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Violinist Eileen Arnold Finds a Job She Loves in Aerospace

The epitome of ingenuity, perseverance, and patience

Eileen Arnold is not one to shy away from pursuing a passion, so when she discovered the field of systems engineering, it didn't matter that the timing wasn't exactly perfect. When is it ever perfect, and why should that hold anyone back?

Eileen graduated from high school in the 1960s when times were different. There weren't quite as many options. Financial aid for higher education was more limited, as were certain career paths for women. Arnold entered the University of South Florida on a violin scholarship, although her passion at the time was geology. She played in the Florida Gulf Coast Symphony five nights a week to help defray costs, which was problematic for taking the chemistry, calculus, and physics courses required for a geology degree while continuing her music career on scholarship. She began taking geography courses as electives, which included geology topics as an alternative while still part of the music department.

It would take ingenuity, perseverance, and patience to get where she wanted to go. It took Arnold ten years to complete her electrical engineering degree, start to finish, after obtaining her bachelor's and master's degrees in geography. She was newly married during her master's studies and a young mother soon afterward.

Some people may know what they want to do from the time they enter college, and they may have the means, to get there. But for others, things may not be as clear cut. Arnold took advantage of each opportunity that came her way, and, while the path may not be straight, she does not see her years studying geography or playing the violin as detours. In fact, to her they are just the opposite. She sees her life as a system of sorts, each stage

A violinist since third grade, Arnold sees many parallels between music and systems engineering.

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playing a significant role in her current career success.

From Violinist to Engineer

Arnold loved the violin, and she was very good at it. Since picking it up in third grade, she had practiced long and careful hours and had sacrificed many other pursuits to stick to a regimented schedule. She was fortunate to have landed at Southwest Miami High School, a public high school with a top-rated orchestra that traveled the state. While there, she was noticed by the University of South Florida and given a full scholarship to major in music.

That was great since Arnold enjoyed studying the violin. There was also money to be made, even as a college student. As part of the Florida Gulf Coast Symphony, she played with Jack Benny and Skitch Henderson. Outside of the symphony, she played in venues both large and small. She played in a small cocktail lounge in Clearwater, Florida, for Betty White and her husband Allen Ludden. She performed back-up for country singers Eddy Arnold and Sammi Smith and was able to "experience the spotlight" playing to over 10,000 people, the lights so bright she couldn't see a single one of them.

But with a shake-up in the music department her senior year, she found herself in search of a new major. She still wanted to study geology—rocks, minerals, and the origins of the earth. Without the chemistry, physics, and calculus background, though, she could count that out. She settled on geography, a major that encompassed geology, and continued on to her masters degree. Still, she felt "cheated" out of math and science, and so she filled her elective hours with math courses. Arnold's master's in geography required papers of her choice, which included topics on fuel cells, fusion power, and personal rapid transit, all indicators of what was to be a continuation in the engineering field.

Around this time, Arnold had a realization. Being female meant that her dream geology job was likely to take place behind a desk, far from the field and the excitement she desired. Fortunately, she took an electronics course for fun, and

Eileen Arnold, shown here with the RAM Air Turbine at UTC Aerospace Systems, finds aerospace to be a very vibrant industry.

she was hooked. At least there was the hope of being in an electronics lab.

There are certain patterns that the technical field and the musical field share, Arnold says. Her hours playing the violin helped her because they dispelled the notion that you are born good at something. "I knew that you could get better with long hours of practice," she says. "That's true with geology. That's true with engineering."

Making It While Raising a Family

Arnold's career change was full of out-of-state moves and child rearing. It began in Pittsburgh, Pennsylvania, where she took a job in regional planning and married an electrical engineer while pursuing her electrical engineering degree part time. The regional planning work, though, was full time in the true sense of the word—Arnold worked right up until the day before her oldest child was born.

When her husband took a job in Iowa, they packed up the family and Arnold continued her degree—first at Kirkwood Community College, where she worked from the hospital both when her oldest had pneumonia and after her son was born ten weeks premature. As a nursing mother, she expressed milk between classes for her third child, a daughter, at the University of Iowa after she transferred from Kirkwood. She mothered them through their myriad illnesses. Arnold took courses every semester while raising her three children after being hired as an intern at Rockwell Collins. She was a full-time student when her intern session wasn't in play, and she took part-time graduate courses offered at Rockwell in the evenings when she interned.

Through all of this, she remembers only one night where she felt like quitting, and it was short-lived. "I woke up the next morning and got over it," she recalls. "It was overwhelming at times. But I had a goal. I'm goal oriented. I had a goal and did whatever it took to get there."

