Welcome to the McClellan Nuclear Research Center (MNRC)

Greetings!

Welcome to the First Edition of the McClellan Nuclear Research Center (MNRC) at the University of California, Davis (UC Davis) newsletter. The newsletter will be published on a regular basis and will cover what's new and interesting in our research collaborations, services, and educational activities. You will notice in this First Edition that we have prepared a summary that categorizes the MNRC, the TRIGA Reactor, Research Opportunities, Services and Facilities, a Researcher Spotlight and suggested ways to engage in collaborations, as well as lists of upcoming activities, grant opportunities and conferences for the month.

Although we are located at the McClellan Business Park, just north east of Sacramento, we are a University of California, Davis facility. We also have affiliates from other academic institutions and from industry, so our newsletters will include their accomplishments as well.

We look forward to continuing to provide updates on the accomplishments of our user community in academia and industry, and to promoting and increasing a collaborative environment.

Please feel free to forward along our newsletter to your colleagues using the link at the bottom left or please have them email us at mnrc@ucdavis.edu if they would like to join our mailing list to receive our newsletters in the future.

~Barry M. Klein, Ph.D. MNRC Director

ABOUT THE MNRC

The McClellan Nuclear Research Center (MNRC) is owned and operated by the University of California, Davis (UC Davis). MNRC's mission is to provide educational and

In This Issue

Researcher Spotlight

Ahmad Moradi, Soil Scientist within the Department of Land, Air and Water Resources at UC Davis

"Neutrons are sensitive to water, and plant roots consist of around 90 percent water. When one wants to examine them, or the movement of water in the soil, neutrons are far better tools than X-rays."
-Ahmad Moradi

http://news.ucdavis.edu/search/news_detail.lasso?id=10016

http://moradi.lawr.ucdavis.edu/

EVENTS:

research opportunities for the advancement of the nuclear sciences in a safe and pro-active environment.

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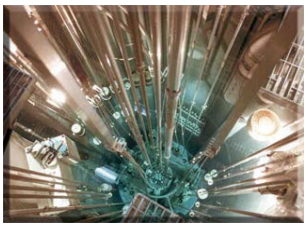
The MNRC was originally developed by the US Air Force to detect hidden defects in aircraft structures using neutron radiography. UC Davis took ownership of the reactor in the year 2000, following the closure of the McClellan Air Force Base. Today, the MNRC continues to provide and expand the use of unique neutron radiography capabilities while expanding its applications to various research disciplines. An X-ray radiography program is being developed to complement neutron radiography. Research programs are expanding to include radioisotope sciences to allow for the production of research, medical and industrial isotopes. The Center is easily accessible and located 25 miles from the Davis campus and approximately 10 miles from the Sacramento campus of UC Davis.

http://mnrc.ucdavis.edu/about.html

THE REACTOR



Our reactor, which began operation in 1990, is one of the newest research reactors in the United States. It is also the highest power TRIGA (Training, Research, and Isotope Production General Atomic) reactor in the United States, rated at 2 Megawatts (MW). The MNRC reactor can also be pulsed to approximately 500 MW for 30 milliseconds.

http://mnrc.ucdavis.edu/about.html

June 10-13, 2012
33rd Annual Conference and 36th Annual CNS-CNA Student Conference
http://conf2012.cns-snc.ca/

June 16-24, 2012
ITMNR-7: International Topical Meeting on Neutron Radiography
http://itmnr-7.com/

June 18 - 23, 2012
Summer School on the Fundamentals of Neutron Scattering in Gaithersburg, MD
http://www.ncnr.nist.gov/summerschool/ss12/index.html

June 24 - 28, 2012
American Conference on Neutron Scattering 2012
http://www.mrs.org/acns-2012/

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RESEARCH AT THE MNRC

The MNRC reactor design allows for a wide variety of research, development, and application activities that involve neutron imaging and neutron irradiation. MNRC is accessible to potential collaborators with significant nuclear science application that will advance research and education; collaborators can be researchers from academia and the private sector. Collaborators are encouraged to participate in the operation and the experiment whenever possible.

Please click below for those interested in conducting research at the MNRC facility. http://mnrc.ucdavis.edu/research.html

IMAGING SERVICES AND IRRADIATION TECHNIQUES AT THE MNRC

The MNRC provides 2 primary imaging services, neutron radiography and neutron tomography.

Examples:

- Neutron Radiography of Turbine blades
- Neutron Tomography of a Pyrovalve, revealing a damaged O-ring
- Neutron Tomography reconstruction of Cumulate igneous rocks from the Skaergaard Intrusion, East Greenland
- Neutron Tomography reconstruction illustrating a defective O-ring
- Reconstruction with isosurfaces (maximum attenuation) of a sandstone sample with endolithic bacterial colony
- Slice through neutron tomography reconstruction of hyaloclastite, altered volcanic glass and hydrogen-rich clay matrix

The MNRC specializes in 3 neutron irradiation techniques:

- radiation hardness testing,
- neutron activation analysis, and
- plant seed mutagenesis

FACILITIES AT THE MNRC

The MNRC has 4 bays to perform neutron imaging (radiography and tomography). 2 bays are dedicated for public service activities. These bays are optimized for production use and allow for rapid sample imaging. MNRC has the largest radiography capabilities in the world and can image samples as large as 34 feet (10.36 m) long, 12 feet (3.66 m) high, and weighing up to 5,000 lbs (2270 kg). The other 2 bays are dedicated for research applications. These bays are optimized for image quality; both bays have tomography capabilities.

The MNRC has multiple facilities to perform neutron irradiation. These include in-core areas, out-of-core areas and one of the bays to accommodate a wide variety of sample shapes and sizes. The in-core facilities, for example, include one pneumatic transfer system (PTS), which exposes the sample to the in-core flux and automatically returns the sample to a controlled ventilated experimental hood. The out-of-core Neutron Irradiation Facility (NIF) includes an Environmental Exposure Chamber.

The Radioisotope Science Facility (RSF) is under development at the MNRC with plans for 6 laboratories, offices, and a classroom which will offer opportunities for radioisotope research and education.

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