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Women in STEM: Academics' Advice for Young Women

Women earn a larger share of conferred degrees yet they earn fewer degrees than men in science and technology; furthermore, women end up filling less than 25% careers in STEM. The fact that women hold 7.5 percent of all patents and commercialize only 5.5 percent demonstrates there is a huge gender gap in the STEM field.

Why is there such a huge gender gap for women? Why are not more women looking to become scientists, engineers, and patent more technological innovations?

What can women do to bridge this gap?

NerdScholar talked to some of the most successful women in the STEM field and they bring their advice to the young women who want to grow careers in science, technology, engineering, and math. Here are the five questions they answered:

1. What was the biggest influence that led you to pursue a career in STEM?
2. What do you see as being the most effective solution to getting more women involved in STEM careers? And what are some of the misconceptions about women in STEM careers?
3. How can institutions of higher education make the process easier for women to get involved?
4. If you could give your younger self one piece of advice, what would that be? Or what advice would you give other young women thinking about a STEM path?
5. Are there any programs out there that you would recommend to young women to take advantage of?

1) What was the biggest influence that led you to pursue a career in STEM?

"I got excited about science through classroom field trips in the 10th grade. My biology teacher took my class to a mudflat and we spent a couple of hours digging for clams. I've been hooked on marine invertebrates ever since. Female scientists should visit schools and have face to face interactions with students and share their career experiences; this would give the middle or high school student an informed perspective on what it's like to work in a STEM discipline."

-Dr. Nancy Frances Smith, Associate Professor of Marine Sciences at Eckerd College in St. Petersburg, FL

"Seeing other young women majoring in engineering at Rice and being encouraged by my parents to study engineering [motivated me]."

- Dr. Alison Whittemore, University of the Incarnate Word in San Antonio, TX

“A wonderful attentive high school mathematics teacher who engaged me with problems and gave me individual attention [motivated me]. He also congratulated my success publicly, which is rare for male teachers to female students.”

-Dr Diana Thomas, Professor of Mathematic Sciences at Montclair State University in Montclair, NJ

“Education was always a huge emphasis in my family. From the time I was young I KNEW I would go to college – My parents made sure of it. It didn’t matter what I decided to major in, but I WAS going to college. In High School I had excellent Chemistry and Math Teachers (Mr Mullen and Mr Fife) – I had always leaned towards science, but they helped me solidify my specific path. Also, my Chem teacher for my freshman year at college was (and still is) a great mentor. Dr Cullen believed in me and pushed me to continue on when times were hard. I like Chemistry because it is very logical. There is a “right” answer to most questions. That type of order makes me happy.”

-Amy Hanks, M.S., Chemistry Department Brigham Young University-Idaho in Rexburg, ID

2) What do you see as being the most effective solution to getting more women involved in STEM careers? And what are some of the misconceptions about women in STEM careers?

“The biggest solution to getting more women involved is to have a critical mass of women who receive extreme public recognition for their work. By this I mean female medalists and female Nobel Prize winners; females on guideline boards making scientific and engineering decisions for our nation; females who are CEOs of large companies (although not STEM, they are leadership positions). Although this is circular, consider this. I have repeatedly asked my students at the beginning of the year in a general education math class to describe a mathematician. They are even allowed to draw pictures. They draw and describe Einstein. The day they instinctively draw someone who looks like me, we have solved the problem. They will only do this when there are enough females not only in STEM careers but who have been publicly recognized for their outstanding achievements.”

-Dr. Diana Thomas, Professor of Mathematic Sciences at Montclair State University in Montclair, NJ

“Having more role models. Most women currently involved in a STEM field will tell you that observing other women in a STEM field helped them realize it is possible for them. There are women involved in many STEM activities (teaching, research, writing, etc). Some are easy to find, but some take some digging. If women role models were easily accessible, I think more women would realize that it is possible for them to have a career in STEM.”

-Amy Hanks, M.S., Chemistry Department BYU-Idaho in Rexburg, ID

“The biggest obstacles for girls in STEM are bias and stereotypes. STEM professionals do look like you and me. “

-Rosalyn S. Hobson Hargraves, Ph.D., Associate Professor, Department of Electrical and Computing Engineering at Virginia Commonwealth University (VCU) School of Engineering in Richmond, VA

“Female scientists should visit schools and have face to face interactions with students and share their career experiences; this would give the middle or high school student an informed

perspective on what it's like to work in a STEM discipline. Mentoring of course is invaluable. Mentors can provide great career advice and help build confidence in younger women. I owe my career choice to my biology teacher – her passion for biology was infectious and she made science seem exciting and accessible.”

-Dr. Nancy Frances Smith, Associate Professor of Marine Sciences and Biology at Eckerd College in St. Petersburg, FL

3) How can institutions of higher education make the process easier for women to get involved?

“There are sometimes STEM departments that do not have any women faculty. This usually isn't a specific act of discrimination – there are just a certain number of women STEM faculty, and they can't be in more than one place at a time. If institutions of higher education recognize this, and let women students know about other women faculty members (even if they aren't in their department or college) it could help those students. Also, as a STEM faculty member I need to be willing to mentor women students, even if they aren't in my [field].”

-Amy Hanks, M.S., Chemistry Department BYU-Idaho in Rexburg, ID

“Early influencing in guiding young girls into science, math, engineering, and technology can never begin too early. As young girls show aptitude and interest in these areas, the skill set should be noted, encouraged, and developed with education and real world experiences. Examples, mentors, role models in these fields should be part of any well-rounded education. Girls in middle school are just forming ideas, opinions, and higher level thinking skills and STEM outreach at this age would capture and engage potential talent in the formative stage. Women are half the population and should represent half the workforce in these lucrative and rewarded fields.”

