



The Scientista Foundation



When the Going Gets Tough: *How the Scientista Foundation Empowers Collegiate Women in STEM*

WHAT DO YOU DO when you enter your college years knowing you're going to be outnumbered? Knowing that resources won't be made as readily available to you, and that you might even receive some criticism for your goals and ambitions? Sure, you might be new to this engineering thing, this mathematics thing or this chemistry thing; but my goodness, it starts an unquenchable fire in you that burns just as brightly as the next student's. Or maybe you've grown up building things. Maybe you spent your free time experimenting, went to space camp every summer or were constantly found tearing apart old computers. Maybe you grew up wanting to be a scientist and when you step into that higher education haze of social and academic discovery you realize that there are those who think your abilities are less favorable. Less meaningful. The amount of opposition may be small or it may be great, but it's there, often going to work in the back of your mind, reminding you time and time again that someone out there thinks you can't do it, and simply because *you're a girl*. How do you cope? What do you do?

I'll tell you what you do. *You don't give up.*

Because you *can* do it.

The subject of women in science is often contradictory, full of the assumptions and biases of both sides, and has been the cause of numerous arguments, studies, and proposed solutions; however, the fact of the matter still remains: there are simply and sadly too few women in science, and whatever the reasons for this may be, the women who *are* in science sometimes have it rough. For current college and graduate students, resources are sparse, mentors are scarce, and community engagement is often overlooked. This is the base upon which the Scientista Foundation was built. Julia and Christina Tartaglia, sisters and biology majors at Harvard College, recognized the lack of resources for women in higher education and wanted to change that. Since the inception of the foundation they have made it their personal business to provide whatever it is the modern female STEM student needs, whether it be inspiration, connection to resources and role models, or exposure to job opportunities.



The 2014 Scientista Symposium.

"I started Scientista when I was a senior in college because I noticed that though there were many organizations that focused on empowering professional women in STEM, there was no organization that focused on the needs of collegiate women -- this is an important time when women are deciding what they

want to study and what career they see themselves in." Says Scientista co-founder, Julia Tartaglia, who came up with the idea for Scientista from her dorm room at Harvard. "I saw Scientista as a great opportunity to dispel stereotypes and common misconceptions about what a 'woman in STEM' looks like and what career paths are available to STEM majors beyond the bench." Christina Tartaglia, Scientista co-founder,



The Scientista team and speakers at the 2015 Scientista Symposium.

had a similar experience. "While completing an undergraduate major in molecular biology, I was struck by the fact that so few of my professors were women. I wanted to be able to create a platform that would allow all women to have access to female role models in science, even if they weren't able to find them in their daily lives. What's unique about Scientista is that the role models we feature aren't just professional women in STEM, but the students themselves."

The goal of the Scientista Foundation is to help women in science in any way possible, but the organization aims to provide this assistance through three main avenues: content (the Scientista website), community (individual campus chapters), and conferences (the annual intercollegiate Scientista Symposium). One of the main issues that the Scientista Foundation has attempted to address is the need for a means of connecting women in STEM with one another and with the larger scientific community. Through the Scientista blogs, anyone can gain access to inspirational articles and memes highlighting the accomplishments of women in science, up-and-coming contributors to scientific causes, and even advice and tips on anything from dressing like a scientist to selecting your first lab. The Scientista campus chapters further facilitate this connection by providing a sense of community and camaraderie through social media and campus events.

The annual Scientista Symposium, held in New York City, extensively broadens the horizons of many women through networking, exposure, and inspiration. Every year, the Symposium brings together prominent women in various scientific fields in order to teach,

encourage, and inspire, and also offers numerous workshops, a recruiting fair, and the opportunity to present research.

So far, the symposium has been incredibly successful, and its success will only continue to increase. Lauren Koenig, Co-Editor-in-Chief, said, "I think the Symposium is one of Scientista's biggest successes in terms of having an amazing number of speakers that represent the diversity of both women in science and career opportunities for women in science. There are few places that aspiring scientists can find such a broad perspective on their potential to contribute to the field." Many attendees have expressed their gratitude for and enjoyment of the symposium, including the following: "[It was an] incredible experience to meet other women involved in stem majors and in careers. It inspired me for my future endeavors and allowed me to learn about what I might be interested in after my studies." "The Scientista Symposium was exactly the missing puzzle piece I needed to tie my college coursework to real-world applications. I was really honored to have the opportunity to present my research poster to a representative from the company founded by one of the world's most renowned geneticists." "Attending the Scientista Symposium opened my eyes to all of the women in STEM who have not let the difficulties of the field interfere with their dreams. It provided an opportunity for us all to feel strength and support to help us continue on our path." This year, the Scientista Symposium will be held October 1-2, and will feature the title, "Scientistas Stand Up – Becoming a Leader in STEM."

