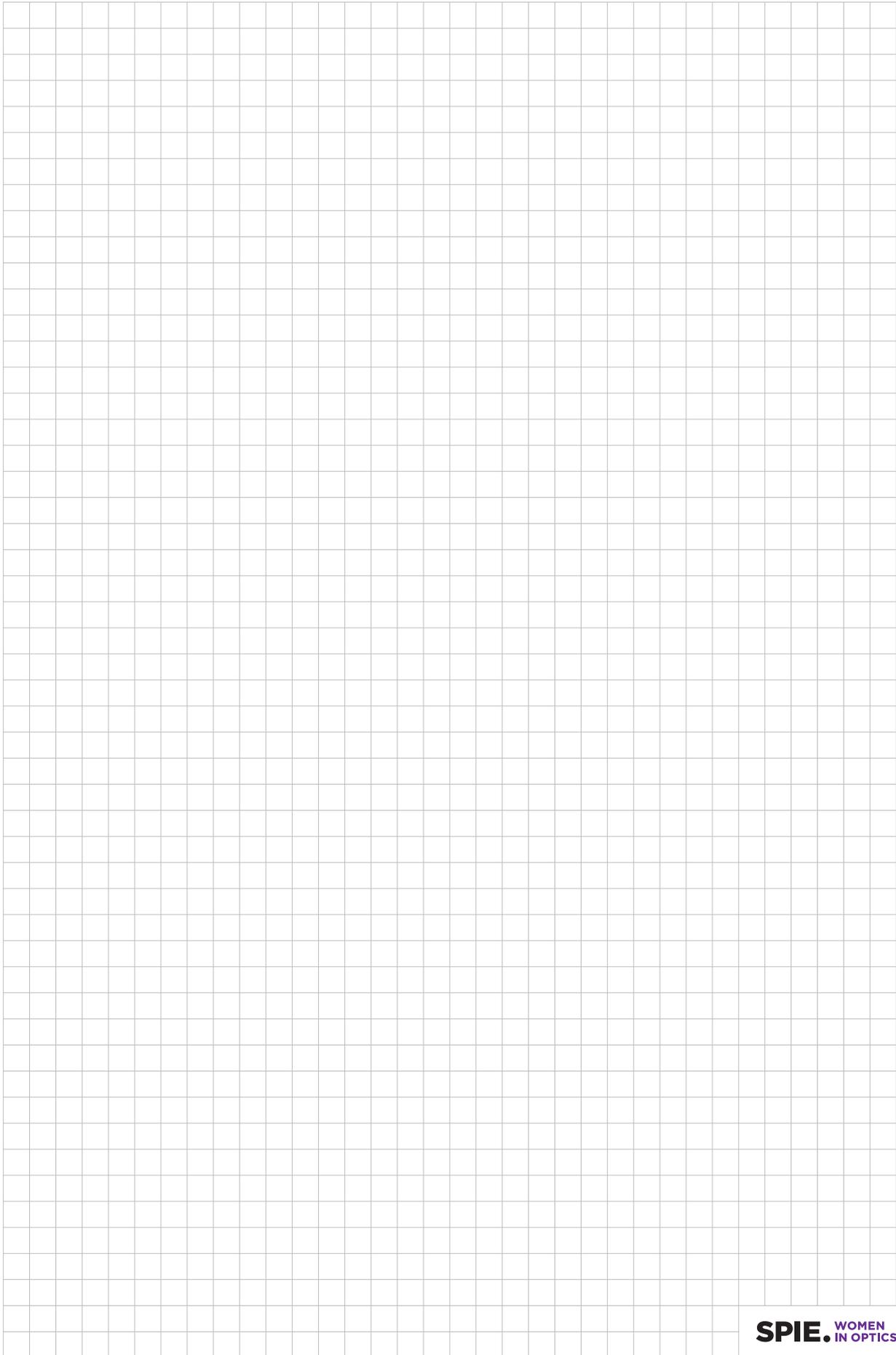
–Isha Behl

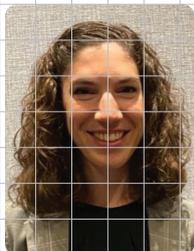




**“Become comfortable  
with being  
uncomfortable.”**

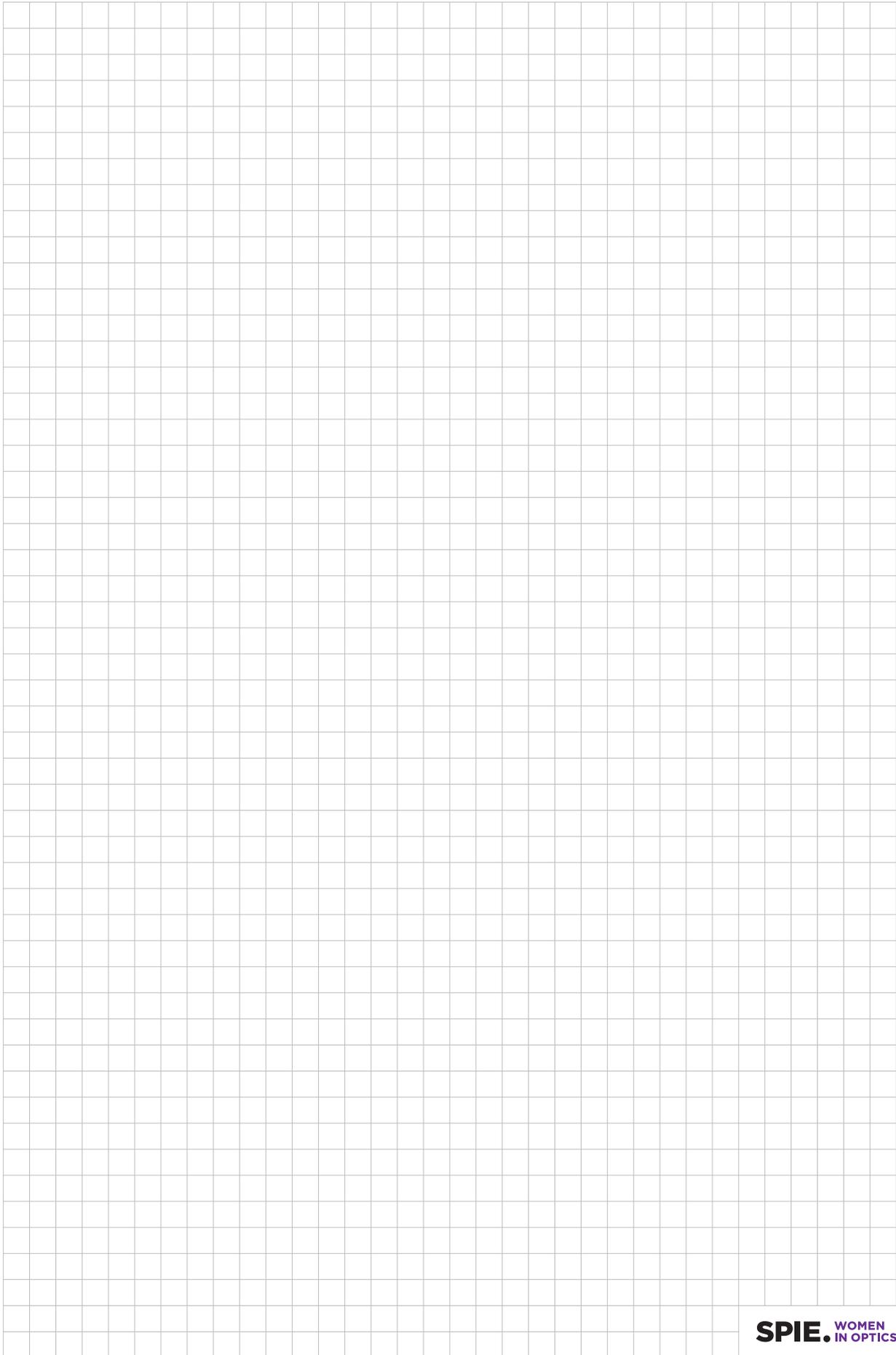