Arnold stayed at Rockwell Collins for 22 years, where she discovered systems engineering while working the commercial side of avionics for air transport and business and regional jets. She calls what she was doing at Rockwell Collins "the perfect job" because of all that it encompassed—"multiple technical dimensions, multiple customers, cool technology, and a motivated team." Overall, she adds, it was "a thrilling experience with a solid grounding in systems engineering."

Arnold divorced after 16 years of marriage, then remarried eight years later. Her new husband, Craig, was the victim of a company bankruptcy, which opened an opportunity for Eileen to switch jobs and move, since the kids were on their own by then. This time, the move was to Minneapolis, Minnesota. Arnold took a job at United Defense, now BAE Systems, where she worked on weapons systems for ten years. She was awarded the Minnesota Federation of Engineering, Science, and Technology Societies Charles W. Britzius Distinguished Engineer Award for her outstanding lifetime achievements in the practice of engineering, contributions to the engineering profession, and actions enhancing the image of engineering in our society in

Arnold continues to work and learn while making time for her four grandchildren.

professional organizations such as the IEEE and the International Council on Systems Engineering (INCOSE).

BAE Systems was a groundbreaking place to work for Arnold. It was the first time she had a female in the reporting chain above her, a director who would later became a vice president.

Three years ago, Arnold made another career change. Missing the aerospace industry, she moved to Rockford, Illinois, and signed on with UTC Aerospace Systems. She was thrilled to be back in the airplane business!

The Lure of the Dream Job in Aerospace

Arnold sees aerospace as a very vibrant industry. She relishes that it is a certification environment, because this means more rigor. "All the practice on the violin and long hours prepared me for dealing in aerospace," she says. "It's also satisfying to board an aircraft knowing how it works and that you contributed to its safety."

Today, she is a systems architect at UTC Aerospace Systems and loves her work. Arnold talks passionately about her favorite project to date, what she describes as a "systems-oriented opportunity to upgrade the infrastructure across multiple programs in an efficient manner."

The only thing lacking may be other women in her current group. At UTC Aerospace, they are working on attracting more women, and one boon is that Arnold's director is female.

Giving Back and Getting Involved

In the early 1990s, Arnold ran the largest all-volunteer conference in North America, IEEE Fall Con, as its technical chair. In 1996, she discovered INCOSE and has been a volunteer and leader for the organization ever since. "I became a certified Expert Systems Engineer when the credential was first introduced and in 2013 became an INCOSE fellow."

She felt immediately at home there: "It is so thrilling to actually meet people that are like-minded on what they think is important," she says. "We all have different ideas and that's good, but there's a like-mindedness that is so cool! Hopefully you've experienced that at some point, this feeling that they're all talking my language," Arnold says during our interview, demonstrating first-hand some of the nurturing qualities that most likely make her a terrific mentor.

Arnold has always enjoyed mentoring, both formally and informally. Back when the switch was made from paper to electronic resumes, for example, she enjoyed working with others to help students with that transition, explaining what employers were looking for in the new electronic form of resumes and letting them in on the buzzwords they needed to get their resumes onto someone's desk.

She has some particular advice for young women: Learn everything you can technically, be sensitive and aware of the culture around you, and acquire a mentor that is well respected at your company. "Not all men understand that women have some special hurdles," she says. "It may not be true today," she muses, "but I always thought women's rules were men's rules. I thought they were one and the same because, after all, I grew up working in a 'one-woman to a hundred-men' environment on programs. I just watched the men's behavior and assumed any decisions made for men applied to me. Life is fair, right?" But, she says, that is not how it always worked out for her. In her experience, men can get away with being threatening where women cannot, and the simple act of disagreeing with a man may be enough for a woman to be perceived as threatening. "I don't know if you've experienced that," she says. "Hopefully not."

Arnold hopes to help bring more women into systems engineering. One of her role models has always been well-known systems engineer and author Eberhardt Rechtin, who passed away in 2006 at the age of 80. He played a key role in the development of the Deep Space Network, a system to capture communication from distant planetary spacecraft. He wrote many books on the development of such large-scale aerospace systems and helped create the nation's first program in aerospace architecture at the University of Southern California. Additionally, he did much to promote women and minorities in the field of engineering.

"He communicated that women make the best architects and designers in a systems group because they are used to juggling so many things," Arnold says. "Families, kids, husbands, relatives, work, housework, food on the table, nutrition, and on and on and on." She pauses, and laughs. "I loved him just for that one sentence," she says.

Arnold continues to work and learn and now has four grandchildren to fill in any spare time that may arise. "Spare time?" she says with a laugh. "What's that?"

—Katianne Williams