

SOONER SPOTLIGHT • DONNA NELSON

With a refreshing enthusiasm for her all-consuming vocation, Donna Nelson views her work as an assistant professor of chemistry through interested, sparkling eyes that dance at the mention of organoborane research. Throw in a reference to computers, and she is ecstatic.

A native of Eufaula, Nelson graduated from OU with a bachelor's degree in chemistry in 1974, attended Auburn University, earned a Ph.D. in 1979 from the University of Texas and until 1983 conducted postdoctorate research at Purdue University with Herbert C. Brown, 1979 Nobel laureate in chemistry. After interviewing with several institutions, Nelson returned to OU because "they made me the best offer.

"It turned out that my goal and the department's goal were one and the same," she explains. "This department really emphasizes research, and some places I interviewed did not have that goal." In OU's chemistry department, faculty members are encouraged to apply for external support grants and seek publishers for their research documents.

Nelson's work currently is underwritten by a \$135,000, three-year grant she received in February from the National Science Foundation. She concentrates on the development of borane reactions useful in the synthesis of biologically important molecules such as radiopharmaceuticals, insect pheromones (communication devices), and prostaglandins (hormones produced naturally in the body).

Nelson's methods are unique because of her utilization of computer calculations to fully explore the mass of informa-

tion generated by research experiments. She explains that "often in chemistry you go into a system—a chemical reaction or a class of reactions—and there is so much information there that you cannot analyze it all."

Variables such as temperature, solvents, pressure or concentration affect chemical reactions, and data explaining those effects could possibly exist but would be very difficult to analyze. "So, you put the data in the computer and let it figure out the rules that are in operation," she says.

A new project centered around the computer's artificial intelligence, coupled with data programmed by Nelson, could lead to production of computer software that would aid many state industries from chemical to agricultural. "It is the closest thing to a thinking computer," Nelson says, "easily modified and transformed to a specific system."

Throughout her work, Nelson's students are of utmost importance, and under her supervision they conduct most laboratory experiments for the research projects. Last summer, two Oklahoma City high school students studying with Nelson as part of a special nationwide project discovered a method of generating bromine, useful as a laboratory chemical but hazardous to store because of potentially harmful vapors.

With the students' discovery, Nelson points out, bromine now can be obtained in a very low concentration, eliminating storage dangers. As a bonus, the students' work will be published in conjunction with Nelson's ongoing research.

"I am not sure to this day that they understood the full significance of their accomplishment, but I think someday they will," Nelson muses, admitting that the thrill of discovery is her motivation.

"What really intrigues me is figuring out the mechanisms by which the reactions go—exactly in what orientation and in what order the molecules come together. That is why I enjoy the computer calculations, because they enable me to make predictions of how the molecules come together and then test the predictions in the lab."

Nelson is chair of the department-sponsored Karcher Seminar Series, which brings notable chemists to OU in keeping with efforts to publicize the University's name in professional circles. She says the department is "racing upward by leaps and bounds."

As late as 1983, American Chemical Society statistics omitted OU's chemistry department from a ranking of the top 50 schools in the country. OU debuted on the list in the high 40s, ranked 37 last year, and 1986 estimates project continued momentum.

Her many responsibilities do not leave Nelson with much time, so evenings at home are devoted to documenting research results. She is aided by a computer terminal that allows her to dial into the University's computing facility, which she dubs "great and fantastic."

After-hours work is not a burden to Nelson. "It's not just my job, it's my hobby. I'm a lucky one; I was hired to do exactly what I enjoy doing."

This fall, Nelson will teach undergraduates in her application process to obtain tenure, a goal in no way guaranteed by her research, grants, publications and teaching, she observes. "They don't make it easy to get tenure here, but I wouldn't want to be someplace where it was really easy. I wanted to be at one of the best universities."

—MARGARET FRENCH



Betsy Baker

One of OU's top young faculty members, chemistry's Donna Nelson, front, is joined in the laboratory by graduate students Pam Spinks, left, Roswell, Georgia, and Penny Cooper, Yukon.