—Olga Sachkouskaya

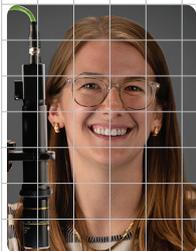




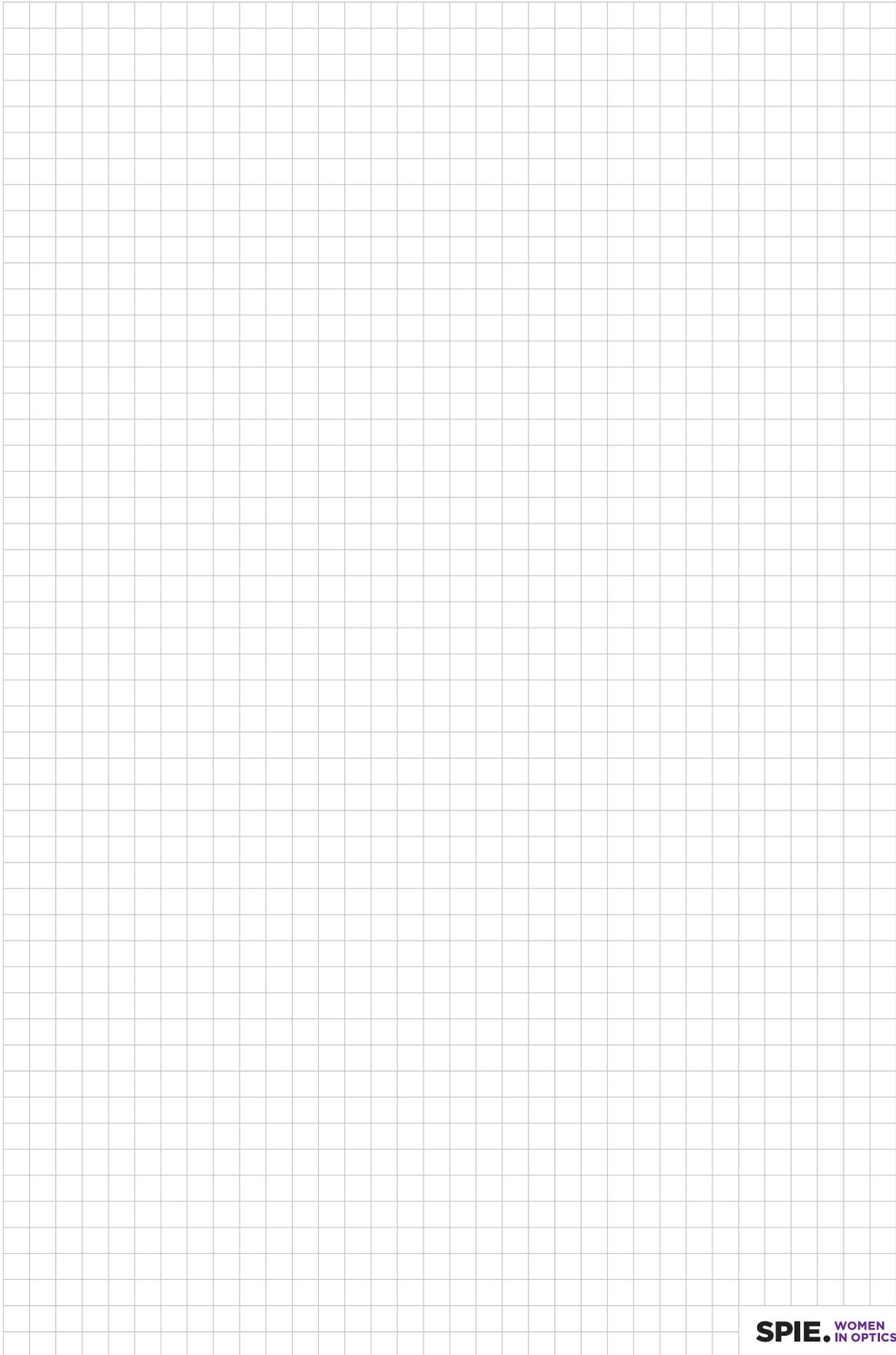
**“The strength of  
science is the  
diversity that makes  
up its community.”**

