

CNF ↓

George Malliaras, Materials Science and Engineering, is the new L. B. Knight Director of the Cornell NanoScale Facility. Donald Tennant, a 1973 Cornell graduate in engineering physics, previously at Lucent Technologies, is CNF's new director of operations. Tennant is one of the nation's most respected experts in nanofabrication and electron-beam lithography and has held national policy roles.

These appointments create a unique opportunity for individuals from industry and academia to come together for the benefit of nanoscale science. "George and Don will bring new energies and new ideas to CNF, a facility that is already thriving," says Joseph Burns, Theoretical and Applied Mechanics/Astronomy and Vice Provost for Physical Sciences and Engineering, in announcing the appointments. Malliaras comments, "I look forward in particular to working with Don Tennant. We have a lot to learn from each other."



> www.cnf.cornell.edu

CfE ↓

The Center for the Environment, a Cornell-wide unit specializing in crafting interdisciplinary collaborations among scientists at Cornell and partnering institutions, applies new knowledge to environmental problems and needs around the world. Current research projects address marine and coastal environments, environmental complexity, and sustainability. New York City and New York State, Great Lakes coastal ecosystems, and international sustainable development planning are major initiatives of the center. Projects focusing on the environment of New York City include sustainable environmental enhancements to the waterways, the impact of 9/11 emergency actions on the Hudson River, the role of aquatic vegetation in the ecosystem, and research priorities in urban ecology.



> www.environment.cornell.edu

CCMR ↓

The Cornell Center for Materials Research has added two new instruments suitable for imaging specimens ranging from DNA to nanoparticles to bone. This capability integrates optical microscopy with techniques that provide important complementary information, allowing researchers to better understand and manipulate material structure and chemistry. The instruments are located in the CCMR's Bard Hall Molecular and Cellular Surface Imaging (MOCSI) facility under the direction of Christopher "Kit" Umbach, Materials Science and Engineering.

The new Raman microscope is used to determine the composition of micron-dimensional regions of a material by measuring changes (known as Raman shifts) in the wavelength of an incident laser. The new near-field scanning optical microscope (NSOM) passes a laser beam through a glass fiber being scanned along the surface of the material and collects the reflected or transmitted light, enabling the determination of optical and topographic properties at nanometer dimensions.



> www.ccmr.cornell.edu

LASSP ↓

Keith Schwab, Physics, is the newest addition at the Laboratory of Atomic and Solid State Physics. He joined the physics department as an associate professor in April 2006. Schwab comes from the spooky world of the National Security Agency, where he and his group performed ultra-low temperature experiments on nano-electro-mechanical structures and quantum information devices.

These structures and devices have been able to demonstrate the world's closest approach to the Heisenberg uncertainty principle [Science, 2004] and have recently shown that a tiny vibrating structure can be cooled using the quantum back-action promised by Heisenberg (Nature, 2006). Schwab is setting up his laboratory in the basement of Clark Hall and will base his ultra-low temperature experiments in the microkelvin laboratories. His work will probe the limits of quantum behavior. It will attempt to show that a mechanical structure can be located in two places simultaneously, as standard quantum mechanics counterintuitively allows.



> www.lassp.cornell.edu

(l.) George Malliaras; (r.) Donald Tennant

New York City Waterfront Post-911

(l. to r.) Graduate student Erik Herz and Kit Umbach in CCMR's MOCSI facility

A scanning electron microscope image of an aluminum and silicon nitride resonator coupled to a superconducting single electron transistor

NBTC ↓

The Nanobiotechnology Center welcomes the return of Harold Craighead to the position of director of the NBTC, following Barbara Baird's successful five-year term. Harvey Hoch, chair of the plant pathology department, has joined the team as codirector. The center also thanks Anna Waldron, who established NBTC's excellent education program and has now moved to Vermont. The center's new education director is Jennifer Weil, who comes from the University of Pittsburgh.

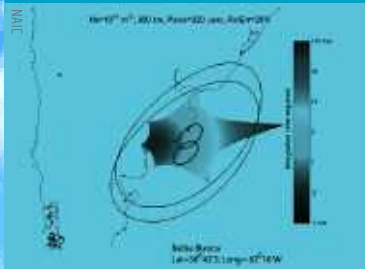
NBTC is continuing its International Research Experience program, designed to give students an opportunity for extended overseas visits to provide an international perspective on research and science in other cultures. The center is also completing its annual review of research projects, and with recently announced funding initiatives, looks forward to continuing advances in research, education, and knowledge-transfer programs in 2007.



> www.nbtc.cornell.edu

NAIC ↓

The National Astronomy and Ionosphere Center hosted an international workshop at the Arecibo Observatory on "Concept Development for an Upper Atmospheric Research Facility at the Arecibo Geomagnetic Conjugate Point in Argentina." More than 60 researchers from the United States and Argentina attended. The workshop participants hope to build an ionospheric research facility at the southern geomagnetic latitude corresponding to the geomagnetic latitude of the Arecibo Observatory in the north. Such a unique "conjugate" facility will enable researchers to study the propagation of phenomena physically connected to the same geomagnetic field line from both the northern and southern hemispheres. Discussions with funding agencies in Argentina and the United States have begun based on the recommendations formulated in the workshop report.



> www.naic.edu

CHESS ↓

The Cornell High Energy Synchrotron Source welcomes Zhongwu Wang as a new staff scientist. He will oversee the high-pressure science program and user facilities at the B1 and B2 experimental stations. While a postdoctoral associate at Los Alamos National Laboratory, Wang visited CHESS routinely to study zinc sulfide (ZnS) nanobelts and carbon nanotubes. The ZnS work led to developing a model for pressure-induced stability that can extend to using nanobelts for electronic and optical devices. The carbon nanotubes study discovered a whole class of superhard materials that are harder than diamond!

Wang will continue studying exotic phases of carbon, such as carbon nanotubes, that show interesting phase behavior and may also serve as vessels for squeezing other materials. Carbon nanotube technology will be applied to high-pressure melting measurements, phase transformations, and determining equations-of-state of Earth materials, with application to the lower mantle and core-mantle boundary.



> www.chess.cornell.edu

LEPP ↓

The United States has traditionally been a leading scientific and technological nation. Currently, however, there is a shortage of qualified high school physics teachers. High school teachers inspire students to take an interest in physics and prepare them to compete as scientists and engineers in the global market. To address this problem, the Cornell Laboratory for Elementary-Particle Physics (LEPP) is working toward educating undergraduates about the value of high school physics education. Last summer LEPP hosted a variety of professors and physics educators to examine the nationwide shortage and the role higher learning institutions, such as Cornell, could play in alleviating the deficit. Workshop participants defined two major problems: the lack of prestige and the low salary of secondary school educators. Participants discussed the idea of incentive packages to encourage undergraduates to consider teaching careers. They also proposed collaborations between educators at the high school and university levels and increased dialogue on the subject within the academic community.



> www.lepp.cornell.edu