-Brigid Siegel Polachi, Access Executive Search

4) If you could give your younger self one piece of advice, what would that be? Or what advice would you give other young women thinking about a STEM path?

“Never be afraid to take a leadership position not just if it is offered, but to seek these opportunities. Apply for things. Shoot high. I always spent my time underestimating myself, while my male colleagues leaped at opportunities.”

-Dr. Diana Thomas, Professor of Mathematic Sciences at Montclair State University in Montclair, NJ

“Keep going – you can do it! It is often hard, but if you work hard and do the best you can, it will work out. Your path might not be the same as you expected or hoped, but keep going. The universe has a way of getting you to where you are supposed to be.”

-Amy Hanks, M.S., Chemistry Department BYU-Idaho in Rexburg, ID

“The most important things for girls to do if they are considering a career in a STEM field are to do well in school, take upper level math courses, and participate in STEM extracurricular programs like FIRST Robotics and science camps. Most STEM professions require post-secondary education and often you have to apply and be admitted to those programs. These programs typically look at how you perform academically in your classes to judge whether or not

you.”

-Rosalyn S. Hobson Hargraves, Ph.D., Associate Professor, Department of Electrical and Computing Engineering at Virginia Commonwealth University (VCU) School of Engineering in Richmond, VA

“Show up for class and study harder. Treat your academics like an 8-5 job.”

- Dr. Alison Whittemore, University of the Incarnate Word in San Antonio, TX

“As an anomaly in my freshmen year of college, a female student from Catholic school with less Math and Science than male students from the Bronx High School of Math & Science, I felt overwhelmed, insecure, and doubted my ability to succeed and compete. I was afraid of failure and not measuring up and shared my concerns with an approachable professor. His response was pivotal in changing my outlook- he assured me that the raw skill set was there but I was too hard on myself. He counseled me to let the higher-level math and science skills take time to develop and to relax. This reinforced my instinct that electrical engineering was a good fit for me and gave me the inspiration to stay with it and study hard. My best piece of advice- if you are feeling insecure, reach out to a teacher, professor, or mentor before you are overwhelmed and lose focus. Don’t give up too early- everyone takes time to season.”

-Brigid Siegel Polachi, Access Executive Search

5) Are there any programs out there that you would recommend to young women to take advantage of?

“Yes. Apply to NSF funded Research Experiences for Undergraduates and also seek out those program that are designed for women – these are training opportunities. Practice your speaking skills by reading books like “The Well Spoken Woman” and seek out any free public speaking or leadership skill programs on your campus. They exist. Also be involved with student government. These types of skills are important to develop simultaneously with the core content of your STEM discipline.”

-Dr. Diana Thomas, Professor of Mathematic Sciences at Montclair State University in Montclair, NJ

“Find a Mentor, whether it is a Teacher or Neighbor, or just someone you connect with online. You need someone in your corner who will encourage you in your goals. Most STEM professional organizations (i.e. The American Chemical Society’s Women Chemists Committee or the Society of Women Engineers) have programs for minorities and women so look them up and see what resources they have available to take advantage of.”

-Amy Hanks, M.S., Chemistry Department BYU-Idaho in Rexburg, ID

“I had a mentor in 9th grade and he helped me understand what a career in electrical engineering could look like. He encouraged me to do well in school and helped me with my science fair project. So I will always recommend finding a mentor or several mentors. You can look for mentors through school, through volunteer organizations, and professional societies like the Society for Women Engineers.”

-Rosalyn S. Hobson Hargraves, Ph.D., Associate Professor, Department of Electrical and Computing Engineering at Virginia Commonwealth University (VCU) School of Engineering in Richmond, VA

“Take as much math and science as you can. Go on field trips to manufacturing plants, job sites, and laboratories.”

- Dr. Alison Whittemore, University of the Incarnate Word in San Antonio, TX

“I think the key to getting women into STEM fields is the opportunities provided early in life, especially in high school (but elementary and middle schools are also important so that females will embrace their high school math and science classes). I would strongly encourage females to take AP science courses (biology, chemistry, etc.) if they are offered, as this will help them do well in the college science courses. Outside-the classroom experiences are especially important. There are a variety of summer science programs that would be a great way to spend the summer such as the Sea Education Association’s SEA Program.

-Dr. Nancy Frances Smith, Associate Professor of Marine Sciences and Biology at Eckerd College in St. Petersburg, FL

“For students in elementary, middle or high school, I highly recommend looking in your area for STEM camps, either during the school year or in the summer, especially if they are hosted by a college or university. These are great ways to meet college faculty, try your hand at different STEM fields, and get a feel for what college can be like. After-school programs that focus on STEM are available in some areas as well. For college students, I recommend looking at funding opportunities for undergraduates through the National Science Foundation (NSF), the National Institutes of Health (NIH), Environmental Protection Agency (EPA), and Centers for Disease Control (CDC) – all of these governmental organizations have internships and fellowships available for young researchers, particularly women (I know that there are others as well, but these are the ones that come to mind). Talk to your professors about these types of opportunities and get advice before applying. And plan ahead! Many deadlines sneak up, so start looking around and gathering the materials you need to apply.”

-Dr. Sara K. Tallarovic, Professor in the College of Math, Science and Engineering at UIW in San Antonio, TX

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