Is there a glass ceiling at UCSB?

Linda Petzold is a renowned computer scientist and mechanical engineer, and one of the few women to have reached the highest levels of the two fields. She was Chair of UCSB's Department of Computer Science from 2003 until 2007. Before coming here in 1997, Petzold was a professor at the University of Minnesota, and earlier, an adjunct professor at the University of Illinois at Urbana-Champaign. Prior to that, she worked at Sandia National Laboratories and then Lawrence Livermore National Laboratory. Petzold, who is known for her work on differential-algebraic equations, has been honored by many organizations, including the National Academy of Engineering and the Association for Women in Mathematics.

Petzold talked to Convergence about her experiences as a woman in science and engineering, and offered some advice to other women about breaking through the glass ceiling, sticking up for themselves, and mixing motherhood with the demands of academia.
How did you get interested in science and then decide to make it a career?

I?ve been interested in science since I was a young child?I?ve always loved science. My father?s a mechanical engineer. He always seemed to be doing interesting things, and I was always asking him about them. He was a great role model. I always had the idea that it would be fun to design things, to change the world.

You completed high school in just 3 years. Was it difficult for you to fit in?

I was always the weird smart girl. It?s not very cool in U.S. society, in high school, to be a smart girl? I don?t have a daughter so I don?t know exactly what it?s like for girls now, but in watching my son I get the impression that it?s still not OK to be smart. My dad said, ?When you get older, it?ll be an advantage, being smart.? He was right.

While in high school, you attended a National Science Foundation-funded summer program for gifted students. How did that influence you?

I grew up in a working-class neighborhood?the same neighborhood my dad grew up in, and he was the first college graduate in this family?where it was unusual for kids even to go to college, let alone to think about being researchers. The NSF program did two things for me: It opened up the idea that maybe I could do research, and it showed me that it was OK to be a smart person? It was a big eye-opening experience for me to meet all those other smart kids and to realize that it?s OK to be one.

When you went to college, did you intend to major in computer science?

I thought I was going to be a chemist, but the chemistry lab wasn?t my best environment. I ended up with holes in lots of my T-shirts. I went to see the chemistry professor about a homework problem and got talking with him, and he suggested that I
In the early years of your career did you have a mentor? How important do you think that is for young female scientists?

A good mentor is tremendously helpful in any field. I had two really terrific mentors, and they were both men. Your chances in science and engineering, even nowadays, of having a female mentor are really low. I'm frequently asked, “How many women have you mentored?” and I find the question frustrating, because the few of us who are here can't possibly bear the burden of mentoring the entire next generation all by ourselves, if that next generation's going to be any bigger. There's no question that men have to be involved. Men can be great mentors for women, and women for men.

There are a number of other women in high-ranking faculty positions at UCSB, including Evelyn Hu, Scientific Director of the California NanoSystems Institute, and Alice Alldredge, former Chair of the Department of Ecology, Evolution and Marine Biology. Do you think they serve as role models for young female scientists?

They definitely do, and I haven't met a woman here in science or engineering who wouldn't be an excellent role model.

How do you think campus groups like Women in Computer Science (WiCS) and larger organizations like the Women in Science and Engineering (WiSE) help?

I think they give people a sense of community. Students can meet people who are similarly inclined, and it also introduces them to potential female role models. WiSE is great. They hold workshops, which I think are great opportunities for women to network with other women in the field.

As a woman in the male-dominated fields of computer science and mechanical engineering, have you experienced or observed discrimination?

For the longest time I really didn't believe that bias existed?I think that's partly because I just didn't have time to see it and I didn't want to see it. I really never thought about it until I was a full professor, and now I certainly don't think about
discrimination every day. But I do remember the first few times I got an invited lecture. My colleagues would say, ?You just got that because you?re a woman,? Right after I had my baby and I started traveling again, I?d hear, ?Why are you here? Didn?t you just have a baby? Who?s taking care of your baby?? Well, he has a father who was quite capable of taking care of him. I?ve never felt threatened or that I?ve lost opportunities, but it?s still more than just an annoyance?

I think the first time I really felt it big time was after I got my first big grant, for $2 million. A prominent colleague who had a competing proposal was actually very angry at me when I got the grant, and basically told me to concentrate on less ambitious objectives.

