CONTACT INFORMATION
The NRL’s professional staff are available to assist experimenters, educators, and students.

David E. Moncton, Director
Professor Moncton is responsible for overseeing operations of the Nuclear Reactor Laboratory (NRL). He is a condensed matter physicist with extensive experience in research as well as in the construction and management of large DOE user facilities. He is also responsible for overseeing that the NRL maintains an effective regulatory posture that is safe to the public, to the researchers and employees, and to the environment.

Lin-Wen Hu, Associate Director of Research
Dr. Hu is responsible for overseeing the operational procedures that are in compliance, NRC inspections, and security. (617) 253-4211

Edward S. Lau, Assistant Director of Reactor Development and Utilization
Mr. Lau is responsible for overseeing that the NRL maintains an effective regulatory posture that is safe to the public, to the researchers and employees, and to the environment. (617) 253-8333

Mary E. Young, Administrative Officer
She is responsible for all financial and personnel matters related to the NRL, as well as the overall coordination and management of the NRL. (617) 253-0008

Saurav Datta, Nuclear Reactor Operations Manager
Mr. Datta oversees the administrative and operational activities of the NRL. He is responsible for regulatory issues that affect the NRL. (617) 253-0008

http://nrl.mit.edu/about/careers

MISSION AND GOALS
The MIT Nuclear Reactor Laboratory (NRL), which has served the university and surrounding community for 52 years, is an interdepartmental center that operates a 6 MW research reactor (MITR-II) in support of MIT’s educational and research mission. No electricity is produced.

The MITR-II is a second largest university research reactor in the United States and the only one located at a major research university. Its mission is to provide faculty and students from MIT, researchers from the national scientific and engineering communities, as well as local area universities and hospitals with both a state-of-the-art nuclear facility and the infrastructure to use it for important research and other societal objectives. Highest priority is placed on operating in a highly professional manner which is safe to the public, to the researchers and employees, and to the environment.

In addition to the NRL’s role as a major center for neutron research it is committed to educating the general public, to promoting education and training in nuclear science and technology. The MITR-II is the second of two research reactors on the MIT campus. The original one, the MITR-I, first achieved criticality in 1956. In 1974, the reactor was shut down in order to allow conversion to the MITR-II which offered a higher neutron flux level.

DESCRIPTION OF THE MITR-II
The MITR-II is a light-water cooled and moderated reactor that utilizes flat plate–type thermal, aluminum-clad fuel elements. The MITR-II, which currently operates at 6 MW, is located in the center of a massive light cylindrical steel building that is equipped with a controlled pressure relief system. Access to the containment building is through either a pedestrian or a truck airlock. The reactor core consists of hexagonal-shaped elements arranged in a hexagonal pattern. There are generally 24 elements and 3 core insertion positions. The core is surrounded by a heavy water reflector, a graphite reflector, a steel shield, and finally a biological shield. Additional safety is achieved since the light-water coolant, the heavy water, and the shield regions are all separately cooled. The MIT reactor runs at atmospheric pressure and 55 °C (the temperature of both water and heavy water). The nuclear reaction is controlled by inserting neutron absorbing blades. To provide an alternative shutdown mechanism, the heavy water can be dumped to a holding tank, eliminating the reflected neutron flux necessary to sustain a reaction. Furthermore, when either the cooling water or the fuel temperature rises, the reactor coolant system will be trip, shutting the reactor down for safety. The maximum thermal neutron flux available to experimenters at 0.025 cm⁻¹•sec⁻¹•neutrons⁻¹ is 8x10¹³ neutrons/cm²•sec.

MITR-II Flux Levels while operating at 6 MW are as follows:

<table>
<thead>
<tr>
<th>Flux Level</th>
<th>Value (neutrons/cm²•sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal</td>
<td>4x10¹⁳</td>
</tr>
<tr>
<td>Fast</td>
<td>6x10¹³</td>
</tr>
<tr>
<td>Prompt</td>
<td>1x10¹³</td>
</tr>
<tr>
<td>Medical</td>
<td>1x10¹³</td>
</tr>
<tr>
<td>Interferometer</td>
<td>1x10¹³</td>
</tr>
</tbody>
</table>

WHAT DOES THIS MEAN IN LAYPERSON TERMS?
When the MITR-II research reactor does not produce electricity, its mission is to produce neutrons that are used in various cutting-edge scientific and engineering studies. Its power level is 6 MW, comparable to 3000 MW for a large electric power reactor. Because of its low power and small size, and its passive safety design features, it does not present a significant safety concern.
EXPERIMENTAL FACILITIES

The MITR-II is the major experimental facility at the NRL. It is available 24/7 throughout the year, and offers opportunities for reactor scale-up and maintenance. The MITR-II supports a broad research program that encompasses all aspects of nuclear science and engineering, including advanced materials, fuel research, neutron scattering, and reactor safety. The facility is available to students and can be operated locally or over the internet to measure neutron energy distributions and absorption.

Neutron Scattering Experimental Facility

Neutron scattering and spectroscopy are among the government funds for studying the solid state and the fundamentals of matter at the atomic and molecular scales. The NRL, a neutron-scattering instrument includes:

- A high-temperature diffractometer that is equipped with counting proportional counters. PGNAA
- A neutron monitor and detector and standard collimators, aog and PPG Fiber. This instrument is suitable for elastic neutron scattering experiments on challenging problem materials and in an important tool for students training in neutron scattering.
- A neutron optics test system has photometric neutron beam for tests of neutron detectors, and other neutron instrumentation components.

Medical Irradiation Facility

Two facilities are available. One is located in the basement and uses a neutron beam from the reactor core. The other is located on the first floor, utilizes a beam produced by a fission converter driven by reactions from the core. The neutron source is the beam from the fission converter is the highest intensity beam available in the US. The neutron beam is used in medical applications such as:

- Support of MIT-R neutron-beam operations by providing medical irradiation services to hospitals and other medical institutions.
- Offering lab facilities for students, undergraduate and advanced secondary studies.
- Providing irradiation services for neutron activation analysis.

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