Scientista also boasts a wide variety of international writers that contribute to its website. The diversity within the foundation's contributors is incredible, and has extended Scientista's reach to many countries, communities and individuals. "I also think success is reflected by the number of international writers that contribute to the Scientista website" says Koenig. "It's amazing that this cause resonates with women around the world, showcasing both the need for this type of organization and the number of people who want to fix problems such as the lack of diversity and mentors available for women in science."

The Scientista Foundation wants to fix these problems, because they've been there too. They understand the struggles of being a woman in STEM and have seen firsthand the positive effects that mentorship, support, and personal determination can have on a scientist. Koenig, wildlife technician for HDR, can attest to it. "Breaking into science can be extremely difficult and students often



Attendees at the 2015 Scientista Symposium.

struggle with the need to stand out from their peers in order to have a competitive advantage. Academic science has also become extremely specialized and requires intense focus and devotion to a particular topic. As an undergraduate, I knew I wanted to study ecology, but I didn't know exactly where I wanted to focus- either taxonomically or topically. This led me to pursue multiple fieldwork opportunities to be exposed to all different styles and approaches to ecology as an academic, management, and conservation tool. These positions allowed me to travel and learn an incredible amount about what I wanted from a career. I also gained a much more realistic understanding of challenges in science, including the ways that funding and the need to balance multiple stakeholders can affect the science itself... Rather than be discouraged by learning about the complexities of conducting science within our current system, I was most impressed by my mentors and peers who worked hard and believed in their projects... I found an incredible network of fellow scientists that help make for an enthusiastic and motivating research community."

The Scientista foundation set out to make a difference, and has not stopped there. Each additional team member they have taken in, like Koenig, has added a new experience, a new perspective, and a new road to success, which has enriched the organization as a whole and has allowed for increasingly more opportunities to empower. The Scientista Foundation holds fast to a vision of hope for women in science all over the world, and is turning that vision into reality with an unparalleled fearlessness. "Ultimately," says Christina, "the Scientista Foundation is more than just a network for women; it's a movement of budding scientists that, together, are changing the face of STEM."

A History of Women in Tech

The history of women contributing to the sphere of technology may be scant by comparison, but it is consistent. Women have graced the tech scene for decades, often in quiet, unrecognized ways, but their varied and individual impacts have been quite monumental in contrast.



Presenter at the 2015 Scientista Symposium.

And would you believe they began even before the invention of the computer was realized? Let's take a look at a few of the key females in tech history, and how their dedication and intellect have continued to live on in today's influential women who have accepted the call to action in this ever-changing field of modern technology.

In 1842, Ada Lovelace, an expert in mathematics and self-titled analyst and metaphysician, was tasked with the responsibility of translating a memoir on the subject of an "Analytical Engine" published in French by Italian mathematician Louis Menebrea. The memoir was written in an attempt to sponsor the work of Charles Babbage on his Analytical Engine, what we today would call a computer. Ada's contributions, however, are articulated in her notes on the memoir. A skilled mathematician and close friend of Babbage, Ada knew and understood the intricate workings of the Analytical Engine just as well as he did, and the writing she produced as she translated Menebrea's memoir neatly displays her competence on the subject. She is also credited with what can be considered the world's first computer algorithm, brought to light in these same notes. Ada's understanding of the machine and its potential are outlined in the following statement, presented in her writings: "A new, a vast, and a powerful language is developed for the future use of analysis, in which to wield its truths so that these may become of more speedy and accurate practical application for the purposes of mankind than the means hitherto in our possession have rendered possible. Thus not only the mental and the material, but the theoretical and the practical in the mathematical world, are brought into more intimate and effective connexion with each other." Unfortunately, Babbage was unable to obtain funding for the Analytical Engine, and Ada eventually died in 1852 at the age of 37, never seeing in full the creation of the machine she so fully understood long before its time.

Exactly one century later, actress Hedy Lamarr and co-inventor George Antheil received a patent on an idea they called frequency hopping.



Attendees at the 2015 Scientista Symposium.

