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NSF Funds Instrument for Chemistry Research at IWU

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NSF Funds Instrument for Chemistry Research at IWU

BLOOMINGTON, Ill. – The National Science Foundation (NSF) has awarded a $248,000 grant to Illinois Wesleyan University's chemistry department to purchase a Nuclear Magnetic Resonance (NMR) spectrometer for use in synthetic chemistry research.

Ram Mohan, principal investigator, and co-principal investigators Brian Brennan and Rebecca Roesner submitted the grant proposal. Brennan is an assistant professor, and Roesner is an associate professor and chair of the chemistry department. The grant was awarded through NSF's Major Research Instrumentation program for the purchase of advanced instrumentation for research.

Mohan, Beling Professor of Natural Sciences, explained that an NMR spectrometer uses essentially the same technology as MRIs commonly used in hospitals. An NMR is an invaluable tool for determining the structure of unknown molecules, especially those made via the course of both inorganic and organic synthesis, according to Mohan. "I cannot think of current research in synthetic chemistry without a high field spectrometer," he said.

The new 400 MHz instrument will replace a 17-year-old 270 MHz spectrometer that frequently needs repair. Mohan added that the 400 MHz spectrometer is a sophisticated instrument requiring considerable maintenance and upkeep. The spectrometer utilizes a superconducting magnet that requires a steady supply of liquid helium that is replaced every four months and liquid nitrogen that's replaced every week.

"A modern, reliable NMR is key to research training, student and faculty research productivity, and Illinois Wesleyan's continued success in preparing students for scientific careers," Mohan said.

"NMR spectroscopy is taught in our sophomore organic chemistry courses," Mohan added. "At Illinois Wesleyan, every student in these courses will get multiple chances to use the

instrument to determine structures of unknowns assigned to them or to confirm the identity of molecules they have synthesized."

Mohan said that many large institutions limit access to such instruments. "At IWU, the state-of-the-art instrument will be available on practically a walk-in basis to our research students," Mohan said. He noted that, over the past 10 years, 78 percent of IWU chemistry majors have participated in undergraduate research, with a majority of those students enrolling in graduate school.

In addition, chemistry students at Heartland Community College (HCC) in Normal will utilize the new instrument. The HCC students will conduct their experiments on their campus and then bring their samples to IWU for hands-on experience with the spectrometer, Mohan said.

Roesner and Mohan will use the new instrument to routinely elucidate structures of molecules synthesized in their laboratories. Brennan uses the NMR spectrometer in his research to identify synthetic intermediates.

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