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'behave badly'

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If you can't stand the heat,
get out of the laboratory

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An inside look at innovation and discovery at Missouri University of Science and Technology // Fall 2012



Turning over a new leaf in manufacturing

Missouri S&T researchers look
to nature for inspiration.

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Growing nuclear

Nuclear energy has huge potential as an abundant source of clean power. The key is to unleash it in a controlled way.

Muthanna Al-Dahhan, chair of chemical and biological engineering and professor of nuclear engineering at S&T, is studying fourth-generation nuclear energy systems through two research grants.

The first project examines the core of pebble-bed nuclear reactors, which are cooled by helium. Nuclear fuel particles are placed in graphite pebbles. Gravity pulls them down and then they are circulated back to the top of the core, Al-Dahhan says. His other project is to help advance the design, scale-up and performance of gas-solid spouted beds by coating nuclear fuel particles in all types of fourth-generation nuclear reactors.

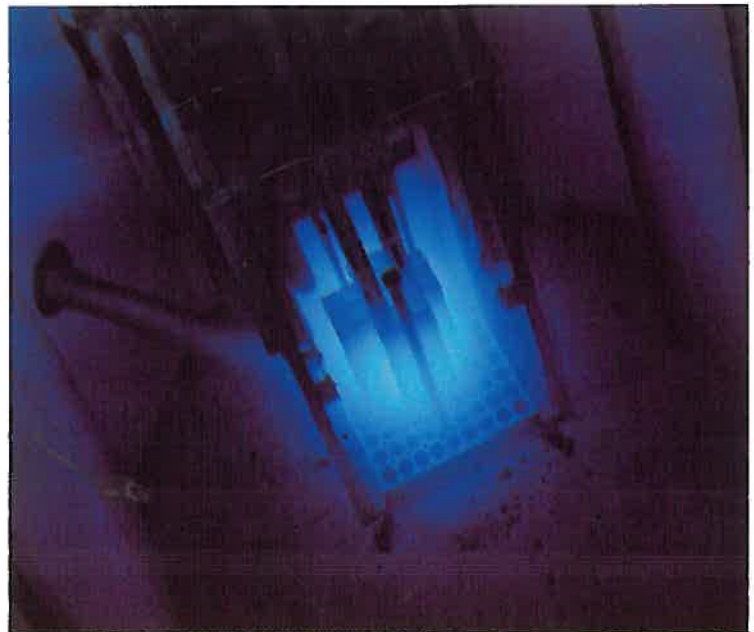
While nuclear engineers strive to make clean energy more available, they also drive innovations in medicine. In addition to making standard X-rays and other treatments possible, nuclear technology is used to detect and treat various kinds of cancer and other diseases. Missouri S&T faculty members **Hyoung-Koo Lee**, an associate professor, and **Xin Liu**, an assistant professor, are both working on research related to nuclear medicine,

including technologies that could improve mammograms and other procedures. Current research areas include digital mammography, computed tomography and digital tomosynthesis.

S&T houses one of the state's three nuclear reactors — the first one in Missouri. It is used for teaching and research.

"Using our reactor, Dr. Lee has been conducting research on a new imaging system that will produce clearer pictures of biomaterials," says **Arvind Kumar**, chair of the nuclear engineering program at S&T.

"The technology could also be used to examine the contents of shipping containers." ■



First in the state

The core of S&T's nuclear reactor, known as a "swimming pool" reactor, sits near the bottom of a large concrete pool of water.