



# Women in Microwaves: A CLOSER LOOK

Despite efforts to bring more women into engineering, the numbers show only a slight increase. To provide some insight into this issue, some of the stars of the “Women in Microwaves” panel at this year’s IMS share their experiences, advice, and perspectives.

A small percentage of female university students elect to focus on engineering while even fewer opt to actually work in the engineering field. Science, technology, engineering, and math (STEM) programs are looking to bring more students—and girls in particular—into the sciences. As noted in the paper, “Persistence is Cultural: Professional Socialization and the Reproduction of Sex Segregation,” about 20% of undergraduate engineering degrees are awarded to women overall. But only 13% of the engineering workforce is female. In the highly specialized microwave engineering field, that percentage is, of course, even smaller.

That study, which appeared in the journal *Work and Occupations* (<http://wox.sagepub.com/content/43/2/178.abstract>), was co-authored by Susan Silbey (Leon and Anne Goldberg Professor of Humanities, Sociology, and Anthropology at MIT); Carroll Seron (professor at the University of California at Irvine); Erin Cech (assistant professor at the University of Michigan);

and Brian Rubineau (associate professor at McGill University). They found that the problem is not in the education of women engineers, but in their early work experience and the dynamics that arise. During work opportunities like internships and team-based educational activities, gender dynamics seem to generate more opportunities for men to work on the most challenging problems. In contrast, women tend to be assigned routine tasks or simple managerial duties. Interestingly, at this year’s International Microwave Symposium (IMS), the “Women in Microwaves” panelists touched on related themes: the need and enthusiasm for mentoring and being more vocal about their own “wins” as well as desired opportunities.

Herewith are insights shared by Karen Catlin, Advocate for Women in Technology; Kaelly Farnham, Marketing Programs Manager at Keysight EEs of EDA; Dalma Novak, Vice-President of Engineering at Pharad LLC; Vesna Radisic, Senior Scientist at Northrop Grumman; and Johana Yan, Lead Engineer at MaXentric Technologies.

### How did you end up studying the field of microwaves and RF and working in it?

**Novak:** I loved microwave engineering as an undergraduate student and chose to pursue a PhD. so I could learn more about the field.

**Yan:** I was always fascinated with wireless technology as a child since I first saw it in some sci-fi movie. It was science made to look like magic; what more could a child ask for? Perhaps my ultimate turning point toward microwaves was during my first undergraduate microwave course. It was an optional course, but the description seemed interesting. It was during that class that the Smith Chart was introduced. I was fascinated by the vast amount of information that can be encompassed in one circle. As the class progressed, I learned to design matching networks and optimization. Having different performance tradeoffs to work with was a lot of fun.

**Farnham:** I was a math major in undergrad and found that I liked applied math the best. And one of the coolest applications for that is in RF/microwave design.

### What are you proudest of when you look at your career in the microwave industry?

**Radisic:** I am the proudest of the reputation I have built in microwave community. This reputation is partially built on the papers I have written and presented. It makes me proud when colleagues in this field ask about my work, reference it in their papers, and ask if I have any new results.

**Yan:** I am proud and grateful to have found a balance between my family life and work life. Having the ability to juggle and successfully keep both sides satisfied has brought me great happiness. Having an understanding and supportive family has allowed me to continue publishing in my field as well as volunteer some time to the IEEE organization.

**Farnham:** Helping to start the Keysight Society of Women Engineers Enterprise Program (KSWEEP)—an internal organization to support the success and advancement of women engineers at Keysight—and providing opportunities for women at Keysight to participate in the annual SWE National Conference. In our first year of existence, we increased our Keysight delegation to the SWE National Conference from 30 to over 50 women.

### A lot of young women have cited a lack of work-life balance as a reason they didn’t pursue engineering. Do you have any advice on achieving that balance?

**Farnham:** Achieving a work-life balance is something that one has to deal with whether they are a man or a woman, engineer or not. It’s something we all work toward throughout our lives. It’s never a “solved problem.” My best advice is to be passionate. Be passionate about your work and be passionate about your life as well. Being passionate about life for me means taking time to go swim on my lunch break, ride bikes

with colleagues on the weekends, and have dinner at home with my family every night.

**Radisic:** There is definitely a challenge with balancing work and life, especially when you have kids. I don’t think there is a career where that balance gets easier. I think choosing jobs, bosses, and coworkers that are understanding and offer flexibility in the work environment is the key.

**Yan:** You have to understand what it is you want. The one fair thing in this world is that every person gets 24 hours a day. It is impossible to get a work-life balance if those closest to you are not supportive. The key to having this balance is to surround yourself with supportive people.