In the events leading up to that time, Lamarr had been unhappily married to an Austrian Fascist weapons manufacturer who would bring her to his meetings in an attempt to suspend her acting career. The meetings were spent talking about ways to listen to and jam the radio signals used by American aircraft and weapons, all while Lamarr listened and learned. After ending her marriage she intended to foil her ex-husband's plans and began developing the idea of transmitting radio signals along rapidly-changing, or "hopping" frequencies, which would make these signals far more resistant to jamming, and far more difficult to intercept. The sequence of frequencies would be known to the sender and receiver beforehand, yet remain unknown to outsiders, in this case the Germans of WWII, leaving attempted interceptors faced with the task of deciphering a completely random code. After presenting their concept to the National Inventor's Council in 1940, however, the technology was ill-received and ignored. But only for a short while. In 1962, the technology was used during the Cuban missile crisis, and in more modern times, has been utilized in



Attendees at the 2015 Scientista Symposium.



The Scientista team at the 2015 Scientista Symposium.

wireless technology, notably cell phones. Lamarr was presented with the Pioneer Award by the Electronic Frontier Foundation and became the first woman to receive the Invention Convention's BULBIE Grass Spirit of Achievement Award shortly before her death in 2000.

Grace Hopper was one of the first women to earn a PhD in mathematics, doing so in 1934 after studying math and physics at Vassar College and earning a master's degree in mathematics from Yale University. Hopper joined the U.S. Naval Reserve in 1943 during World War II and was commissioned as a lieutenant in 1944. Due to her background in mathematics, Hopper was assigned to the Bureau of Ordnance Computation Project at Harvard University, and it was there that she learned to program a Mark I computer. After the war ended, she continued working with computers, a task in which she would be involved until her death. After working with Mark II and Mark III computers at Harvard, she switched gears and went to work with Eckert-Mauchly Computer Corporation, followed by Remington Rand and the UNIVAC computer. Hopper is perhaps most known for helping create the first compiler for computer languages, which led to the creation of the Common Business Oriented Language, or COBOL. COBOL is based on Hopper's FLOW-MATIC language design, which is the first language-based form of programming, taking a turn away from strictly binary-based code, which allowed for a more easily-read form of code and, therefore, more programmers. After 19 years of service in the Navy, Hopper retired as a rear admiral and was the oldest serving officer at the time. She continued working in the computer industry for many more years, however, and became the first female individual to receive the National Medal of Technology, which she was awarded in 1991. Up until her death in 1992, Grace Hopper continued to encourage young people to learn how to program. As a testament to her legacy of teaching, the Grace Hopper Celebration of Women in Computing Conference and the Grace Murray Hopper Award offered by the Association for Computing Machinery continue to encourage and support women in technology today, in her stead.

It is a continuous effort to get more women into technology, but the field is nonetheless ripe with feminine talent. It has been an honor for the Scientista Foundation to interview many of these women, all emerging faces in the scope of modern technology. Among these women are Alexandra Diracles and Melissa Halfon, the founders of Vidcode. Both women found their way into code a little differently: Diracles was interested in art and photography when she visited a talk

at MoMA that featured engineering and human communication, which changed her perspective on creativity. Halfon, on the other hand, had grown up with a love of math and computer science, which she pursued despite the gender stereotypes she faced every day. Their combined project at Startup Weekend EDU targeted a noticeably recurring issue in part responsible for the low numbers of women in technology: getting girls exposed to and interested in coding. After the project won first place at Startup Weekend EDU, the team moved forward with the prototype and became VidCode, a platform that allows users to manipulate video processing through coding. Diracles and Halfon are currently working on developing Vidcode into an iOS and Android mobile app, and expanding their curriculum to schools across the United

States. It has become a gateway for girls into the world of coding creation, with involvement growing every year.

Another woman on the forefront of coding education is Ria Galanos, computer science and mobile app development teacher at Jefferson High School for Science and Technology in Alexandria, Virginia. She may have learned how to code in BASIC in junior high and proceeded to study aeronautical engineering in college, but Galanos ultimately found her calling to be teaching. She originally taught math due to her academic background, but soon ended up teaching computer science, a role she has taken on with flying colors. Galanos strives to eliminate gender bias in her classroom and remains an inspiration for both girls and boys alike. She sponsors Coding Lady Colonials, which invites anyone interested to come and code with friends while they experience the excitement of learning something new. Coding Lady Colonials has also organized HackTJ, a 24-hour high school hackathon run by students in the Virginia area. Galanos, as many before her, is yet another testament to the sheer power and influence that one woman with determination and strength can radiate in the exciting world of technology.

Watch out world! You're about to get a lot more women in tech. The question is...are you ready for them?

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<http://www.biztechmagazine.com/article/2012/05/mothers-technology-10-women-who-invented-and-innovated-tech>
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