

Jennifer Zhao '05 Works in a NanoResearch Laboratory and Becomes an Advocate for Undergraduate Research

Jennifer Zhao '05 works as a research assistant in Stephen L. Sass's nanofabrication laboratory. The team's research objective is to create periodic surfaces on silicon chips at the nanometer scale. These surfaces can serve a variety of purposes including biomedical research on antibodies, manufacturing nanowires, and magnetic signal storage on the nanoscale. Zhao prepares samples for viewing in the transmission electron microscope (TEM), and she has recently been trained to operate and interpret the results using the TEM.

Zhao first found out about the possibility of undergraduate research from Michael O. Thompson, Materials Science and Engineering, who gave a presentation about the department in her introductory engineering course. Zhao took the initiative to contact Thompson and was referred to Sass, who supervises undergraduate research in the department. Initially, Zhao was given a list of professors who needed research assistants and the specific areas of their research. However, before she even had a chance to refer to the list and set up any appointments, Sass realized that he needed an undergraduate researcher to work with his team. After he informed her about his nanostructure research, Zhao became interested in his work, and she has been working for Sass's team ever since.

Sass has always been a strong advocate for getting undergraduates into research laboratories early in their careers at Cornell. "If students join our groups during their freshman and sophomore years, they learn that all those math, chemistry, and physics courses that they are taking are actually useful for solving problems in research. The students get to share in the scientific enterprise and discover the excitement of discovery. Imagine if they are so fortunate as to find something important that no one else has discovered. That's a real kick! Also, our students get to use sophisticated equipment such as electron microscopes, which is a valuable experience. And, they frequently have to write technical reports and give oral presentations. Thus, they learn important communication skills," Sass explains.

Zhao brings a different perspective to undergraduate research. As a freshman, she feels that while she does not have enough background to contribute to the project on a theoretical level, she is learning a lot through working with graduate supervisor Fang Mei and Sass. "Jenn did valuable work making replicas of nanoperiodic surface structures during her freshman year. Now that she has some experience, Fang will be training her on the transmission electron microscope," says Sass. "I am very pleased with the contributions of Jenn, so much so, that I asked her to continue on this summer [2002]."

Zhao plans to become more deeply involved in the development of the research project in Sass's laboratory and contribute more intellectual information to the project as her experience progresses. She recently learned that she was awarded a General Electric Faculty for the Future Summer Research grant.

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Jennifer Zhao

In just one year, Zhao has already reaped the benefits of being an undergraduate researcher. "I think I have benefited a lot from undergraduate research because I get exposed to senior or graduate-level lab work so early, and it helps in my career choice. It's also a great way to get to know wonderful faculty like Professor Sass. He's been supportive and helpful in every way. I also get to know many wonderful graduate students who have been in my position and are also willing to help me out in career choices. So far, it has been an extremely rewarding experience, and I have already recommended doing undergraduate research to many of my friends."

Zhao has become a spokeswoman and advocate for undergraduate research. "I think there is nothing to lose and everything to gain in this kind of activity. You get to play with expensive equipment, do work that really amounts to something useful for the world, and potentially get rewarded financially," she remarks. "This position has taught me what really goes on in a research lab, and how discoveries are made."

Thinking about her future, Zhao comments, "Besides looking really good on a resume, this research position has taught me a lot about what I'd like to do in my future career. Right now, I am between materials science and engineering and the environmental engineering option in civil engineering. I am also considering picking up a biomedical minor."

Zhao certainly has three more exciting years ahead of her!