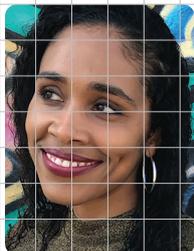
—Madison Rilling





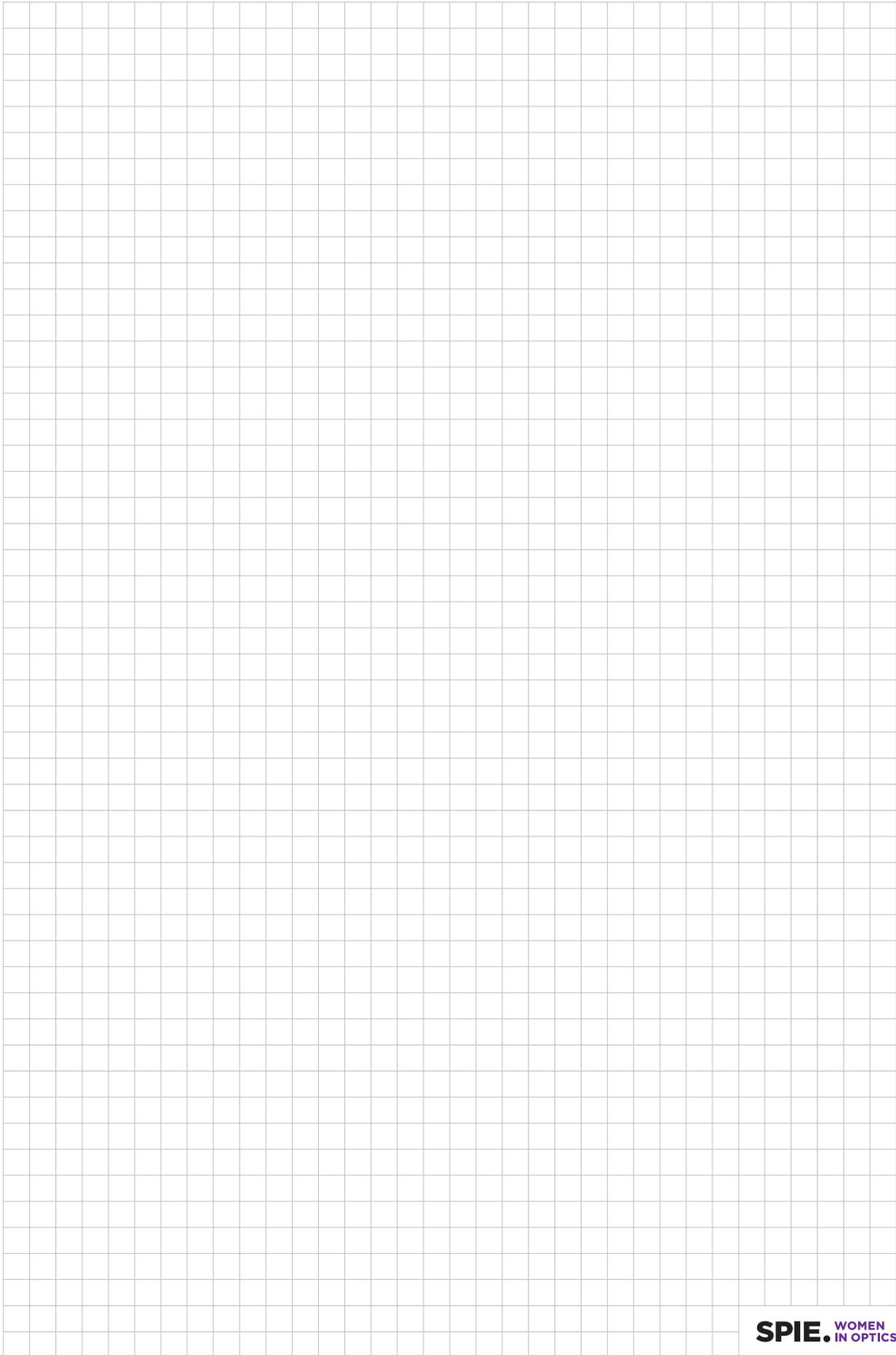
**“It’s OK to ask for  
help from others.”**  
—Rebecca Charboneau

