UML Prof. Celebrates Four Decades of Plastics Engineering

Storied Tenure Benefits Hundreds of Students

Thirteen-year-old Rudolph Deanin was mesmerized from the start: the DuPont exhibit at the 1934 Chicago World's Fair flaunting brightly colored, bubbling liquids in glass tubes was like nothing he'd ever seen. And the beauty and potential of science determined his future, then and there.

"I knew then that I wanted to be a scientist of some sort," says Deanin, a UML Plastics Engineering Professor since 1967. Far from a scientist of "some sort," Deanin has been a leader in the plastics engineering field since its inception, witnessing its enormous growth—writing 13 books, 313 papers and earning 36 patents along the way.

▲ Rudolph Deanin

When asked about some of the most significant developments in his field, Deanin cites the demand for plastics products made from non-petroleum-based sources like corn. His expertise in polymer structures, composition, practical properties, polyblends, stabilizers, processing aids, and renewable raw materials, among others, puts him in high demand from industry. In fact, he has consulted with 450 companies throughout his career.

Deanin, a 2000 inductee into the Plastics Institute of America's Hall of Fame, has two daughters with his wife, Joan.

On his lengthy run at UML, Deanin says simply, "If you're too old to play, you might as well work."

New TEAMS Program to Expand University's Regional Outreach

Local High School Students to Supplement Curricula with University Courses

A new UMass Lowell program, now in its infancy, may be the latest example of how the University is reaching out to the region—in this case, its youth—while at the same time expanding and improving its own possibilities.

The fledgling TEAMS (Technology, Engineering and Math-Science) program, which began its pilot phase last year with 270 regional high school students attending UML classes part-time, moved into a higher gear this fall, as 32 specially-selected 11th- and 12th-grade students from 12 local school districts are enrolled in UMass Lowell courses.

The four courses being offered—environmental biotechnology, interactive robotics, bat engineering design, and assistive technology and electronics—developed through a collaboration of UMass Lowell faculty and regional high school teachers, are designed to supplement, rather than to replace, advanced high school courses. Their goal is to allow selected students to explore applied concepts in a range of science, technology, engineering and math (STEM) career fields that

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UML Researchers Study 'Killer' Electrons in Space

Energetic Particles Endanger Both Astronauts and Satellites

Space is such a harsh and dangerous place. Aside from temperature extremes and high vacuum, space travelers also have to worry about highly energetic electrons, which can pose a hazard to the health of astronauts and shorten the lifespan of orbiting satellites.

A team of researchers led by Dr. Qiugang Zong of the UML Center for Atmospheric Research (CAR) used data from the European Space Agency's CLUSTER spacecraft to help understand how these "killer" electrons are generated. Their findings appeared in the "Geophysical Research Letters" published on June 29. Zong's co-authors include CAR co-director Paul Song and research assistant Xuzhi Zhou.

ESA's four CLUSTER spacecraft made the observations in the aftermath of an intense geomagnetic storm on October 31, 2003. During such a storm, the solar wind—a continuous high-speed stream of charged particles from the sun—impacts and compresses the daytime side of Earth's magnetosphere, the region around our planet controlled by its magnetic field. The impact triggers instabilities along the boundary of the magnetosphere, called the magnetopause. These instabilities create Ultra Low Frequency (ULF) electromagnetic waves, which in turn produces killer electrons.

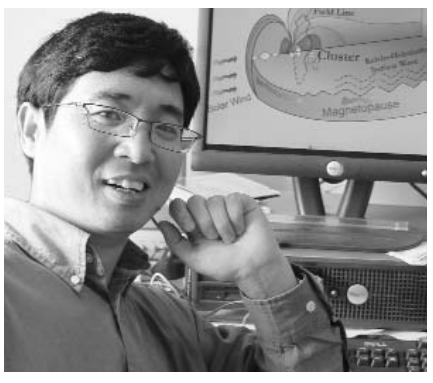
Zong's team not only confirmed that ULF waves do accelerate electrons to very high energies, but they also succeeded in directly measuring—for the first time—the velocity attained by the accelerated electrons. Following a storm, electrons can be energized up to a million electron volts or more and accelerated up to 94 percent of the speed of light, or over 280,000 kilometers per second.

"Understanding the source region of killer electrons and their energization mechanism is very important since these particles can penetrate deeply into satellites and cause them to malfunction," says Zong, who was interviewed by the European Space Agency, the German TV network ZDF, Discover magazine, and others. "For example, more than 15 satellites were reported to have been affected by the 2003 storm."

Killer electrons also pose a radiation threat to astronauts if they are caught during a spacewalk. "It's like getting zapped with the equivalent of five chest X-rays," he says. "So astronauts will have to stay inside the shielded crew module of the International Space Station and wait out the storm."

But people on the ground can rest easy. "Earth's magnetic field protects us perfectly well," says Zong, "though airline passengers flying above 25,000 feet near Earth's polar region during a severe geomagnetic storm might experience some effects. Researchers are doing their best to predict the intensity of these storms so astronauts can take cover and airlines can divert their flights or descend to lower altitudes."

NASA is planning to launch two Radiation Belt Storm Probes around 2010 to study the killer-electron phenomenon in greater detail.



▲ Dr. Qiugang Zong

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