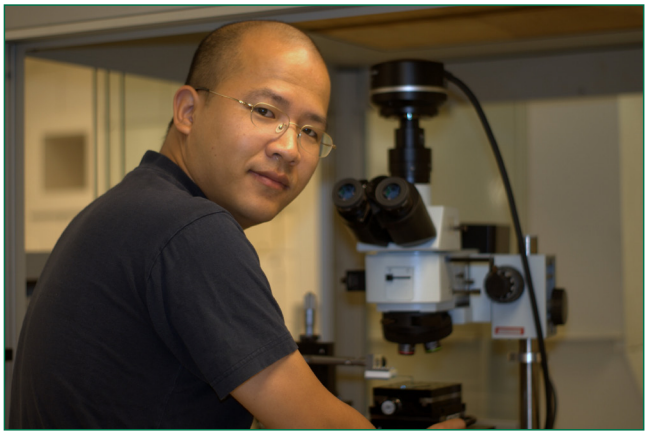
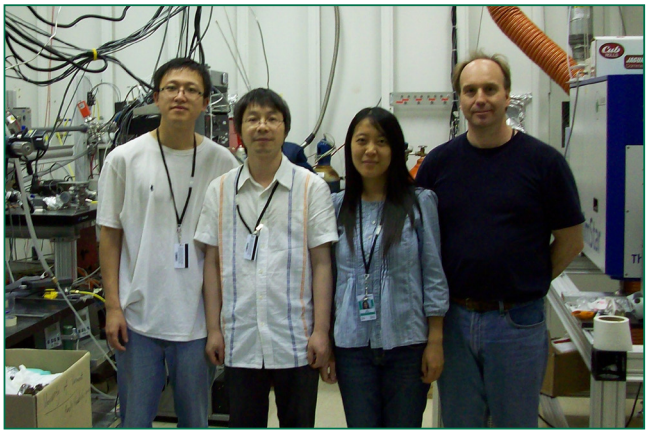
Professor Randall Headrick

Since coming to UVM from Cornell University in 2001, Professor Headrick's research has primarily focused on finding new ways to make and characterize thin films of metals and semiconductors. In his laboratories on the fifth floor of Cook Building, he and his research team are busy growing films of organic semiconducting materials with an eye to making the next generation of photovoltaic materials. He has developed a method of making thin films from liquid solutions by "painting" them onto a surface, an idea which has earned a United States Patent in 2008 because of the potential to produce solar cells or organic electronic circuits with high performance but very low cost. Headrick's group is also studying several other methods of making films, and are currently working on a laser deposition method that uses a beam of light to vaporize materials for films that can be used in magnetic data storage devices. The group combines their thin film deposition work with studies of the molecular structure of the films using x-ray beams from the National Synchrotron Light Source on Long Island, and studies how the structures relate to the electronic, magnetic, and optical properties of the materials. Dr. Headrick currently serves as Director of the Materials Science Program at UVM, an interdisciplinary program involving researchers from CAS, CEMS and COM. Two of Professor Headrick's graduate students, Mr. Songtao Wo and Ms. Lan Zhou are expected to finish their PhD work in Materials Science by May, 2010.



Songtao Wo, a graduate student in Dr. Headrick's group, with the thin film deposition equipment that they recently constructed. This research is supported by the National Science Foundation (NSF MRI #DMR-0722451 and CAREER #DMR-0348354).



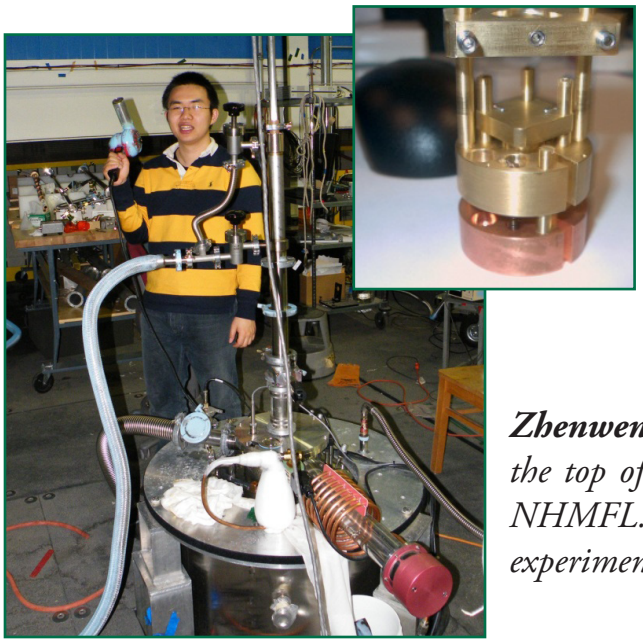
Some of the Headrick group during their first laser deposition this year at Brookhaven National Laboratory, Upton, NY. Group members, from left to right are: Minghao Li, Yiping Wang, Lan Zhou, and Randall Headrick. This work is supported by the United States Department of Energy (DE-FG02-07ER46380).

