

Interview -- Making Strides Newsletter, Research
News On Minority Graduate Education (MGE) Volume 2 Number 1 February 2000.
<http://ehrweb.aaas.org/mge/Newsletter/Chandrasekhar.html>

An Interview with Dr. Meera Chandrasekhar

By Virginia Van Horne
MGE Senior Research Associate

Each issue of Making Strides features a short interview with an underrepresented SME minority professor who has been instrumental in mentoring and encouraging students through all levels of the education pipeline, as well as demonstrating leadership and outstanding accomplishments in the world of SME.

I had the opportunity to chat with Dr. Meera Chandrasekhar, a Professor of Physics at the University of Missouri-Columbia. A winner of the 1999 Presidential Award for Mentoring in Science and Engineering, Dr. Chandrasekhar conducts research on condensed matter physics and optical spectroscopy of semiconductors, superconductors and polymers, specializing in studies in high pressure. She obtained her Bachelor's of Science degree from M.G.M. College in Udupi, India in 1968; her Master's of Science from the Indian Institute of Technology in Madras, India in 1970; and her Ph.D. in Physics, "The Effects of Uniaxial Stress on the Electroreflectance Spectrum of Ge and GaAs," from Brown University in 1976. After completing a postdoctoral fellowship at the Max-Planck-Institute in Stuttgart, Germany, she came to the University of Missouri-Columbia, where she is currently a full professor. In addition to her research and teaching, she has written close to 95 reviewed articles and has developed hands-on physics programs for elementary and middle school students and teachers.

How did you become interested in science?

Good question! All of this happened so long ago, I have to think back. As a child, I was always very interested in science. But, the thing that set it all off was a wonderful teacher in my first year of college. I attended college in India in the small, rural town of Udupi. In India, one attends a rather small (in terms of size) institution in order to obtain their bachelor's and then moves on to a larger institution for further study. This one particular teacher I had was absolutely great. His method of teaching was so clear, and he always expressed such enthusiasm. Everything he said made sense, and it connected with the outside world.

There was no looking back after that! I was also fortunate to be able to participate in a series of month-long summer institutes via a national scholarship I had received my first year of college. As the institutes were held at different colleges or regional labs across India, I was able to interact with students of all levels and all cultures.

Tell us more about your education in India.

College tuition in my day was extremely cheap. To give an indication, my monthly food bill was about half of my annual tuition! The Indian Institute of Technology was a

government sponsored institution. The master's degree course was mostly based on coursework. We had to complete a small research project, but there was not as much of an emphasis on research as there is here in the United States.

Even as an undergraduate student at M.G.M. College in Udupi, I began to think about continuing my education beyond the bachelor's degree. My family was very supportive, but it was clear to me that I had to be an outstanding student, as being a woman would put external pressures on me—primarily to get married early. I graduated from M.G.M. College in 1968 and completed my master's degree in physics at the Indian Institute of Technology. After that, I knew that I wanted to obtain my Ph.D. and specifically, I wanted to do a Ph.D. in experimental physics. I realized that I would have access to better equipment, facilities, etc., if I attended an institution outside of India. I applied to several institutions, but was very interested in Brown University.

Why Brown?

My uncle was a physicist and worked for a company near Brown University. He had obtained his doctorate from a university in Germany. He was the first in my family to have pursued a career in the sciences. My father was a career army officer, my mother was a homemaker and my grandmother was a teacher.

I applied to and was accepted at Brown University. I obtained my Ph.D. in physics in 1976.

Did you encounter any obstacles as a student?

When I went to college, (it was the late 1960's, early 1970's), women were just entering into the SME fields. In India I was always aware that I had to watch out for myself. Many of the women who are the senior scientists in India now are people of my generation. In order to succeed, we knew we had to be extremely good (academically) so no one could question us. We also believed that family members should not put pressure on us. We were a transitional generation.

What about at Brown?

There were very few women at Brown. Three out of 100 graduate students were women. This was consistent with the national average that was running between two to three percent at that time. When I began my Ph.D. studies there were two other women. One switched to medical school after one semester and the other obtained employment when she received her master's.

For one year I worked as a teaching assistant, and then did research. Students had to go around and visit professors, searching for a thesis advisor. When I did this, I got mixed reactions. Some professors were very kind, others were not. Also, from a cultural perspective, I found it particularly difficult to approach these professors. In India, the professor is given more respect and interactions are more "at a distance." I always felt as if I was intruding on their time. I realize now that that was not the case.