### Let’s look at mentoring. Have you made it a point to mentor the next generations of engineers and women in particular?

**Yan:** I’ve previously mentored several young engineers, including women. For those who are more timid, I usually try to get them to present their work more. Being organized and having good presentation skills go a long way. I think this applies to both genders.

**Novak:** Absolutely, both in my work environment and through my IEEE volunteer activities. I believe that being a role model for young engineers is vital for guiding their careers and encouraging their ongoing participation in the profession.

**Farnham:** I love mentoring, and I think I get just as much out of it as the mentees. As a leader of KSWEEP, I get the opportunity to meet new women engineers, and I make it a point to schedule regular check-ins. My favorite thing to do is take 30-minute power walks around the Keysight campus. We get up from our desks, get a little sunshine, and get to catch up.

### How has having an advanced degree helped you in your career?

**Yan:** An advanced degree helps bring credibility to one’s career. For example, if you have a doctorate, the “Ph.D.” on your business card lets others know that you have worked extensively in the field. It is also a way of allowing others to know your achievements without explicitly having to say it. Furthermore, during the journey of obtaining my advanced degree, I attended and presented at many conferences, which offered me the opportunities to meet and network with many established professionals and professors. That exposure definitely helped me get a head start on my career.

**Farnham:** I had a master’s degree before beginning my industry career. I believe this helped me because then I could completely focus on my work and not have to take time to study.

### Would you recommend this industry to the next generation of women?

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Pictured are the speakers from this year's "Women in Microwaves" panel at IMS: Magdalena Salazar Palma, Vesna Radisic, Dalma Novak, Johana Yan, Karen Catlin, Katherine Herrick, and Kaelly Farnham.

**Farnham:** Yes! It's fun being on the leading edge of really cool technology. Plus, it's a growing industry. And there is so much going on; there is something for everyone.

**Yan:** Absolutely. Diversity in the working environment helps generate new ideas and gives different perspective. Engineering is fun. The job of an engineer in essence is a dream-maker. We have the opportunity to take what we dreamt up as children and bring it to reality with some practical modifications.

**Some of you have noted that in your careers, hard work did not necessarily translate into recognition of your achievements and efforts. How did you overcome that?**

**Novak:** Once I internalized this reality, I made a conscious effort to proactively communicate my achievements. This did require a major change in mindset and behavior on my part, as I recognized that acknowledgment of my contributions didn't necessarily happen automatically.

**Yan:** What you say is true. Many engineers (men included) work hard in the field and many are not recognized. To be recognized, engineers must make themselves visible. Knowing that you are the best RF engineer is great, but having others recognize that you are a great engineer is even more important. Therefore, marketing oneself is equally as important. As many consultants would put it, self-branding is important. I think even for women who are not in consulting, we can take a few lessons in visibility from our fellow consultant engineers. Their ability to make themselves visible and confident without bragging/boasting is vital to their survival.

**Regarding the above question, the panel spent some time talking about the need for visibility—but noted that many women worry that calling attention to their achievements**

**will make them appear as if they're boasting or bragging. What are some tips on walking that fine line?**

**Catlin:** First, brag for another woman. Talk about how awesome she is, what she recently accomplished, and her potential. Support the points she's making in meetings or in email. Be a vocal advocate for her, and chances are she'll return the favor. Second, give presentations of your work. Volunteer to present your team's project update at a company meeting. Sign up to give talks at industry conferences. Write up a version of your talk to publish on your company's internal blog or newsletter. Look for ways to make your accomplishments visible by teaching others about your expertise or experience.

**Radisic:** Visibility is very important in anyone's career. Yet as young engineers, we are often unaware of this and believe that hard work alone is enough to be recognized. Hard work is critical, but visibility helps tremendously in one's career. It is important for women and all engineers to call attention to their achievements. In order to avoid being perceived as bragging, I would suggest that focus can be on the team accomplishments, not just ours. We can also phrase it in the sense of how our accomplishment can be used further by the company and how it can help other projects.

**Yan:** Depending on the achievement... if the achievement is part of a team effort, using the words "we" or "our" makes it less like personal bragging and gives credit to all those that were part of the effort. If it's a personal achievement, then it's okay to bring attention to it. Men do it all the time. One appears to be "bragging" if the achievement is randomly brought up or if one tries too hard to make others aware of it. However, if the achievement is relevant to the topic, then bringing up the achievement only lends credibility to your expertise in the particular subject. It does not appear like bragging, but rather "self-branding."

**Farnham:** Find a buddy who can advocate for you. Also, keep your LinkedIn profile up-to-date. Be active on social media and share links to your accomplishments. And post awards/accolades on your walls at work. This encourages conversations about them.

