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Biophysicist in Profile



Lila Gierasch

Lila Gierasch credits being in the right place at the right time with much of her success. It also helps that she has boundless energy and determination and knows what she wants. Born in Needham, Massachusetts, Gierasch grew up in a science-oriented household. Her mother was a teacher, and her father, a civil engineer, was always “gung-ho about math.” Gierasch’s older brother by eight years, Peter, was interested in astronomy, and she was his sidekick as they built radios and telescopes together. Peter is now an astronomer on the faculty at Cornell, and her older sister by five years, Molly, has been a math teacher and is now a therapist.

While Gierasch’s love and interest in the physical sciences was honed at home, she always felt an innate curiosity toward biology. “I was fascinated by living things and how they worked,” she explains. She began her college education at Mount Holyoke College, which was in her hometown and where her mother had gone. As a ‘townie,’ Gierasch received a scholarship to Mount Holyoke, but Gierasch chose it because of its tradition and reputation in science. “It is a wonderful school that encourages women in science,” Gierasch

explains, “where the professors let you know that anything is possible, that you can do anything.”

In her sophomore year cell biology class, while listening to her professor, *Kay Eschenberg*, Gierasch recalls thinking to herself, “I want to do this!” She enjoyed exploring questions about biological systems with a chemical perspective, and her senior thesis was on the refolding of collagen single chains into triple helical molecules. She recalls her lab time in college fondly, thrilled to spend time “playing in her sand box.”

During the summer following her junior year while working at Harvard in the lab of *Alwyn Pappenheimer*, she saw a poster for the International Union of Biophysics Congress at MIT and attended it. “There, I listened to the founding

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fathers of biophysics speak,” she remembers, “and getting the chance to hear the pillars of biophysics such as *Flory*, *Prigogine*, *Katchalski*, and *Ramachandran*, I was completely won over.” She recounts that she “was intrigued by the intersection of chemistry, physics, and biology” she saw there, and still has her notes from that 1969 meeting!

Deciding that she wanted to do her graduate studies in biophysics, she chose to go to Harvard after graduating in 1970 with a degree in chemistry from Mount Holyoke. But deciding on which lab at Harvard was not as easy.

Being on the ‘right bus’, shuttling between Harvard Medical School and the main campus, helped her decide. Gierasch recalls overhearing a senior biophysics student, *Barbara Brodsky* (now at Rutgers), talking about her research on “collagen”, and she seized the moment to find out whose lab Barbara worked in. It was this “accident of fate,” she says, that helped her choose *Elkan Blout’s* lab, where she explored

synthetic peptides and cyclic peptide models for beta turns and used techniques such as chemical synthesis, NMR, CD, and IR spectroscopies—a multi-method approach she has stuck with throughout her career.

Even before graduating with a doctorate in biophysics in 1975, Gierasch had been drawn to a teaching career. She had accepted a faculty position at Amherst College, a liberal arts school, prior to finishing her dissertation. While she doesn't advise anyone to follow her example, she did enjoy her time there.

She describes those days as “filled to the brim.” Along with teaching and launching an NIH-funded research program working with undergraduates, she coached the women's cross-country and riding teams. Her time at Amherst was significant in many ways. The campus had made the decision to become co-educational

during her first year there; she had been hired along

with six other women, immediately doubling the campus female faculty population. Gierasch recalls that being a woman, who was only a few years older than her students, and working at gaining the respect of her students and peers, was sometimes overwhelming. “You start to lose confidence in yourself,” she says. But she learned that “you need to look around you and notice that it's the situation and not the person that is the problem.”

At Amherst, Gierasch met guest lecturer *Jean-Marie Lehn*, who would later win the Nobel Prize in Chemistry. Interested in the work in supramolecular chemistry that his lab at the Université Louis Pasteur de Strasbourg in France was doing, and a self-proclaimed ‘Francophile’, Gierasch asked if she could join his lab for a sabbatical,

and he agreed. Taking some time off from teaching, Gierasch worked with Lehn's lab, which she describes as “very international and very chemistry oriented,” and immersed herself in the French culture.

Realizing how much she missed having a greater focus on research, which was difficult with the teaching demands at an undergraduate liberal arts school, in

“...she had been hired along with six other women, immediately doubling the campus female faculty population.”

Biophysical Chemistry at the University of Delaware. There she spent eight “wonderful” years, where she continued her work on peptides, getting more involved in the biological aspects, including launching a research project on targeting sequences—the zip codes that enable cells to correctly localize newly synthesized proteins. She established fruitful collaborations with *Stan Opella*, *Tom Silhavy*, *Bill Degrad*, *George Rose*, and *Jon King*.

As her research became increasingly biological, she was attracted to a setting where her collegial interactions would offer top-notch biomedical research thrusts. Adding to this had been her continuing difficulty obtaining funds to purchase a high-field NMR instrument in a setting where her lab would be the only major user.

