



Biophysicist in Profile

Ruth Heidelberger

If you were to pour determination, patience and integrity into a beaker, heat it over a love of science and add a touch of whimsy, you'd get Ruth Heidelberger. Currently Professor of Neurobiology & Anatomy at the University of Texas Medical School at Houston, Heidelberger's career as a scientist began the summer before her last year of high school when she started working as a technician in *Paul C. Lauterbur's* lab at Stony Brook University. "I washed glassware and performed other simple tasks for chemist Paul Lauterbur, who was developing the NMR-based imaging-techniques that we now know as MRI," she says. "Paul gave everyone who wanted to work in his laboratory a chance, and in my case, this experience shaped my future."

Heidelberger, who received her BS, MD, and PhD from Stony Brook University, had planned on eventually attending an allied health professions school, but working with Lauterbur changed her mind. "The experience in Paul's laboratory, working with chemists, physicists, programmers and doctors, inspired me to bridge the gap between science and medicine." She finished up her BS in chemistry and continued in Stony Brook's MD/PhD program. The research portion of her training took

her to *Gary Matthews'* lab as his first graduate student. "Ruth was the kind of student we all dream of having," says Matthews, mentioning not only her well-rounded personality but her A+ grades. "[She] developed the preparation of giant-terminal bipolar neurons from goldfish retina that was a mainstay in my lab for many years."

This method turned out to be a mainstay for Heidelberger as well, transforming her first project, establishing the calcium-dependence of neurotransmitter release, in Nobel Prize-winning *Erwin Neher's* lab, where she scored a postdoc. "Using the retinal bipolar cell nerve terminal preparation that I had developed with Gary, we measured the calcium dependence of the rate of synaptic vesicle fusion and made important inferences based upon the results about the properties of the calcium sensor molecule responsible for driving release," she says. This proved to be both a scientific and a personal breakthrough for Heidelberger. "The high level of science and intellectual stimulation that I experienced in the Neher laboratory was so enticing, that I ultimately decided to forgo a medical residency, and I decided focus on a career as a full-time scientist."

Today, her research extends that of both Matthews' and Neher's labs. A cellular physiologist, her lab investigates the factors that regulate neurotransmitter release. The findings will lead to a deeper understanding of how we see and improve our knowledge of neuronal communication. "It's all about discovery and innovation," she says.



Heidelberger playing the fiddle in Göttingen, Germany, during her days as a postdoc.

A dedicated scientist, Heidelbergler lends a hardworking helping hand to her collaborators. “Ruth and I have worked on several projects related to synaptic exo- and endocytosis over the years,” says *David Sherry*, a housemate of Heidelbergler’s at Stony Brook. “She’s a terrific collaborator. She’s deeply and directly engaged in a project at all levels. Ruth also is completely committed to results of high quality, even if it means going the extra mile to get it right.” *Wallace Thoreson*, who has published a few papers alongside Heidelbergler, praises her attention to detail and solid conclusions. “I enjoy writing papers with Ruth,” he says. “In addition to being a fluid writer, I always learn a lot from her creative approach and breadth of knowledge.”

Heidelbergler’s approach is admired not only by her collaborators. “Her patience and readiness to answer my questions helped me build up my technical skills and confidence,” says *Proleta Datta*, one of Heidelbergler’s grad students. “Ruth is also a challenging mentor, in that she always guides you in the right direction, giving hints but encouraging you to work out the answers yourself. This not only gives me the thrill of discovering something myself but helps me build my confidence as a scientist.”

This confidence-building characteristic persists in Heidelbergler’s indispensable presence on the Biophysical Society’s Committee for Professional Opportunities for Women (CPOW). “From serving on CPOW, I have become much more aware about current issues facing women in science and about productive ways to increase the presence of women in science,” she says.

Heidelbergler also actively participates in the exocytosis/endocytosis subgroup, even serving terms on the executive board and as Chair. “The subgroup meeting is a great opportunity to talk with other scientists in my field and learn about some of the most interesting and recent

advances in the field,” she says, adding that this is also true for the Annual Meeting as a whole. “The Annual Meeting is my favorite meeting,” she says. “Excellent science is presented there that is simply interesting in its own right.”

While her early exposure to science was facilitated by her father, a meteorologist, Heidelbergler’s volunteering bone comes from her mom. “My mom is the one who got us interested in the arts and in helping people through volunteer work,” she says. Heidelbergler is an accomplished fiddler, preferring to play Irish folk music. “There was always the possibility that I would run away and join a band,” she says. While not about to forgo precious time with her husband and five-year-old son, Matthew, she harmonizes her musical interests with her already full life by fiddling for the odd dance or festival and singing in the church choir. “Ruth is a great role model to all women in science,” says Datta. “She is an excellent example to prove that one can be an exceptional scientist, have a family and [have] a life.”

“I consider myself lucky in that I have had three scientific advisors that I greatly admire and respect,” Heidelbergler says. “Each was an excellent mentor and a thorough and rigorous investigator. They also taught me that science is not about winning or beating the competition, but about knowledge and understanding.” Now a mentor herself, Heidelbergler exemplifies these values through science. “It’s about loving what you do and wanting to do it in the best possible way,” she says. She plans on doing just that for a long time to come.



Heidelbergler with her son, Matthew.