Yonina Fishof '02

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Yonina Fishof '02, Writer of the Undergraduate Research Feature, Comments on Her Cornell Experience

Five years ago, I was a high school junior on a mission: to choose the undergraduate institution that would be the best fit for me, allowing for academic, personal, and professional growth. Was there a place with opportunities that would allow me to flourish at a time when I was bursting at the seams with energy? My inquisitive mind and curious nature prompted me to pursue journalism as a major. However, as I began researching colleges and their undergraduate curriculums, I sat with students and professors at various institutions, interviewed them, and pondered my career options. These sessions provided me with insights that shaped my choice of undergraduate school and my career objectives. I realized that a communication program that emphasized social sciences, research, and humanities would provide me with the broadest, most sensible, and rewarding education as opposed to a hard-core journalism major, which would focus more on the “how” than the “why.”

Cornell was the right place for me. Through my research and many questions, I learned that I could study history, cooking, film, astronomy, and biology at this one institution. In addition, the Cornell community valued the importance of learning outside the classroom. One factor that separated Cornell from other institutions is the university's unique commitment to research, particularly at the undergraduate level. The entire Cornell community works to involve students in research projects in the arts, humanities, social sciences, and sciences. I knew that coming here would be an incredible learning experience. And indeed, it was!

Rather than letting college be a passive experience, I planned to take advantage of every opportunity available to me. As a Cornell Tradition Fellow, I planned to strengthen my commitment to work, service, and leadership. On my first day in Ithaca, I began looking for a position that would spark my intellectual interests and allow me to work in communications. For the past four years, I worked as the student writer and editorial assistant for Cornell's Office of the Vice Provost for Research, where I researched and wrote articles for this publication, *Connecting with Cornell*. In order to complete my writing assignments, I arranged and conducted interviews with students and faculty on topics ranging from history to biophysics. Writing about undergraduate research whetted my appetite for discovering ongoing research in a wide range of fields and communicating it to others.

As a sophomore, I received special permission to enroll in Writing for Magazines, an upper-level communication course. After successfully completing and receiving an A in the course, Professor William B. Ward asked if I would serve as the undergraduate teaching assistant (TA) for the course. I eagerly accepted his offer and served as a TA for two years. Internships with the American Society of Magazine Editors (ASME), the ABC News Brian Ross Investigative Unit, NPR-WNYC Radio in New York City, involvement with WVBR-FM in Ithaca, and active participation in Campus Insights, a public access show, continued to cultivate my interest in research, investigative reporting, and communication. Each of these experiences contributed to the continuing process of refining a career path.

Cornell introduces students to research at many different levels. I

learned to appreciate the diversity of topics available for exploration and each person's special attraction to an area of interest. I witnessed the encouragement of mentors across a wide range of fields. Tina Snead, who was my “boss” but in reality was my mentor and friend, showed me the importance of finding a field that I loved. She demonstrated the true meaning of passion and devotion through her dedication to Cornell and its undergraduate research program and to communicating about research. In discussing assignments for *Connecting with Cornell*, Tina contributed to the development of my own research style by encouraging me to go out and explore what faculty and student researchers were working on and report back, rather than handing me a menu of what needed to be done. Her mentoring helped me to clarify my career goals and to realize how much I love learning.

My experiences at Cornell exemplified its stated mission for undergraduate research and education in action. Through interactions with various members of the Cornell faculty, I began to see that life as a professor provides an interesting and eclectic mix of acquired knowledge and new insight. Also, each professor can influence a new generation and make the world a better place through their research and mentoring. I became enthralled with the idea of someday imparting my passion and experience to students on a university level. The impact of my experiences in investigating and reporting on research at Cornell has prompted me to consider a research component in my career choices. I currently work as a research analyst at InterSource International, an investigative firm in New York City. Each day is a fabulous learning experience filled with new projects and new questions.

Cornell taught me that with hard work and dedication, I could achieve all of my dreams. It is a place that encourages enthusiasm and exploration. It is an honor and a privilege to become an alumna of this fine institution and to know that I made a wonderful decision four years ago based on planning, intuition, and careful research.

Yonina M. Fishof '02

Yonina Fishof '02 has written the feature, Spotlight on Undergraduate Research, for her entire undergraduate years at Cornell.



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