**Karen, you talked about the benefit of having champions around you. Have all of you had your own "cheering team" during your career? What do they do for you?**

**Catlin:** My biggest cheerleader is my husband, who often believes in me more than I do. Whenever my impostor syndrome kicks into gear, my husband helps quell it. Here's just

one example: In the mid-2000s, I was working part-time for a software company, and we were acquired by a larger company. As part of the acquisition, I was offered a significantly larger role if I agreed to work full time. As I considered the new role, I started thinking of all the reasons I shouldn't accept it. I'd have less time with my children. I'd never managed a group of that size. I'd have a longer commute and would get less exercise. I'd have to lay off some people. I lacked experience in some of the technical areas that I would be managing. The list went on and on. My husband helped me recognize that I could and should seize the opportunity. He convinced me that we could handle the logistics of our both working full-time. He reminded me that I had the foundation to learn new technologies and that I was a talented leader. Thanks to his support and encouragement, I was able to set aside my fears. I allowed myself to envision succeeding in the new position, and I got really excited. I found the confidence to say yes.

I recently published a book, *Present! A Techie's Guide to Public Speaking*, and I have a friend who is a big champion of my work. We were at a women's professional networking event, and she must have told 10 people about my book, bringing them over to me to make introductions. It was so very thoughtful and helpful. She bragged on my behalf and helped me to meet people who were interested in my book. She's my role model for helping be a champion for others!

**Yan:** It certainly does help to be surrounded by people who support you. I find that people tend to instinctively "cheer" and make your achievements known to others around you if you do the same for them. If you make it a habit to introduce colleagues through their achievements, I find that they do the same for you.

**Dalma, you mentioned that women often communicate less assertively with the words they choose, tone of voice, etc. Once you became cognizant of this, what did you do to alter the way you present yourself? Other panelists, have you done something similar?**

**Novak:** I made distinct changes to the way I verbally communicated with my colleagues. Before, I specifically avoided making definitive statements, as it was not natural for me to talk like that. I now try to be much more direct and absolute in my speech and responses.

**Yan:** There is definitely a choice of words and tone of voice awareness that helps make you stand out. If a female has a higher voice and speaks loudly, it can be mistakenly perceived as yelling or shrieking. In those cases, the speaker should enunciate and speak slower. Using your chest voice rather than your head voice (as singers would say) allows the message to be conveyed more assertively.

**If you could go back and give advice to your 20-, 25-, or 30-year-old self, what would it be and why?**

**Novak:** Don't sweat the small stuff! The maturity that comes with age has given me the ability to recognize what is truly important in the bigger picture and the confidence to not agonize over things that are not.

**Yan:** Always put all your efforts in. Never be discouraged or embarrassed if you make a mistake. There will be challenges to get a work/family life balance, but women are good at multi-tasking. If you want it badly enough, you will find a way to make it work out.

**Farnham:** I've got three good ones: First, it's okay to be myself! I tried way too hard to be a 50-year-old male when I started. Then I realized I had unique skills, talents, and a way of looking at the world that could make our organization even better. Once I had courage enough to be myself, work was so much more fun and I started to make a difference.

Secondly, subscribe to industry newsfeeds, newsletters, and magazines....and read them! I didn't learn to do this until a year into my career. If I would have done it sooner, I believe it would have helped me learn the lingo and the pulse of the industry a lot sooner.

Third, take breaks! At first, I seriously thought I had to be cranking on projects for eight hours every single day. I underestimated the value of breaks, taking walks, talking to coworkers, and just getting up and walking around.

**Catlin:** Have more lunch dates with the guys! We've all heard the advice, "Go out and network," and we've probably made every excuse not to: The people I should network with are too busy for me to bother them. I'm too busy with my job responsibilities to have coffee or lunch with someone. I'm an introvert, and I need to recharge mid-day by having lunch at my desk. The list of excuses is long, and I know them well. I've used them all over my career.

As a tech executive, most of my peers were men and frankly, I preferred hanging out with the few women in my office. What would have been different if I had invited more of the guys to have coffee or lunch? What aspects of my job would have been easier if I had built more friendships or if I had better understood the challenges they were facing and how I might help them?

While I certainly did a lot of networking over my career, I know that forging even more connections would have been helpful. People are more likely to support you if they share something in common with you. By casually meeting with more of my peers, I would have identified those things we had in common. Our favorite books as kids? Our first programming language? The thrill of shipping our first product? It almost doesn't matter what the shared interest is; what's important is to build that connection. Then, when you need the support of others to drive change or deal with pushback, you have your network to rely on. The more that people know you, the more likely they are to help you when you need it. **MMW**