Ramapo Professor Receives $741k NSF Research Grant

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Staff Writer

Dr. Ozgur Dogru, an assistant professor of engineering physics at Ramapo College, was recently awarded a $741,000 National Science Foundation grant to pursue a collaborative research project with Rutgers University that will simplify detection of the carbon-14 isotope.

Another principal investigator working on the project is Dr. Daniel E. Murnick, a professor of physics at Rutgers University-Newark, and a former advisor to Dogru.

The pair has previously conducted extensive research on uncovering low amounts of carbon-14 isotopes using lasers, in order to improve the current technological methods for detection.

Dogru and Murnick applied for the grant in January 2009. The process included submitting a written proposal that detailed how the research would be possible, benefits the project would produce for the scientific and student communities and goals that the researchers would hope to achieve. Dogru and Murnick also had to estimate and justify a budget plan.

photo courtesy of Ramapo.edu

Ramapo professor Ozgur Dogru is collaborating with a Rutgers professor in hope to improve the development of pharmaceuticals through easier detection of carbon.

Applications for the highly-competitive grant "must meet strict standards of review for their merit and promise in the field of research," said Bernard Langer, Dean of the School of Theoretical and Applied Sciences.

In August 2009, Dogru and Murnick were notified that the NSF had accepted their proposal.

Dogru describes the ultimate goal of the project as coming up with an instrument that can be placed in a small-size room, and that can be operated without highly-skilled people.

"So you just need to give them an overview of how to run the machine and anyone should be able to do it," he said. "Just press the button and get a number, or get a measurement."

In terms of significance, the detection instrument that Dogru and Murnick plan to create would have applications in three main categories—pharmaceutical marketing, environmental research and carbon dating.

Pharmaceutically, carbon-14 is used to test and characterize drugs before they are made available to consumers. The amount of carbon-14 in a blood sample can provide researchers with important information, including where a drug stays in the body, how long it stays there and whether that amount of time is long enough.

Environmentally, carbon-14 is necessary for monitoring carbon dioxide levels in the atmosphere.

Carbon dating is the well-know method that historians use to determine the age of fossils.

In each of these three research categories, Accelerator Mass Spectroscopy can be used to trace and measure carbon-14. This method, however, is expensive, uses large devices and requires many skilled personnel.

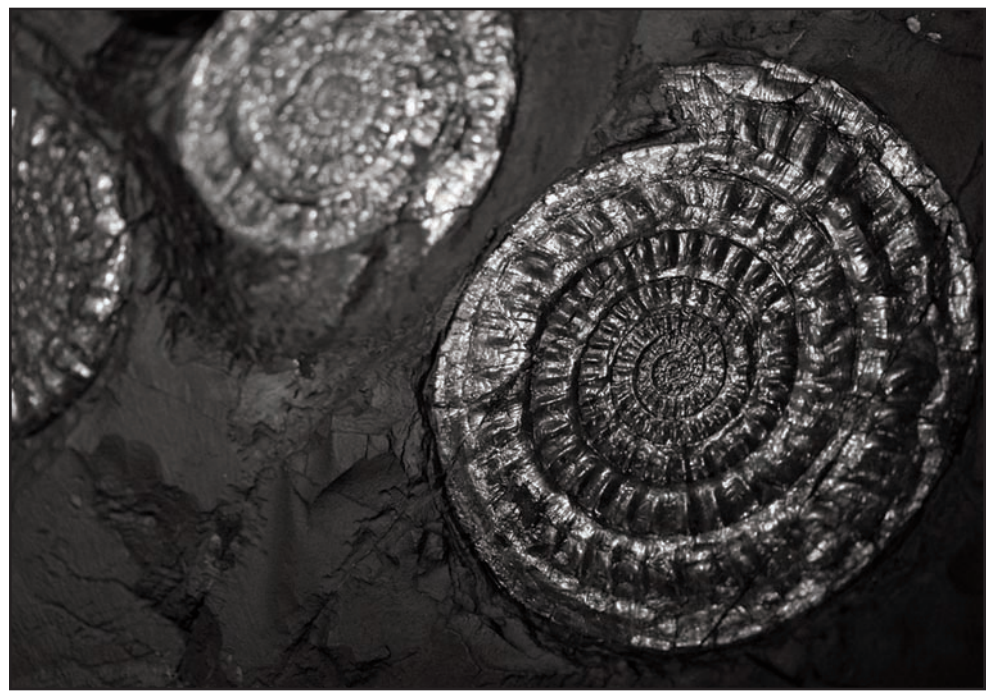

photo courtesy of Creative Commons

Professor Dogru is working to improve carbon-14 detection technology, which could make it easier for people to determine the age of fossils.

"So our project is just coming up with a smaller and a cost-effective device that can replace AMS," Dogru said.

The three-year grant will be used primarily to purchase necessary instruments and equipment for the project, and to hire graduate students. In addition, post-doctoral research associates can be brought on board at Rutgers.

Once the project is underway, Dogru and Murnick will begin a selective recruitment process, inviting students to work with them and take advantage of the invaluable hands-on experience.

"The principal benefit to the Ramapo community," Langer said, "is the involvement of students in state-of-the-art research with an imaginative faculty member in the sciences as an incorporate part of their undergraduate science education and experience."

Undergraduates will have opportunities to operate lasers, execute sample preparation, conduct gas-flow experiments, practice signal analysis and build electrical circuits. Additionally, they will gain familiarity with scientific software, apply principles of theoretical physics and mathematics and interpret data in order to develop cohesive models.

"The thing is, in research—especially if it's experimental—you always come across problems," Dogru said, "and you are trying to solve the problems to get a lot of experience, which is very important for any student."

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