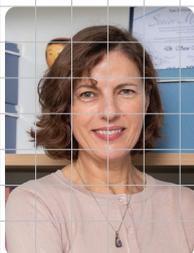




**“Be yourself. Believe  
in yourself. Be  
persistent.”**

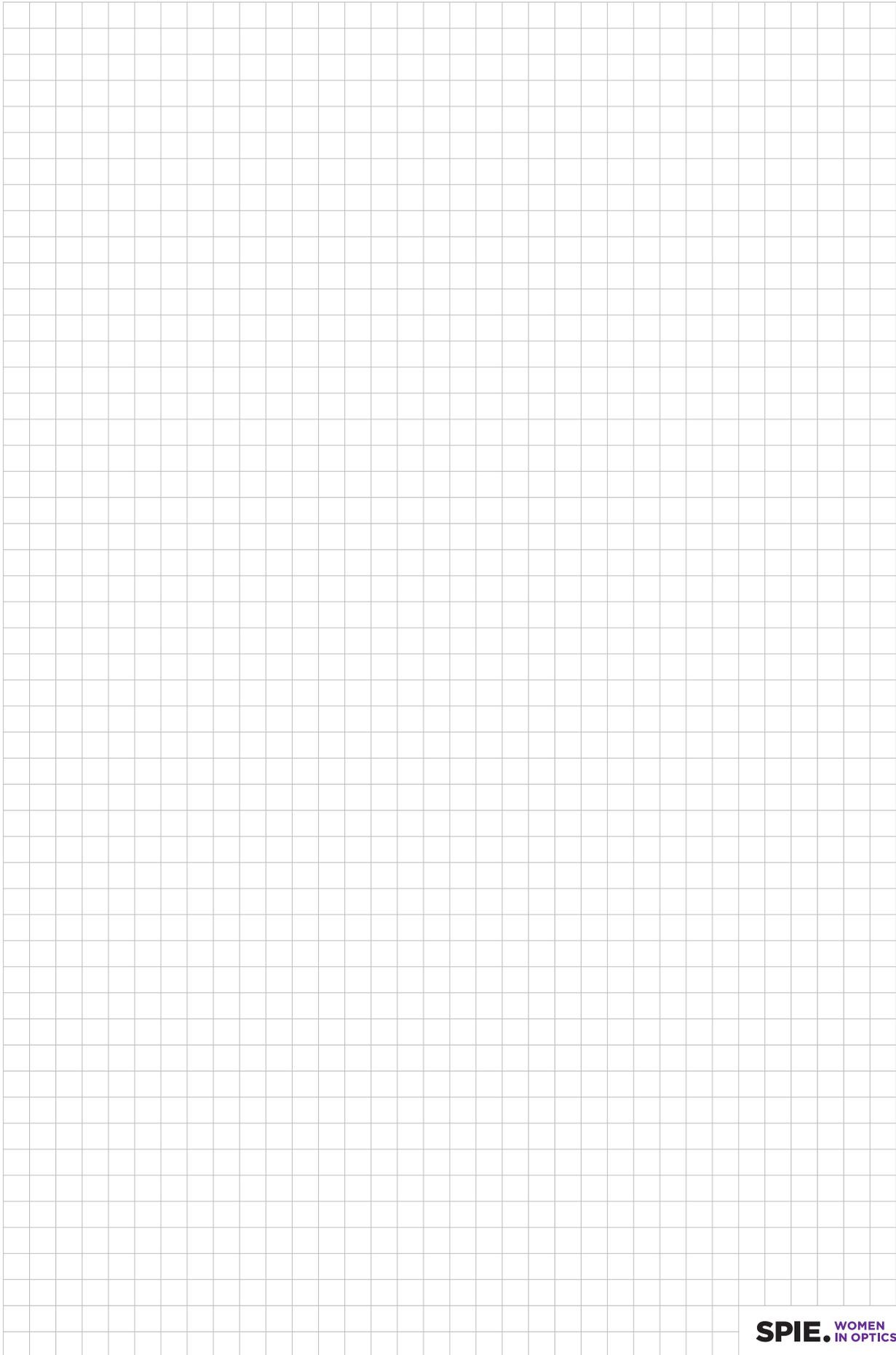
—Nia Imara





**“Be willing to step  
out of your comfort  
zone and jump into  
the unknown.”**

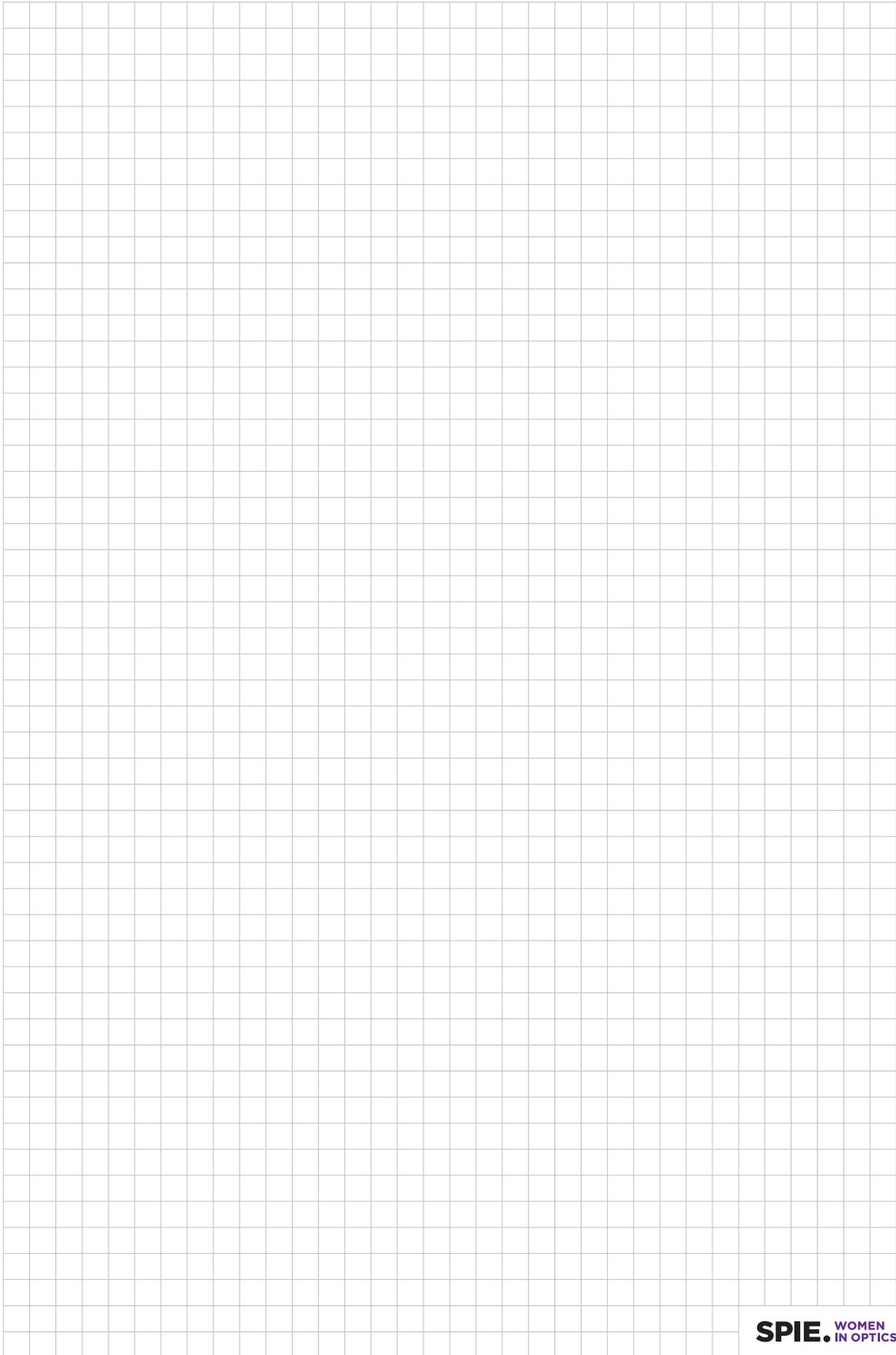
—Saša Bajt





**“Appreciate your  
uniqueness.”**

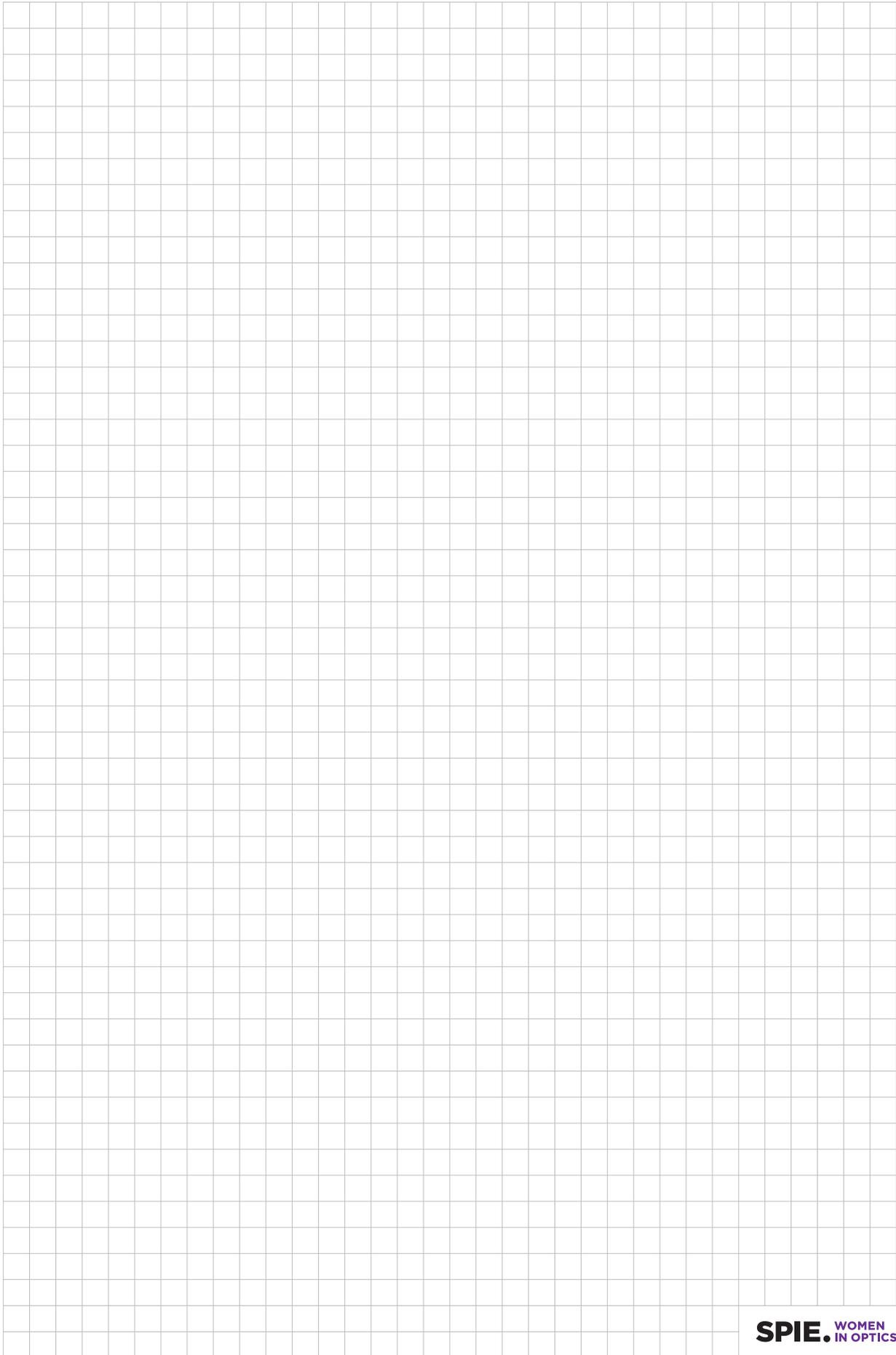
—Zhexin Zhao





**“Keep going! Nothing  
can stop you.”**

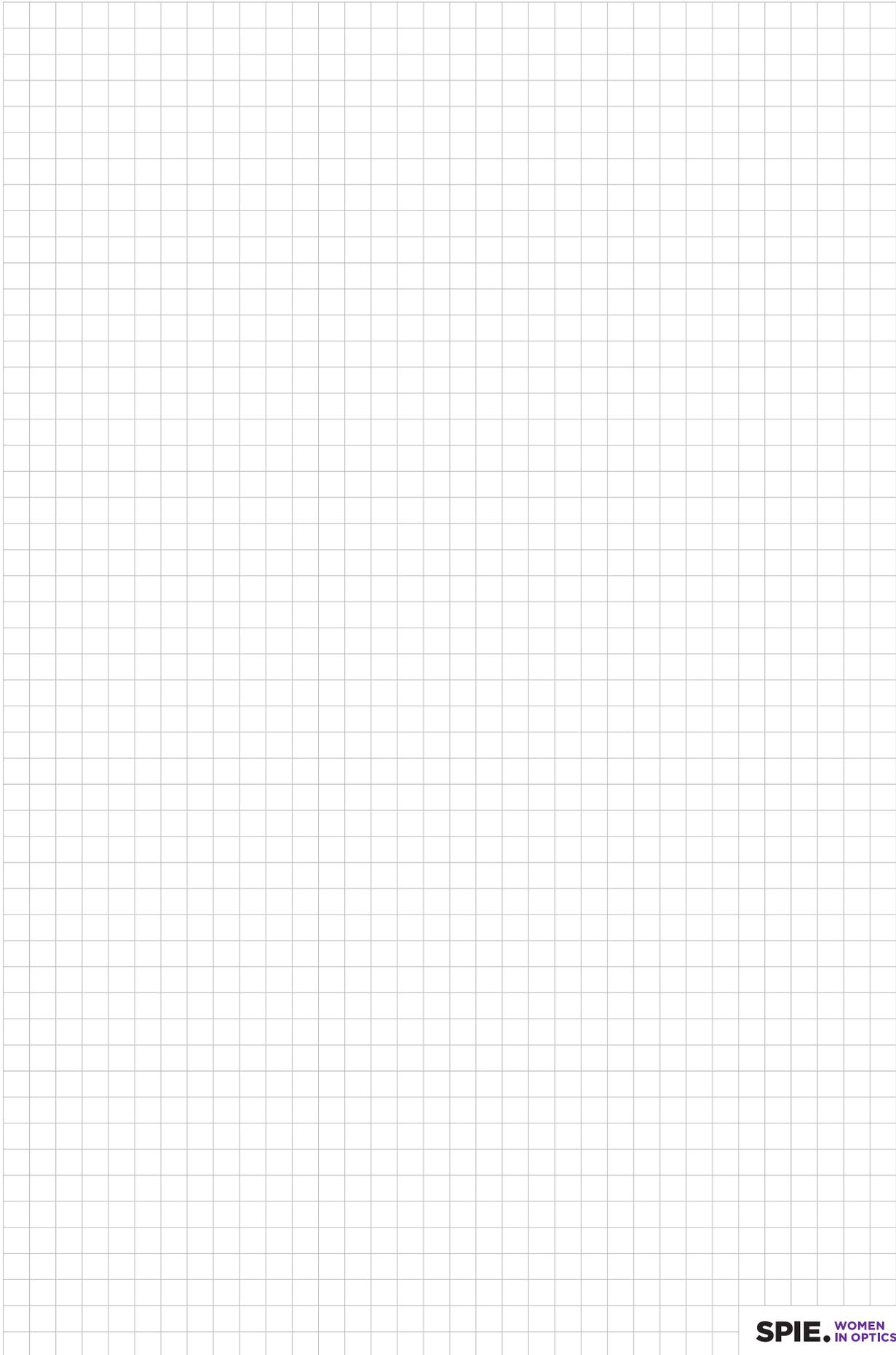
–Dalila Ellafi





**“Ignore all stereotypes as well as peer or family pressure.”**

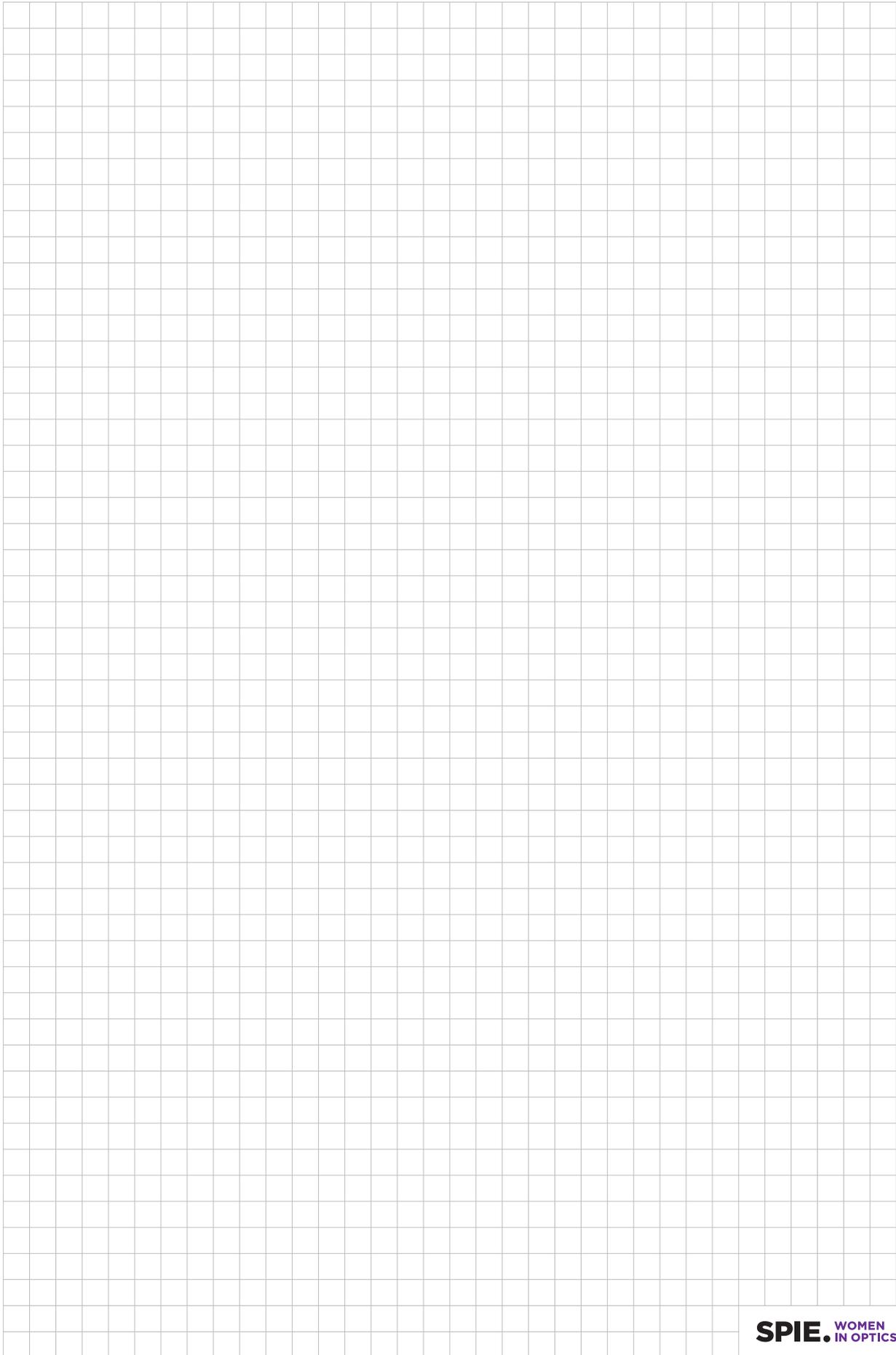
