

WOMEN IN ENGINEERING

ELYSE ROSENBAUM—A CAREER IN ACADEMIA— IMPRESSIONS AND HINTS



My intended audience for this article is early-career engineers, especially those still engaged in university studies. I, too, spend much

of my time on a university campus, but as a faculty member rather than a student. I am the Hasselbrock Professor in Electrical and Computer Engineering at the University of Illinois at Urbana-Champaign. Some of you may be considering a career in academia. This article will shed a bit of light on what it is that professors do when we are not lecturing in the classroom or reviewing our graduate students' research results. I will also provide focused advice for the woman readers.

I was asked to contribute a non-technical article for the Women in EDS series. Why did I agree? Many readers may be unaware that professors are evaluated annually for their contributions in three spheres: teaching, research, and professional service. Those evaluations determine our next year's salary and eligibility for promotion in rank. My authorship of this article constitutes professional service, and that was one of my motivations for doing it. That brings me to my first piece of advice for young engineers: Look for service opportunities that fit your interests and are not overly burdensome (i.e., very time consuming). Do not reflexively say yes to all requests.

If you had asked me to make predictions about the year 2021 back when I was a student in electrical engineering, I would not have projected that the EDS Newsletter would con-

tain a series of articles on Women in EDS. I could not have imagined that there would be anything noteworthy about women in our profession. Indeed sadly, the engineering workforce of 2021 doesn't have significantly higher female representation than that of 1991. Perhaps the young women reading this article will be the ones to finally achieve parity. There are no good reasons for you not to do so! Engineering competency and engineering brilliance are found in equal measures among male and female students. My perception is that historically, more young men entered the university with confidence in their hands-on technical skills, perhaps having developed them by participating in a robotics club or an Eagle Scout project. Today, we find that more and more young women participate in "tech" activities during their high school years. However, even if a student did not participate in youth engineering activities, it is not an impediment to successful completion of an engineering degree or to a long, productive career as an engineer.

Since the engineering workplace will be majority male for at least the next decade, how is a woman to cope with her minority status? You should strive to rapidly establish a reputation for excellence and reliability, so work hard starting day one. Advocate for yourself; ask to be assigned to high-excitement, high-visibility new projects. Choose your battles carefully for maximum impact; if you refrain from objecting every time a male coworker says something a bit offensive or you detect implicit bias, people will take notice when you do call out an inequity or an inappropriate statement. In the

words of the late, great U.S. Supreme Court Justice Ruth Bader Ginsburg, "It helps sometimes to be a little deaf in every workplace." Observe which of your co-workers are competitive and which ones have your best interests at heart. Treat the latter as your informal mentors; go to them for career advice—it doesn't matter if they are male or female. And now I want to address the men specifically: please make an effort not to be jerks! Don't comment on your female co-workers' appearance; don't make assumptions about what kinds of skills they have; don't exclude them from lunchtime and after-work socializing, since that is how a lot of professional relationships are built.

Those of us in academia may not have work-life balance—many of us are workaholics—but it is an ideal profession for people who also want to be parents. Professors work many hours per week, but those hours are flexible. You can arrange your schedule so that you are free to pick up the children from daycare or school each afternoon or you are home in time to prepare dinner each night; also, you can work from home if a child is ill. University communities are great places to raise children. Most universities offer educational and cultural programs that are open to persons in the community, and the local schools tend to be very good. Academia is a highly suitable career for parents, moms and dads alike, but I recognize that historically, childcare has been the mother's special responsibility.

How did I succeed as a female professor? First, I devoted a lot of time to planning and practicing my external presentations, especially in the early part of my career. Conference talks

are the primary way one becomes known in the EDS community, and being known translates to getting approached for research collaboration and research funding opportunities. As a graduate student, I received the Roger A. Haken Best Student Paper Award for the 1991 IEDM, in part because my presentation was clear and engaging. As a professor, I received an Industry Pioneer Recognition Award from the EOS/ESD Association, in recognition of my research group's sustained contributions to the field. Researchers within the ESD discipline were aware of those contributions as a result of the carefully constructed and well-practiced presentations my students and I have given at the annual EOS/ESD Symposium.

Second, as a nontenured assistant professor, I proposed research projects that would leverage my academic training and that I could easily argue I was well qualified to lead. Only after becoming better known—

and receiving tenure—did I step further outside my comfort zone. At that point, I had established that I was highly capable of leading research projects and I knew that proposal reviewers would be less skeptical of me than of a junior professor. Today, I lead a research center that focuses on machine learning, which is a far cry from my doctoral research on gate oxide reliability!

In closing, I want to mention that my favorite research projects still are those that focus on reliability of individual semiconductor devices. I am an EDS girl at heart.

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