

Michelle Shinn
Staff Scientist, Thomas Jefferson National Accelerator Facility
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Applications of the Free Electron Laser (FEL)

Jefferson Laboratory operates a kilowatt average power, sub-picosecond free-electron laser, covering the mid infrared spectral region. The program and this new user facility, derives from the primary mission of Jefferson Laboratory, namely, nuclear physics research and the world's first large superconducting accelerator for generating continuous multibillion-volt beams of electrons, called CEBAF.

The program to build the FEL (originally called the IR-Demo), was led by Fred Dylla under the auspices of the Laser Processing Consortium, a growing partnership of high-technology manufacturers, start-up companies, research universities, government, the Commonwealth of Virginia and the U.S. Navy.

Dr. Michelle Shinn, a staff scientist in the Free Electron Laser Program in the Accelerator Division, has 13 years of experience in optical spectroscopy and laser development. She is responsible for FEL optics, applications, cost analyses of solid-state laser systems, as well as characterization and integration of the drive laser for the injector test stand.

Dr. Shinn attended Oklahoma State University, where she received all of her academic degrees in physics. After receiving her Ph.D., she was a physicist in the Laser Program (Y Division) at Lawrence Livermore National Laboratory in California from 1984 to 1990. During that time, she initiated laser action in radioactive promethium. She left LLNL in 1990 to join the faculty at Bryn Mawr College, where she taught undergraduate classes in physics and had an active research program in laser spectroscopy from 1990 to 1994. During a research leave from Bryn Mawr, she began working at Jefferson Lab, becoming an employee in 1995.

The Department of Energy's Thomas Jefferson National Accelerator Facility, or Jefferson Lab (JLab), is a basic research laboratory built to probe the nucleus of the atom to learn more about the quark structure of matter. The lab is managed by a consortium of 59 universities called the Southeastern Universities Research Association or SURA under contract of the DOE. SURA's goals are to foster excellence in scientific research, to strengthen the scientific and technical capabilities of the nation and of the Southeast, and to provide outstanding training opportunities for the next generation of scientists and engineers. In addition to the exploration of the nucleus JLab works to educate the next generation in science and to partner with industry to apply JLab's advanced technology.

JLab represents a \$600 million investment of the Federal Government, the State of Virginia, the City of Newport News, foreign contributors and the U.S nuclear physics research community. JLab has an annual operating budget of approximately \$70 million per year.

[View movies of the FEL at work!](#)