Again, fate placed her in the right spot at the right time. *Alfred Gilman*, Chair of the Department of Pharmacology at the University of Texas Southwestern Medical Center became aware of her efforts to obtain a high-field NMR, and Gilman informed her that she would have access to the equipment she needed at UT Southwestern. “Plainly speaking,” she says, “I was wooed by an NMR machine.” Of course this was not the whole story, as UT Southwestern offered

the perfect environment for her interest in exciting biomedical research questions. She accepted the position of Professor of Pharmacology and Robert A. Welch Chair in Biochemistry and moved to Texas. She was not only the first woman to have the latter honor, but also was probably the youngest Welch Chair holder.

Gierasch was thrilled to join the faculty of UT Southwestern, because “it provided a candy-store of biological questions for a biophysical chemist to address. Many of my daily interactions were with Nobel Laureates. My lab was next door to *Mike Brown* and *Joe Goldstein*, who received the Nobel Prize in 1985, and we collaborated on several projects.” Gilman, her chair, received the Nobel Prize in 1994. She worked closely with *Hans Deisenhofer*, who received the Nobel Prize in 1988. A self-proclaimed “organizer,” Gierasch joined other colleagues in obtaining a Molecular Biophysics training grant, which paved the way for the establishment of a Graduate Program in Molecular Biophysics, which she directed during the time she was at UT Southwestern.

While in Texas, Gierasch met her husband, *John Pylant*, who at the time worked for Texas Instruments. Both

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avid horseback riders, they met while taking lessons. They enjoyed the outdoors and, since neither of them considered themselves ‘city folk’, they lived on a ranch outside of Dallas. As the city grew, however, the daily commute became too long and Gierasch missed the seasons, especially snow, that were part of growing up in Massachusetts.

She had promised Gilman that she would stay five years in Texas, and

Biophysicists in the News



Amit Chattopadhyay, Centre for Cellular & Molecular Biology, India, and Society Member since 1984, received The Shanti Swarup Bhatnagar Prize in Biological Sciences.



Keith Hodgson, Stanford University, and Society Member since 1999, received the Department of Energy's Ernest O. Lawrence Award for 2002.



Helmut Strey, University of Massachusetts, and Society Member since 1994, received the 2003 John H. Dillon Medal from the American Physical Society.

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ended up staying six. Missing her New England roots, and drawn to a university setting, Gierasch applied for a faculty position at the University of Massachusetts, Amherst. She was recruited to head the Chemistry department. This was a challenging position because the department was not only large, it was also one with divisions among the chemistry communities. Gierasch sought to break down the barriers that separated the chemists by making the department more interdisciplinary and hiring new faculty with interdisciplinary research interests. Nine faculty were hired during this time. Slowly, however, she realized that the administrative duties were taking her out of the lab and classroom. When the opportunity arose to become chair of the Biochemistry & Molecular Biology Department, she took it because the smaller, more cohesive department allows her to do more research and teaching, the two things she loves most about her career.

Today, her lab includes eighteen members, and a major research thrust is protein folding, the interest that began at Mount Holyoke. She remains committed to breaking down barriers, and encourages her students to become more interdisciplinary by doing things like involving computer scientists in her research. *Joanna Swain*, who has worked with Gierasch for the last six years, finds that Gierasch "has an exquisite eye for detail," which challenges her students to excel. "Lila takes her job as a trainer of scientists very seriously....and she is absolutely tireless," notes Swain. "Anyone who has watched her disappear up the mountain trail ahead of them, either at a Gordon conference or lab retreat, knows that she is driven to

excel," Swain says. "You can usually forgive her competitive nature, however, when you reach the top and find she's laid out a picnic, replete with wine!"

Gierasch advises those starting out in biophysics to be careful when options are presented. "Weigh them carefully, and don't go by what others tell you," she says, "and be aware of what you want. Focus on how you want to invest your time." This is particularly important, she reflects, for her female students. Women in science are increasingly asked to join committees and become involved in departmental duties. While this is not necessarily bad, she notices that women tend to end up doing more administrative duties and less work in the lab. *Patricia Clark*, one of her former postdocs, appreciated Gierasch's style of encouraging students to make their own choices, while being there when they need her. Clark recalls that "Lila went a long way towards clarifying what I wanted from an academic position. Not because she filled my head with her own ideas, but because she had a knack for asking me questions....and hearing my own answers made me realize what I wanted to do. That was invaluable." Now an assistant professor at the University of Notre Dame, and mentoring her own students, Clark finds herself asking, "What would Lila do in this situation?"

When Gierasch does find the rare opportunity for some free time, she enjoys spending it with her husband, whom she calls her "support system who holds the world together." Together they enjoy gardening, bicycling, bird watching, and preparing homemade jams from their own fruit trees. And the non-city folks still ride horses together, now in the rural countryside of Amherst.