—Martha Vardaki

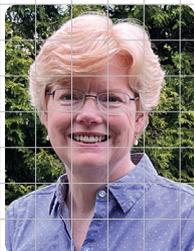




**“If you are  
dedicated and take  
responsibility for  
what you do, you can  
achieve anything.”**

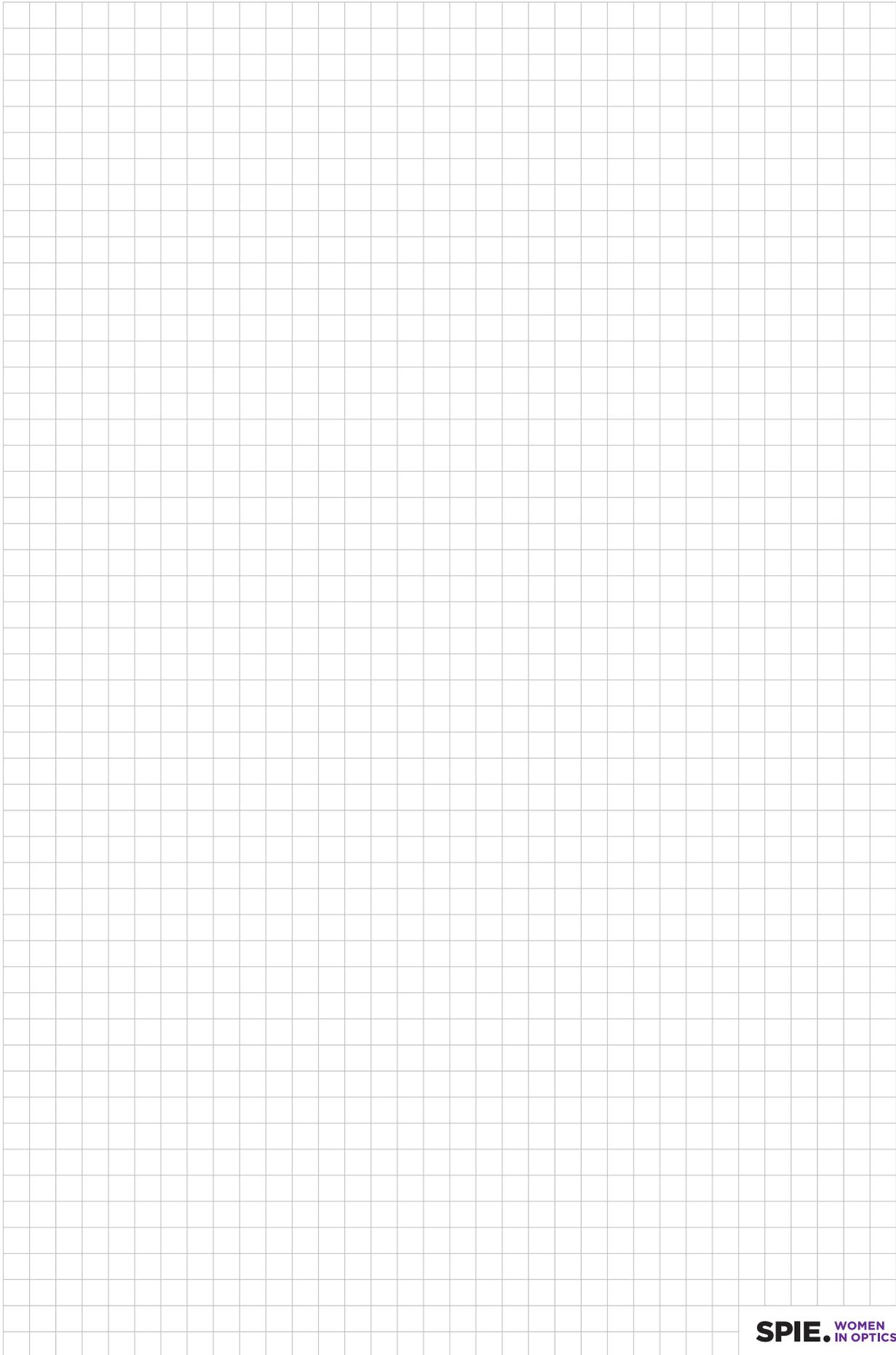
—Anna Gebarska

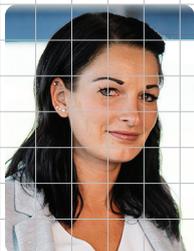




**“Keep an underlying sense of ‘Wow — this is so cool!’ as a reminder of why you’re in your field.”**

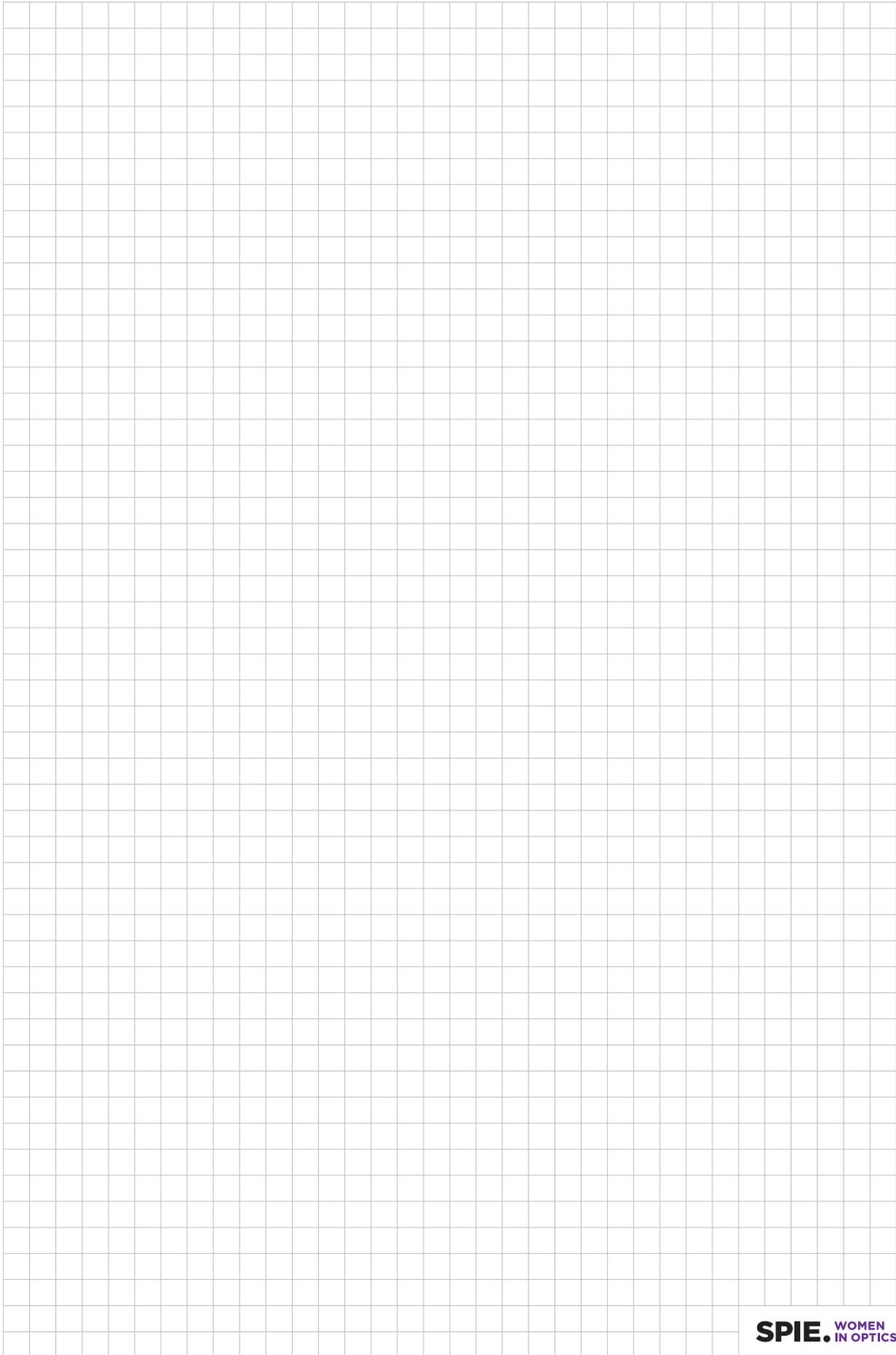
—Mary Kate Crawford

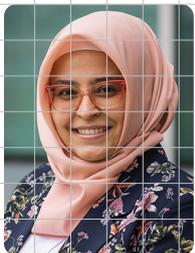




**“It doesn’t matter  
which way you  