Professor Madalina Furis

Professor Furis's research group explores the quantum realm of novel nanostructured materials where the intrinsic spin of the electrons shapes the materials' properties. The team is currently conducting optical spectroscopy experiments to probe properties of electrons in nitride semiconductor nanostructures and crystalline organic semiconductor films. Such materials are of interest for many energy-saving applications such as solid state lighting, spin-based computing and photovoltaic devices for solar energy harvesting.

Since arriving in 2006, with support from the National Science Foundation, Professor Furis has been building UVM's first magneto-microscopy facility that integrates the latest generation of ultrafast lasers with superconducting magnet technology and top-of-the-line polarization optics into spectroscopy experiments that map electron spin dynamics at micron resolution in high magnetic fields. The facility will be used by faculty in physics, chemistry and engineering to conduct high magnetic field studies of electrons in a variety of materials systems, including semiconductor nanostructures, proteins and polymers. Such systems are of interest for many applications ranging from quantum computing to nanotechnologies and imaging-based diagnostics.

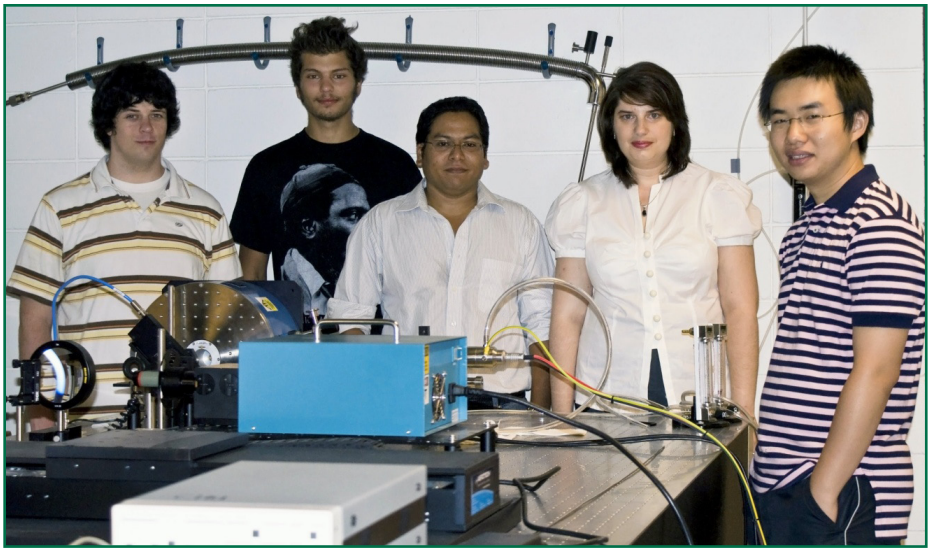
Professor Furis and her students are also conducting very high magnetic field experiments at the National High Magnetic Field Laboratory (NHMFL) in Tallahassee Florida. As a member of the lab Users Executive Committee, Professor Furis is involved in the development of experimental infrastructure around the upcoming Florida Split Coil Helix 25 Tesla magnet, a ground breaking piece of technology that will enable research in electron spin physics and ultrafast phenomena never accessible till now. She was also recently featured as one of the promising young high magnetic field scientists in the "Science Starts Here" profile series of the NHMFL.



Current members of the group include PhD Materials Science students Zhenwen Pan, Naveen Rawat and Lane Manning and undergraduate physics majors Chris Libby and Margaret Sutton. More details about projects and research group members can be found on the group's webpage.

Zhenwen Pan, *a graduate student in Dr. Furis's group, next to the top of the ten foot -high 17T SCM3 optics magnet at the NHMFL. The inset shows the sample mount he designed for the experiment run of April 2009.*

Professor Madalina Furis continued...



Some of the Furis past and present group members with the first high field experimental setup at the magneto-optics lab located in Cook Building. From left to right: *Chris Libby (junior physics major), Eli Kinigstein (junior physics major) Naveen Rawat (PhD graduate student–Materials Science) Madalina Furis and Zhenwen Pan (PhD graduate student–Materials Science). This work is supported by the National Science Foundation (DMR 0821268).*