The Photon: Spotlight

On Alumna Mary Claire Herda

Newly minted physics alum, Mary Claire Herda, discusses her adventures to come and the ones she's had here.

Looking Forward, Looking Back

by Mary Claire Herda, Class of 2001

There were rumors going all over that physics was the hardest subject yet. Absolute death to the high school student, and the instructor, **Mr. Owen**, made it even worse! With these threats going around Eleanor Roosevelt, I was terrified that I needed to take the class the next semester. I always loved my math classes but I didn't think for an instant that this class called "physics" could be anything but bad.

However, when the junior semester rolled around, I was pleasantly surprised to find that physics really wasn't all that bad! In fact it was the best class I have ever taken.

Mary Claire and Mr. Owen

Mr. Owen had a dry, twisted sense of humor. As students laughed about his jokes, he would slyly slip in the physics. So in the end, we were no longer intimidated by the subject but felt rather comfortable with it. When taking a test or a quiz, I would simply read the question, and it would be so funny that I would burst out laughing and all my nervousness about the exam would totally be gone.

Below is an example of how he would tell a joke, and yet make the kids do the physics problem to quench their curiosity:

While flying through space in a nearby galaxy, your spaceship is hit by a small meteor. You are thrown into the control panel and are knocked unconscious and your ship crash lands on a nearby planet. After you crawl from the wreckage of your ship you immediately set about to determine what planet you have arrived on. Based on the terrain and atmosphere, you conclude that your must be on either Dahmer (the cannibal planet), or Paragonius (the happy planet). You construct a pendulum by hanging a 500g jar of Tang from a 30cm string and find the period of the oscillation to be 5.8s. You have the mass and radius of Dahmer and Paragonius available to you from your tricorder.

I decided to go into physics because of this class, and the University of Maryland seemed the best place to do so. **Ruth Zerwitz** was the advisor at

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On the Materials Research Science and Engineering Center (MRSEC)

RAM, FRAM and YBCO--it's not alphabet soup, it's cutting edge research. *Maryland Research* writer, Megan Michael, describes the work being done by Dr. Ramesh and the MRSEC on enhancing computer memory.

A Material World

by Megan Michael

(The following is adapted from an article entitled, "The Material World" in *Maryland Research* magazine, University of Maryland, spring 2001.)

It seems obvious to say that materials are everywhere. They make up the clothes we wear, the pots and pans we use for cooking, the cars we drive, the houses we live in and the computers we use at home and work. There are about 50,000 different materials that make up the various things in our world, and all are based on the 100-plus elements of the periodic table, combined and manipulated into new and useful substances.

Yet for all the materials we think of as the building blocks of our world—from cinderblock to fiber-optic cable—scientists say they represent only a fraction of the materials that will occupy our homes and workplaces in the 21st century. In fact, an entire new universe of high-tech materials is being explored and refined in the laboratories of scientists and engineers at the University of Maryland, where materials research has become a key area in the university's efforts to apply its work to problems outside of academia.

"Within the next 15 years, materials science and engineering projects will result in a whole bandwidth of new, rewarding technologies that will impact fields such as communications, health, environment and transportation," says **Ramamoorthy Ramesh,** a professor in the university's department of physics and materials and nuclear engineering and associate director of the Materials Research Science and Engineering Center, or MRSEC. Ongoing projects at Maryland promise to drastically reduce the size and price of computers and other microelectronics devices, promote healthy living with detectors that can prevent skin cancer and sensors that can manage diabetes, and protect our environment by cleaning up

photo by John Consoli

Dr. Ramamoorthy Ramesh

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the time. When she explained that the physics department did not have lecture-hall-size classes for the students and that there was such a high teacher to student ratio, I was amazed. I was equally excited when I found out that undergraduates could use top-notch lab equipment and work with a physics research group.

When I first came to the department I became involved with the Society of Physics Students (SPS). In the 1998-1999 school year, I was the treasurer of SPS. **Sara Mitchell** and I organized movie nights and decorated the physics building at Christmas time. I got donuts delivered in the morning, since we didn't have access to a car. That year too, I got inducted into Sigma Pi Sigma, the physics honor society.

Mary Claire (left) and physics classmate, Andrea Sharp (right) dressed up for the university's senior dance, the Calvert Cotillion

But life at the physics department was not always fun and games. No…there was a lot of studying involved and long nights! For Electricity & Magnetism, Waves, and Thermodynamics, we formed study groups that grinded out the homework problems late into the night.

The most notable instance of this was in the Astronomy 310 class, Optical Techniques, where a group of us spent the afternoon and the whole night finishing up a lab involving IDL programming. We got a pizza, cranked up the '80's music and programmed into the night. Even though it was tough sometimes, the feeling of accomplishment when we were done was worth it. As [Physics Professor] **Tom Cohen** once explained to us, yes, the problems make you bang your head a lot, but it feels so good when you stop!

I started working with the Nuclear Physics Group under **Dr. Betsy Beise** my sophomore year. Those big foreboding doors at the end of the physics hallway entitled Experimental Nuclear Physics were the entrance to my workplace. Sometimes I caught people giving me scared looks as they saw me entering a place that potentially had radioactive material! I did some programming and built equipment for Dr. Beise.

Mary Claire and her boyfriend on the Massachusetts shoreline

But the best time I had was the summer of 1999 when I went up to Massachusetts to work at the Bates Linear Particle Accelerator Lab. I had a tour of the accelerator and learned how it produced the beam and kept it focused. My job was to take Moller measurements every few days to check the beam polarity. I also learned how to start and stop data-taking runs and transferred the data from removable hard drives to tapes. There were a few times when work needed to be done on the actual target, and I got to help

out a little there.

Mary Claire and Brian outside her apartment in Salem

I stayed in Salem, Massachusetts in a beautiful apartment. **Patty Lee** was my roommate from CalTech. We would cook for each other all the time, and she is the one who introduced me to squid. That summer, I met a lot of great people and had a fabulous time.

I am graduating this May. I can't believe it came so quickly. I considered graduate school for a while but decided that I would rather not be a purely experimental physicist. I did an internship at the Naval Research Laboratory in Southeast D.C. (next to Bowling Air force Base) last summer. They offered me an engineering position when I graduated, and I accepted.

I will be working in the Radar Division, building and testing antennas. I also will be attending radar classes and seminars periodically throughout the country. They want me to replace one of the engineers there. So I will be learning from Mark Parent and when I am ready, I will take over his position and he will move up the chain of command. I am very happy with the hands on work I will be doing there. It has a little bit of everything.

• See Mary Claire's profile

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