I eventually “found” a thesis advisor. He was a wonderful man named Fred Pollak. He was both positive and extremely encouraging. In hindsight, I realize that I was rather naive and somewhat unaware. Unless something was rather overt, I didn’t notice it. For example, while at Brown, I remember going to one of the professors and asking him about his research program. His response was quite curious to me. He asked me why I was even asking about his research since in all likelihood I would quit when my husband moved. I explained that I was single. It was as if he didn’t even hear or understand me. The professor responded, “well, in that case, you’re single now, but you’ll still get married and move.” I couldn’t understand the absurdity of it all. I remember discussing this incident with a post doc some years later, and he assured me that that particular professor was rude to everybody. I realize now that I was probably in denial, accepting unpleasant incidents as freak incidents or attributing it to somebody’s bad mood.

What did you do once you received your Ph.D. in 1976?

I went to Stuttgart, Germany for a postdoctoral position at the Max-Planck Institute. Fortunately, I made a deal with them, explaining I would take two months off in order to learn German. This provided me with a break from studies!

I worked at the Institute there for two and one-half years. While there, I met my husband. He, too, is a physicist. He got a faculty position at the University of Missouri, Columbia, so I followed him.

And, then?

I didn’t have a faculty appointment when I got here; however, the department was aware that I had a physics background. For about the first five years, I held temporary positions, such as research associate and visiting professor. In 1983, I officially joined the faculty as an assistant professor. I was an assistant professor for a few years and then was promoted to associate professor in 1986. In 1988 I became a full professor.

Why academia?

I have always had an interest in teaching. I truly enjoy it. When I was at Brown, I worked as a teaching assistant for one year and had a good time. It had always been in the back of my mind to go into the academic profession.

You also received a Presidential award for Mentoring in Science and Engineering in 1999. Were you surprised?

Yes I was. I knew I had been nominated, but getting nominated is one thing. Actually receiving an award is quite another! I think a large part of this award stems from my work with K-12 students. I really want to get young women interested in the physical sciences.

How did you become involved with students at the K-12 level? Would you say this is a passion of yours?

The passion is getting young women interested in the physical sciences! And, building their self-confidence. One of my major efforts began in 1992 when I collaborated with Becky Litherland, the science coordinator for the Columbia, Missouri school district.

With funding from the National Science Foundation, we began an after-school program centered on physics for elementary and middle school female students. This entailed developing a lot of activities that were both fun and usable by young children.

Working on this project reminds me of my own feelings as well as experiences as I pursued my studies of physics. I, too, did not have the right kind of opportunities, or knowledge or confidence in pursuing a male-dominated field such as physics. The sheer act of working in physics—using your knowledge and building your confidence—is extremely beneficial. Sometimes women will be academically more qualified and will actually perform better than men, yet that does not translate into their perception of being good at the physical sciences. Female students seem more intimidated when they encounter simple equipment, largely because their life experiences may not have included using shop tools or devices such as voltmeters. Their male counterparts, in contrast, appear thoroughly confident, giving the female the feedback that they may not excel in the physical sciences, even if their grades tell them otherwise.

There are other factors: a lack of mentors is one of them. Female students need to see women active in traditionally male fields, so they do not think they are going to be the only females in the class or in the workplace. The number of women is increasing, so that the “onlyness” may not be a factor in many areas. However, the numbers are still disproportionately small in the physical sciences, particularly in physics, engineering and computer science. Yet other studies have documented that female students want to go into professions that do good for mankind.

Female students frequently express the desire to go into fields where they can “help” people, and often see physical science-oriented professions as being less person-oriented. Medicine and biology, in contrast, are more obviously person-oriented. Yet it is the physical sciences that produce a lot of value-added to the quality of everyday life, a factor that may not be obvious to the students.

Do you work with all types of students?

Yes, I’ve taught and worked with all types of students—from freshman to graduate students to postdocs. I have a pretty active research program; my specialty is to do studies under high pressure. I typically have one or two graduate students and sometimes a postdoc working on my research.

Here at Missouri about 15-25% of the SME students are a physics student. I have all types of students—male, female, foreign, U.S.—coming to talk to me. Our department is fairly small. There are 20 faculty members and 40 graduate students. Because of this, we tend to meet all of the students. Like elsewhere in the country, about 50% of the physics faculty are foreign nationals and 50% are U.S. citizens. There is another woman faculty member in the physics department; she also has an appointment in the chemistry department.

What advice do you give to your university students?

I advise students on the importance of remaining focused. It is imperative “to keep your eye on the ball.” Physics is a difficult subject—just like any type of graduate course—and there are times when a student can get discouraged. If you can see your way out of the hole, then you’ve already made strides. I also stress the importance of studying with and interacting with other students.

I always let my students decide what they want to do when they graduate. Most have very strong feelings one way or the other—whether to go into academia or industry. It really is dependent upon the person.

Thank you Dr. Chandrasekhar. For information on the extracurricular programs, please visit <http://web.missouri.edu/~wwwepic/index.html>.