choose and if you  
take a detour; it  
only matters that  
it’s feeling right.”**

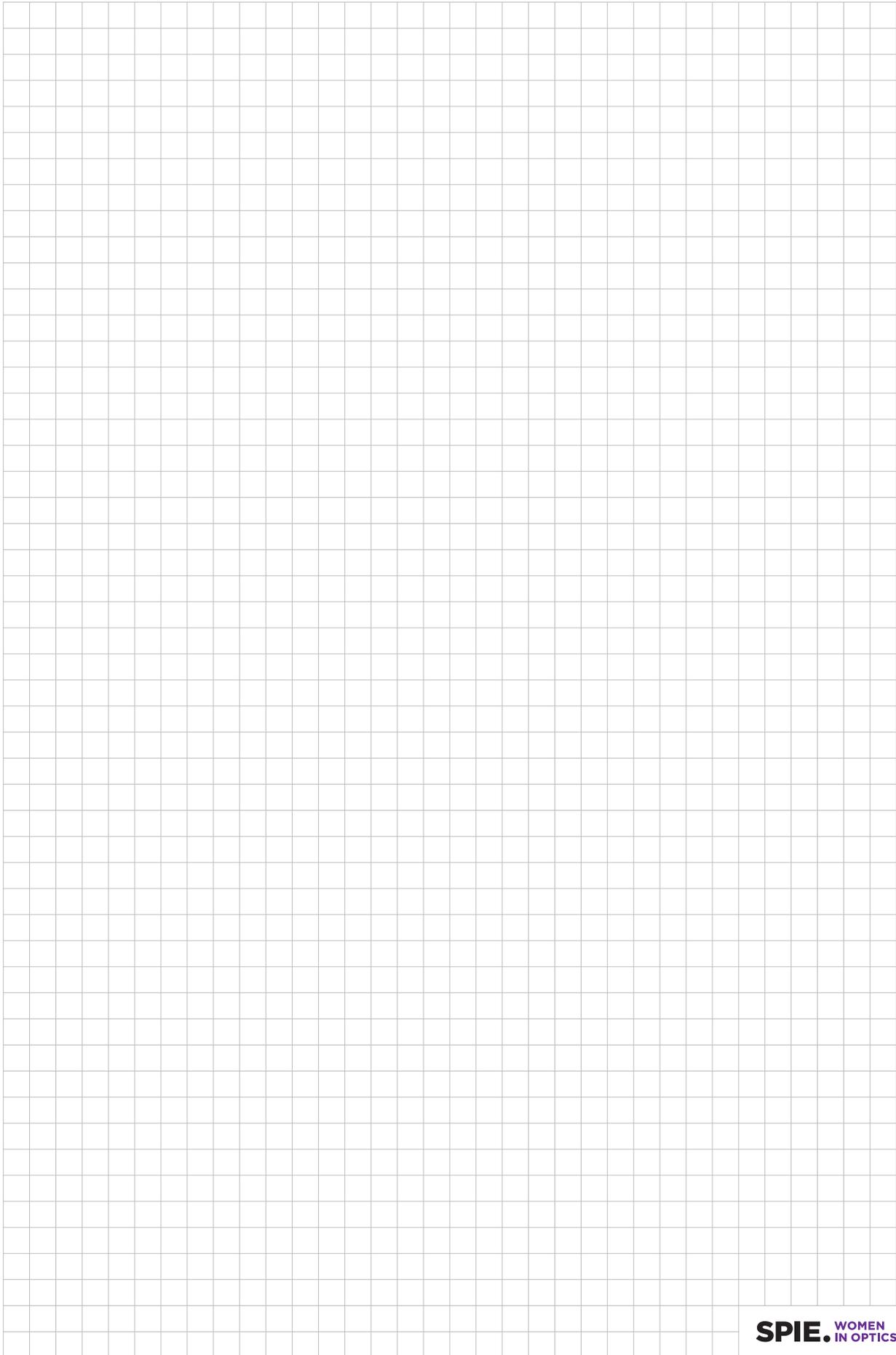
—Claudia Rabis





**“If STEM is your  
passion, you  
belong here.”**

—Ikbal Şencan-Eğilmez



# 2025

## January

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

## February

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	

## March

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

## April

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

## May

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

## June

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

## July

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

## August

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

## September

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

## October

S	M	T	W	T	F	S
		1	2	3	4	
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

## 31 November

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

## December

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

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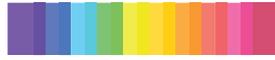
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SPIE has produced the annual Women in Optics notebook\* (\*formerly a planner) and provided it free of charge to young students and accomplished professionals alike, from countries throughout the world, since 2005.

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Know someone who should be featured in this production? Nominate inspiring women in STEM for the 2025 Women in Optics notebook — and find out more about the SPIE Women in Optics program — at [spie.org/wio](https://spie.org/wio).

