

Susan P. Gilbert

If Susan Gilbert was a late beginner in the academic ranks, then Andy Hoenger thinks that her career gives “late” a new meaning. Hoenger now directs the Boulder Lab for 3-D Microscopy at the University of Colorado, but his collaborations with Gilbert on imaging kinesins go back nearly a decade to when he was still in Heidelberg at the European Molecular Biology Laboratory. The work uses Gilbert’s mutant kinesins that freeze in mid-step as a way to unravel microtubule-based movement. It continued after Hoenger moved to Boulder and Gilbert left the University of Pittsburgh to lead the biology department at Rensselaer Polytechnic Institute (RPI) in upstate New York. “Susan was a late starter,” Hoenger explains. “She was a [lab] technician for quite some time before she started her PhD. But now she’s chair at Rensselaer . . . She’s had a fantastic career. I’m a little bit jealous.”

Technically—and Rensselaer Polytechnic Institute is nothing if not technical—Susan P. Gilbert is not the chair of RPI’s biology department but its Head with a capital H. The position fits her to a T, says Margaret (Meg) Titus of the University of Minnesota. “Susan doesn’t do easy science. The kind of thing that she does is rigorous and quantitative. She works on hard things that require careful attention to detail and then taking it to the big picture. She never settles for second best. It has to be right.”

Gilbert’s friend and fellow kinesin researcher Claire Walczak, now at Indiana University, is an RPI alumna. Walczak was at RPI in the late 1980s when female undergrads were vastly outnumbered. There were few women on faculty and no female chairs that Walczak can recall. “Still it was a great place to go to school,” Walczak remembers, “It didn’t feel so dominated by men even though it was four or five to one.” Yet RPI has been changing rapidly, says Walczak, especially since 1999 when Shirley Jackson became president. Jackson set out to make RPI

a prominent research university and to broaden campus diversity. Gilbert’s selection as head of a major department like biology reflects that change.

Engineering Undergrads

Today, RPI’s undergrad population is roughly 70% male and 30% female. That ratio is rooted in its reputation as an elite math and engineering school. But the growing importance of the life sciences to math and engineering has also changed RPI. Biology is now a graduation requirement for everyone. Walczak thinks that the good news for her alma mater is not so much Gilbert’s gender. Rather it’s her precise approach to science, her ability to work across disciplines, and her gift for pulling undergraduates into productive research. “If you look at her track record with undergrads, it’s phenomenal,” Walczak says. “Look at her publications when she was at Pitt. Many of those first authors were undergraduates, not even grad students—undergrads!”

Moving to RPI was also good for her friend, says Walczak. “Susan needed something new. She is so efficient, so organized, plus she has great vision. So becoming a chair at a place like RPI was the next step.”

Heads or chairs, when Gilbert took over RPI’s Biology Department in 2007, she continued a career arc that began in 1982. That’s when she was first accepted into a PhD program at Dartmouth. Before that, Gilbert worked for a decade as a research technician at the University of Virginia Medical Center in Charlottesville, the University of Connecticut Health Center at Farmington, and finally Dartmouth. Gilbert finished her doctorate in cell biology at Dartmouth in 1986. Then came a postdoc with Ken Johnson at Pennsylvania State University. From there she went to Pittsburgh, where she spent 11 productive years and earned tenure.

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But Gilbert's move to RPI makes perfect sense, says her PhD advisor at Dartmouth, Roger Sloboda. "Susan's a motivated career person, so the next step was to go somewhere and chair a department and create something new."

Heavy-Duty Enzymology

Sloboda, who earned his doctorate at RPI, sees his former student as scientific good news for RPI. "She's a consummate enzymologist," says Sloboda. "In terms of heavy-duty enzymological analysis, she's probably one of the, if not *the*, top person in the field now."

She wears the title lightly. Coming on top of her lab, her teaching, her National Institutes of Health panels, her journal reviewing, and her professional societies, the administrative side of being head of biology does not overwhelm Gilbert. "I'm just very, very busy," she says.

One thing keeping her busy is her introduction to biology course, which she co-teaches with ecologist Bradford Lister.

Gilbert figures that they have one chance to give RPI's nonscience undergraduates the biological basics that they will need as technological collaborators and as citizens. Gilbert tries to tie key evolutionary and biological concepts to real-world issues like global warming, stem cell research, personalized medicine, and how to deal with emerging diseases. "This year, H1N1 gave us some great opportunities to discuss these issues in a relevant context," she reports.

RPI cultivates interdisciplinary collaborations, and the floor plan of the new Center for Biotechnology and Interdisciplinary Sciences is a checkerboard of labs from different disciplines: chemical and biomedical engineering; bioinformatics; cell, molecular, and developmental biology; and hard-core biochemistry. It's a place where Gilbert feels very much at home. "My own research is on that interface between biophysics and cell biology. I have a foot in both camps. So I bring that history and appreciation of knowing how both worlds function to Rensselaer."

