

06-24
Media Contact:
Catherine Foster
(630) 252-5580
cfoster@anl.gov

FOR IMMEDIATE RELEASE

Argonne researcher wins Hispanic achievement award

ARGONNE, Ill. (Oct. 12, 2006) — Rex E. Gerald, II, a chemical physicist in the Chemical Engineering Division of the U.S. Department of Energy's Argonne National Laboratory, has received the 2006 Outstanding Technical Achievement Award from the Hispanic Engineer National Achievement Award Corporation (HENAAC). The award, presented Friday in ceremonies in Los Angeles, recognizes unique research that has a high impact on humankind, patents, publications, potential as a role model and involvement with the Hispanic community.

Gerald's scientific work deals with nuclear magnetic resonance (NMR), which is the absorption of electromagnetic radiation at a given frequency by a nucleus with nonzero spin in an external magnetic field. With nonzero spin, the nucleus behaves like a small magnet.

-more-



Argonne National Laboratory
is managed by the
University of Chicago for the
U.S. Department of Energy.

Hispanic Award – add one

“NMR allows you to learn something about the architecture of a molecule,” Gerald said.

Frequently NMR spectroscopy is used when a researcher has created a substance and wants to verify that it is the substance he or she intended to create. The technique can clearly identify a given group of atoms and other atoms or groups surrounding it.

The magnetic resonance imaging (MRI) used in medicine is based on NMR, and just as bringing metal into an MRI scanner has disastrous consequences, it was thought that NMR could not be used to image metallic objects. However, Gerald wanted a way to look inside a battery and get information about its performance without taking the battery apart. This information would be useful for designing better lithium batteries that would be robust enough for electric cars.

“The solution was to turn the problem around and make the metal components of the battery the tools for NMR,” Gerald said. The resulting invention, the Argonne Coin Cell NMR/MRI Imager, was one of the reasons why Gerald was selected for the HENAAC award.

Students are commonly told that NMR was discovered instantaneously and simultaneously by two teams at Stanford University and the Massachusetts Institute of Technology in the late 1940s. Gerald, who has written an encyclopedia article on the topic, said the actual story is that the MIT and Stanford discoveries were the culmination of work done by Isidor Rabi and C.J. Gorter in the preceding decade. Gorter came very close to the ultimate discovery, but was thwarted because he chose an unusually difficult substance to work with. A student of Rabi’s was on the MIT team that eventually won a Nobel Prize in 1952.

-more-

Hispanic Award – add two

Gerald shares this version of the story to inspire his student interns, who he requires — above and beyond Argonne’s general requirements for student interns — to present work at an international conference, write a report for publication in a peer-reviewed journal and write an invention report and patent application, all during a 10-week internship. He finds that stories emphasizing spontaneous flashes of insight as the sole source of inventions can be discouraging to potential inventors.

“If you’re waiting around for that light bulb to turn on, you’ll be very anxious,” Gerald said. “The idea, at least one that has merit, does not come out of thin air.”

Most of the interns Gerald has supervised since he began working at Argonne in 1994 have been undergraduates, many with only one or two years of college under their belts. However, all have risen to the unusual challenge, because Gerald does not permit them to fail.

“It’s not enough to work hard and do a good job and say, ‘My project didn’t work out,’” Gerald said. “You have to make it work!”

He describes the goal of his rigorous yet holistic style of supervising interns as a “transformation of the human spirit.”

“You don’t ever have to do NMR again. You can be an absolutely wonderful leader in your family or a company or whatever, and that’s the desired outcome. The science just turns out to provide an excellent vehicle,” Gerald said.

Gerald said he still keeps in touch with some former students, and that two of them supported his nomination for the HENAAC award.

-more-

Hispanic Award – add three

Gerald was born and raised in El Paso, Texas. His father is Texan and his mother, of Spanish and Italian heritage, is a Mexican citizen. From kindergarten through sixth grade, he and his three siblings commuted across the border every day to attend a Montessori school in Mexico. He credits the Montessori program's emphasis on self-directed learning for his creative approach to science. Also as a result of his studies in Mexico, he speaks Spanish fluently, and he said his familiarity with the culture there helps him bond with Hispanic students he has supervised.

Just as he sees understanding the history of NMR as vital to understanding the process of scientific discovery, Gerald finds that people's lives, including his own, are shaped by their history.

"You see that it's not so much happenstance," Gerald said. "There's a lot that goes into preparing you for that position."

The nation's first national laboratory, Argonne National Laboratory conducts basic and applied scientific research across a wide spectrum of disciplines, ranging from high-energy physics to climatology and biotechnology. Since 1990, Argonne has worked with more than 600 companies and numerous federal agencies and other organizations to help advance America's scientific leadership and prepare the nation for the future. Argonne is managed by UChicago Argonne, LLC for the U.S. Department of Energy's Office of Science.