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Former Harvard University President Lawrence Summers suggested at a conference in 2005 that innate differences between men and women could be one reason fewer women excel in science and math careers. His remarks prompted an outcry, and Summers later resigned. Do you think there?s any truth to what he said?

Undoubtedly there are some differences, but there?s a huge statistical distribution in aptitudes and abilities in both men and of women, and one thing I?ve learned from doing science a long time is there?s a need for people with many different interests and strengths. And shame on Summers?He deserved to get fired.

**What do women uniquely bring to science and engineering?**

Women are well known to have strong abilities at integration, and right now many of the frontiers of science are multidisciplinary... The women do seem to be doing well in those areas. Some of the problems are so complex there?s a need to work in teams. A more team-based, consensus-building approach, at which women do well, is definitely the wave of the future. I think there?s more of that approach now, but there are still not many women to drive it.

It?s been nearly a decade since the landmark Study of the Status of Women Faculty in Science at MIT focused attention on the experiences of women in science and engineering. What did you think of that study?

I was shocked at how well that study described my own experiences. The interesting thing was that the junior women were not the ones who were conscious of any discrimination. It was the senior women who were most disaffected. It?s this invisibility thing. It?s a very subtle issue that you?re not even aware of until someone points it out.
Professors Linda Petzold and Frank Doyle are currently using computational modeling to understand the unfolded protein response that occurs in a yeast cell’s endoplasmic reticulum.

Despite efforts to recruit more women in male-dominated disciplines like computer science, they are still underrepresented. Why hasn’t there been more progress in that regard?

Somehow we’re not recruiting the women students into engineering and the sciences as we should, and that’s compounded in computer science. We have a huge, nationwide problem that’s multifaceted? There’s a problem with the image of computer science. Then there was all the negative press about offshoring and how there weren’t going to be any jobs. A lot of work was moved offshore, but the job market is extremely robust right now. They’ve offshored a lot of the straight programming jobs, so now the jobs are more creative, and have a lot to do with integration.

Still another part of the problem is our approach to computer science education. Five years ago we were deluged with students. We were preparing them to go to the Googles and the Microsofts and we did a tremendously good job of that? but then the dot-com thing went bust and we didn’t have as many students, but we were still teaching them in the old way. We have a very rigorous, technical, and in some ways narrow curriculum, but we’re working on that. We’ve added a new Bachelor of Arts program in computer science. It’s also a rigorous technical degree, but you can do a track in a number of different disciplines: economics, biology, geology. Another thing we do is we assume a lot more programming experience than a lot of the women have when they arrive. A lot of guys joined the programming club in high school or did programming as a hobby. That would seem to be a big disadvantage for women, yet there’s a lot of evidence that you don’t need that programming background to be successful in computer science.

What are the challenges faced by female faculty members in science and Engineering?

I think getting recognition for your work is the biggest challenge. My guess is men don’t think about nominating women colleagues as much as they think about nominating men. There needs to be a system in place to ensure salary equity and promotion equity. I think the younger female faculty members around here, of childbearing age, are very
nervous about it? I think there? s a lot of worry about tenure. I? m a very productive and hard working person, and I could only write one paper the year I had my baby.

**Do you have any sage advice for women embarking on a career in science, or who already have tenure in a field where women are underrepresented?**

Something that I have not been so very good at is defending my right to be here, aggressively defending my position. If you have a view and you? re in a meeting, I think it? s important to make that view known, make sure that you? re heard, and that your ideas are recognized. Women need to watch out for each other, to make sure that they get appropriate credit.

**You have a son who? s now 24 and a UCSB graduate. How did you mix motherhood with the demands of a tenured faculty position?**

I had many years with no recreation! You have to love your work, because you have to give up something, and most often it? s your personal time? but it is do-able. It? s very, very difficult, but it? s worth it. I think you just do it and you never have a thought about giving up other important parts of your life. You have a right to have children, but you can? t be blind? you? re not going to have a lot of free time. Motherhood has tremendous rewards and research has tremendous rewards. I believe you can have it all, or at least almost all. I? m proof that it? s possible, but the next generation should be able to improve on my model.