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Fellowships Aim To Boost Fluorine Chemistry

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The World War II-era Manhattan Project created a heavy demand for fluorine chemists. Afterward, rocket propulsion had a great impact on the field. Today, products ranging from agrochemicals to laser systems to pharmaceuticals draw heavily on fluorine chemistry know-how, but not enough people are entering the field--at least not in the U.S.

"There are tremendous opportunities opening up all the time," says ACS [Fluorine Chemistry Division](#) Chair William W. Wilson, senior research chemist at the Air Force Research Laboratory at Edwards Air Force Base in California. "These areas will continue to need the experienced and creative chemists that we are targeting with the Moissan Undergraduate Research Fellowships in Fluorine Chemistry."

Named for Henri Moissan, the discoverer of fluorine, the idea for the fellowships was hatched in 1988 after the highly successful 12th International Symposium on Fluorine Chemistry in Santa Cruz, Calif., unexpectedly realized a surplus in funding. Using the proceeds, the division authorized the program in 1990, with the first awards being made in 1992, Wilson recalls.



Yucel (left) and Ramachandran have benefited from the Moissan fellowships.

Over the past summer, chemists P. V. Ramachandran, professor of chemistry at Purdue University, West Lafayette, Ind., and Joseph Thrasher, professor of chemistry at the University of Alabama, Tuscaloosa, guided the research of undergraduates who held Moissan fellowships.

In 1996, as editor of an ACS Symposium Series book, "Asymmetric Fluoro-Organic Chemistry: Synthesis, Applications, and Future Directions," Ramachandran could not find a sufficient number of U.S. chemists to act as reviewers. "I knew I had to start at the grassroots level to get people interested in organic fluorine chemistry in this country," he tells C&EN.

Purdue University undergraduate Ahmet John Yucel was a Moissan fellow in Ramachandran's lab this past summer. A junior from Gary, Ind., Yucel says he would have been working in a steel mill during the summer to pay his tuition if it hadn't been for the Moissan fellowship. Instead of working in the mill, Yucel investigated vinylaluminum reactions with the aim of developing efficient methods to synthesize multifunctional fluoro-organic molecules such as fluorinated allyl alcohols, vinyloxiranes, and amino acids. Yucel is planning to make a report to the Fluorine Chemistry Division later this month, and the division is paying for him to go to the spring 2000 ACS national meeting in San Francisco to present his work.

Yucel sounds like a convert. "Before this summer, I was not sure if I was going to graduate school or just straight into industry after receiving my B.S. degree. Thanks to the ACS fellowship, I was able to experience laboratory research, and had the opportunity to learn fascinating fluoro-organic chemistry that I would not have been exposed to in a classroom. After working under the guidance of professor Ramachandran, I am not only sure that I want to go to graduate school, but I have also added fluoro-organic chemistry to the top of my list as an area of research that I would like to study," he tells C&EN.

Marcie Wingfield, another 1999 Moissan fellow, came to Thrasher's lab from Huntington College, Montgomery, Ala., but she has since transferred to the University of Louisville. "I think it's important for people, especially those from small schools, to get exposure to research at a research university with instrumentation and labs," Thrasher says.

Research in Thrasher's lab involved Wingfield in the preparation of fluororous biphasic catalysts that would partition largely, if not exclusively, in the fluororous phase. These catalysts contain phosphine ligands with fluororous "ponytails"--methylene or ethylene spacers between the phosphorus atom and each perfluoroalkyl chain. Wingfield was given a ponytail ligand and catalyst to prepare as well as a catalytic process in which to test the prepared catalyst. Over the summer she had a complete project of her own as well as exposure to a variety of techniques.

For example, Wingfield learned aspects of many vacuum and inert-atmosphere techniques, synthetic fluorine chemistry, multinuclear NMR spectroscopy, and vibrational spectroscopy. "My fellowship allowed me to broaden my knowledge of fluorine chemistry, gave me the opportunity to learn from many people, and allowed me to participate in group research," she says.

Since its inception, the number of Moissan fellowships annually has varied from zero to as many as eight, and the funding has always been a function of how much money the

division could afford from year to year. "When I was elected vice chair/secretary-treasurer in 1996 and before I became chair this year," Wilson says, "I realized that there should be a better way to fund these fellowships, and I began to lobby the executive committee to establish a trust fund, the interest from the investments of which could be used to pay for the fellowships on an annual basis. Consequently, the division allowed me to set up a portfolio with an investment firm to accomplish this in 1998."

Using some of the division's available funds and contributions from some of the division's members, the fellowship fund is a growing account that is expected to have matured enough within a few years to subsidize at least two fellowships per year. Wilson says the division is "still looking for contributions, and a fund-raising campaign is being initiated this fall seeking support from our corporate friends as well as the membership in general to reach our initial goal of \$60,000."

To be considered for an award in 2000, which consists of \$2,500 for a 10-week program, applications must be received by Dec. 15. For more information, contact William W. Wilson, Air Force Research Laboratory/ERC, 10 East Saturn Blvd., Bldg. 8451, Edwards Air Force Base, CA 93524; e-mail: william.wilson@ple.af.mil

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