

ACADEMIA TO SUBSEA FIBER OPTIC CABLES: THE OPPORTUNITIES OF A STEM CAREER

By Dr. Lorraine Gray
Pioneer Consulting



Lorraine Gray is an expert in marine permitting and regulations. She has guided permitting efforts in some of the most crucial submarine fiber optic cable projects underway, including trans-Atlantic and trans-European projects.

My STEM career began with my first degree in Environmental Biology. I really loved the research aspect, reading and reviewing scientific papers, writing critical essays, and doing laboratory work. This prompted me to approach one of my professors, whose classes and subject matter I enjoyed, to ask if she had any job or research openings, since I was interested in pursuing a PhD. Generally, if you want salary growth, a PhD is helpful – of course, a career in STEM is possible without this qualification, but progression is quicker with it. As my mentors told me, a PhD is also a great passport to the world, and that sentiment has certainly rang true for me.

My professor offered me the opportunity to conduct lab trials. This came with the possibility of a PhD research program. These trials were successful and led to even more questions that needed answers. This is a key requisite to winning funding – gather some hypotheses, test them in the lab, and then apply it to the outside world. I gathered my proposal and applied for research

scholarships in Australia. My professor had connections there – a partnership with an affiliate institution is also a pre-requisite to winning funding. I was really fortunate to win three scholarships, which allowed me to spend three years in Australia doing field work for my PhD. I have great memories from my time there – hot summer days, walking through giant sticky spider webs, cooling off by wading in rivers, doing a TV interview for a children’s program, and getting lost in the Sydney suburbs (these were pre-Google Maps times)!

STEM – TO DO A PHD OR NOT?

From an early age, I learned that education is the route to achieve financial independence. The best piece of advice I could ever give is to not depend on anyone else for financial stability. I firmly believe that education expands the mind and creates new opportunities to explore the world beyond where we reside. In the end, it’s so much more than the financial reward.

Doing a PhD is a great learning experience, not just in academic disciplines, but in developing key skills that you just can’t get in undergraduate courses. For me, these included presenting at conferences, which is normally left to more experienced staff in a company; teaching, which is a great way to sup-



My early career days as a PhD candidate/

plement your PhD salary; and project and business development skills. These are all transferable and valuable skills, regardless of whether you stay in academia or not.

After my PhD, I did teaching, which was a great learning experience. When you are a student, I feel that you don’t really learn a subject in the same way as having to teach it. As a university lecturer, you must truly understand your material, in addition to defending your grading decisions. Such experience allows for development of a well-rounded and robust review system, which is critical in STEM industries.

SKILLS – GO TECHNICAL

I decided to move away from the city and my work in academia, so I took a job in the Shetland Islands off Scotland. I really enjoyed working for the local council in this fantastic location that was rich in natural beauty. It was then that I learned how to map important features on land using Geographical Information Systems (GIS), building upon my knowledge of government systems and regulations.

This experience led me to begin working for a high-profile government project mapping marine features at sea. Due to the nature of the project, I spoke at many conferences and before the Scottish Parliament, providing evidence for new marine management legislation.

I've since worked across most sectors, including: oil and gas, renewables, aquaculture, ports and harbors, and more recently, fiber optic cables. Sub-sea fiber cables, which are laid on the ocean floor, account for over 95% of the world's internet usage, a fact that many people are not aware of since the cables are not visible.

The beauty about a career in permitting and environmental consultancy is that there are a lot of cross-cutting issues with only the engineering design that changes. On this path, you gain knowledge in engineering and construction, as well as in the natural sciences. Because these industries are governed by regulation, there are options to work in government as well, which I have done



for half my career. It can be a very diverse career path and is one which continues to inspire me.

“In my opinion, what ambitious young person wouldn’t want to work in STEM?”

In 2017, the U.S. national average wage for all STEM occupations was \$87,570, nearly double the national average wage for non-STEM occupations (\$45,700). From a gender perspective, however, in government female representation in STEM occupations is lacking. This is a big concern of mine, because research shows that equal voice changes what humans prioritize.

The technology sector, especially subsea cables, has a largely male demographic. I believe that men play a crucial role in creating opportunities for women and can be game-changers when it comes to banishing gender limitations. The subsea fiber optic industry is actively working to encourage more women to enter the field and we’re experiencing a boom right now, due to humanity relying even more on the internet for everything from work to socialization.

How can *more* women become involved in STEM?

Today, there is tremendous opportunity for women in STEM careers, and their

contributions to the workforce are what improve our perspectives and society for the better. But, there is still much to be done to close the gender gap in STEM industries.

What can we all do to encourage more women into STEM? I believe that confidence is an issue that especially affects young girls and directly has an impact on ambitions and self-assurance. Research from the Organisation for Economic Co-operation and Development shows that adolescent girls express a greater fear of failure than boys. I think on some level, a lack of self-confidence negatively impacted my advancement professionally.

Perhaps the reason science subjects are less popular with girls is because they require trial and error (where accepting failure is par for the course). This is particularly difficult for young girls, who are generally expected to consistently achieve perfection. Empowerment is a critical element of gender equity. The following steps are just some of the things that can be done to support women in STEM:

1. Showcase Successful Female Role Models

Seeing a woman’s achievements, especially on social media, can lead to more attention being paid to women in professional settings.

This could, in turn, inspire young people to get involved in STEM subjects. I'm fortunate to work for a company that publicizes the achievements of its female employees and helps show what's possible for women in the field.



Top 25 Women In Technology

2. Workplace Transparency

When faced with an obstacle as a woman in STEM, it is crucial to be confident and honest in expressing your concerns. It is not a weakness to speak up, as I once may have thought. You may find that you receive support and encouragement from your colleagues. You'll also forge a path for other women at your company, and make others feel less alone.

3. Mentorship

I cannot say this enough: finding a mentor, whether a family member, colleague, or friend, will go a long way. Look for someone you admire, and don't be shy about initiating the mentorship! Chances are, your mentor had someone to guide them as well.

4. Investing in the Future with Confidence

My time as a lecturer intensified my passion for getting young, hard-done-by kids and mature students to return to education in STEM fields. I wanted to share my passion for the natural world with them. The students inspired me by being a reflection of my younger self. It takes true perseverance and curiosity to succeed in STEM industries, but in the end, it's worth it.

ABOUT THE AUTHOR -

With 20 years of experience in marine management, Lorraine is an expert in marine permitting and regulations. She has guided permitting efforts in some of the most crucial submarine fiber optic cable projects underway, including trans-Atlantic and trans-European projects. She previously worked for the Scottish Government as a Cable Specialist, issuing licenses for survey and installation.

For seven years, Lorraine served in government working in marine policy. During this time, she wrote one of the world's first Marine Spatial Plans (Shetland Islands), a statutory instrument in the Scottish planning regime that helps developers decide on site selection and

environmental assessment requirements.

Utilizing her academic background in fisheries science, Lorraine wrote fisheries, fish ecology, benthic and marine mammal impact assessments for five years for the renewables and oil and gas industries. Since then, she has carried out projects zoning cables, renewables, and aquaculture for Scottish and English governments, and written guidance on zoning for the European Commission.

She is currently Director of Permitting at Pioneer Consulting, which provides full-service submarine fiber optic telecommunications consulting and project management.