Tidewater Sounds

Gilbert comes from a far different world—Virginia's Tidewater region—and has the distinctive vowels of her native accent to prove

it. She grew up on a 500-acre, third-generation family farm across the river from Jamestown. As a farm girl, she raised the full menagerie of baby ducks, chickens, rabbits, and piglets. Gilbert still remembers the consternation on her father's face when she burst into tears after learning her 4-H prize pig had gone to market. "My poor dad was so upset because it had never dawned on him

that I didn't recognize that you don't keep pigs as pets." What shaped her interest in biology most of all, she believes, was just spending so much of her childhood outside in the fields, woods, and streams.

Still, her parents regarded the future of family farming as perilous and emphasized higher education for the next generation. Her brothers both became civil engineers, and Gilbert went off to Randolph-Macon Woman's College to major in chemistry. Her career path, however, took a while to become clear. She met and married Mallory Gilbert, a soil scientist whose job with the federal Soil Conservation Service

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moved him around. She worked as a lab tech because it was both interesting and portable.

In 1980, Mallory Gilbert was transferred to Vermont, and Susan Gilbert crossed the river to New Hampshire. There she worked in the Dartmouth lab of the legendary microscopist Robert Day Allen. Allen pioneered video-enhanced contrast microscopy. He immediately added Gilbert to his summer lab entourage that packed up completely and moved operations to the Marine Biology Laboratory (MBL) in Woods Hole, MA. It was—and still is—a magical place for science, Gilbert believes. "I've always thought of Woods Hole as a playground for scientists. You don't have the tasks of day-to-day life. You live with the thrill of doing science every day without the pressures of administrative responsibilities."

Taking the Course

After a summer at MBL, she gave in to Allen's prodding and applied for admission to Dartmouth's graduate program. "When I interviewed," Gilbert recalls, "someone said, 'We've noticed that you've never actually taken a biology course.' And I smiled and said, 'I am certain that you will give me the opportunity to learn it as a TA.'"

In the summer of 1983, Gilbert came back to Woods Hole as a grad student in the MBL physiology course. One of her classmates was Meg Titus. Gilbert's work ethic floored Titus. "As a student in the physiology course, Susan would do everything we did," Titus recalls, "but then at night she would go to work on her own experiments that she had started with Bob Allen. I don't know how she did it. At the end of a long day, I was exhausted but here was Susan going back to work."

Back at Dartmouth, it had been agreed that Gilbert would have two PhD advisors, Allen for the microscopy and Sloboda for the biochemistry and preparation of squid axoplasmic vesicles to track their movement on microtubules. Then Allen was diagnosed with pancreatic cancer. He died in 1986. The thesis work that began with Allen and finished with Sloboda became the heart of Gilbert's first-author 1985 paper in *Nature*.

Since that first summer at MBL, Titus and Gilbert have become once-a-year roommates at the ASCB Annual Meeting. "She's so very tolerant of my late nights," says Titus. "I get a little carried away staying up to discuss science with friends. Susan doesn't mind that I come into the room at 1:00 or 2:00 am." In return, Titus recognizes Gilbert's critical need for coffee, early and often, at meetings.

One-Ton Slide

Titus clearly recalls Gilbert's first platform presentation at an ASCB meeting. "I always give her a hard time about this because she likes to present these slides with a ton of data on them." At that first ASCB meeting, Titus remembers, "Susan put up this slide with a 26-lane gel. I'm probably exaggerating, but there were an awful lot of lanes and she discussed each one.

Afterward, I told her that you *can't* do that."

Whether it was due to her advice or not, Titus says that Gilbert has since mastered the art of presenting science. "We had her to Minnesota to give a talk. My department is full of cell biologists, geneticists, and developmental biologists but nobody here does enzymology." Gilbert wowed them, Titus reports. "She's scaled back the slides and she's so much better."

At home, the Gilberts are "dog people." There is the large dog, Boomer, a Labrador Retriever, and the "large" dog, Bella, a mighty Shih-Tzu. Mallory is now a private consultant specializing in wetland sciences. The Gilberts have a house nestled in the woods, just off Route 7, one of New York's prettiest roads, as it heads east out of Troy, climbing toward the Vermont border. The Gilberts are out in all types of weather with the dogs. In winter, they snowshoe and ski cross-country.

Their daughter Emmeline graduated from RPI last December with a degree in mechanical engineering and product design and innovation. Emmeline had chosen RPI long before her mother started the long dance toward a job offer, so Gilbert prudently put family peace first. "I asked her if I could apply for the job, and Emmy said, 'Yes, Mom, there'll never be too many good women at RPI,'" Gilbert recalls.

Beyond her passion for family and dogs, Gilbert admits to an unusual guilty pleasure—she loves mindless chores. "I've always thought of these things like stacking firewood or cleaning our house as time just to let my mind wander. I fear that I will never solve another mechanism or write another paper unless I clean my house. My mind is free and things just fall into place." ■

—John Fleischman

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