

**University of Central Florida Energy Materials Building
NIST/DoC Construction Grant Program
Project Summary**

The proposed **University of Central Florida's Energy Materials Building (EMB)** will provide facilities and laboratories for multi-scale materials research and development related to innovative and efficient energy production, storage and utilization. The proposed three-story EMB will provide 47,266 net, 70,310 gross ft² of laboratories, seminar rooms, and offices. The centerpiece and enabling feature of the new building will be the expanded and upgraded Materials Characterization Facility (MCF). In addition to the MCF, 18 research laboratories will be provided, offices for faculty, postdoctoral fellows, and students, and main office of the NanoScience Technology and Advanced Materials Processing and Characterization Centers. UCF will construct the EMB aspiring to meet Leadership in Energy & Environmental Design (LEED) standards achieving a minimum GOLD certification as defined by the US Green Building Council.

The goals of the UCF EMB are to conduct multi-scale materials research and development that enables innovative and efficient energy production and utilization, increase joint collaborative research efforts among interdisciplinary research centers and colleges, provide ready and convenient access to high-value multi-user instruments and facilities, enhance the success of commercialization of technology through development and demonstration of new ideas, construct a living laboratory for field testing new energy and materials research concepts, and create a major "Show Case" that brings visibility and acclaim to UCF among visiting scientists, technologists, research program managers, students and politicians who strive for global energy sufficiency.

The EMB will promote multidisciplinary research by placing faculty, research scientists/postdocs, and students in the same building where they will interact on a daily basis, learn each other's language, and build collaborations. Research foci of the EMB include alternative energy sources and carriers (fuel cells, advanced batteries, low-enriched nuclear fuels, hydrogen, nano-scale materials), new materials for energy efficiency (light-weight alloys and composites, bio-inspired materials, high-temperature materials and coatings, smart materials, energy-efficient lighting sources, conductive supra-molecular assemblies), solar energy (photovoltaic materials and device development), and building efficiency.

The university has identified four user groups who will take the lead in developing an interdisciplinary research area for the main campus. They are: the NanoScience Technology Center, (NSTC); Advanced Materials Processing and Analysis Center (AMPAC); the Center for Research in Education in Optics and Lasers (CREOL), and the Florida Solar Energy Center (FSEC).

The EMB will be designed for collaboration and innovation. For example, the MCF will provide a one-stop location for researchers and community users to conduct state-of-the-art materials characterization. The EMB will be designed and furnished to encourage interaction among researchers wherever possible, including hallways, atrium spaces, and break rooms. Research laboratories will be organized by thematic areas, rather than departments or centers, eliminating any identification of space as "belonging" to one center or another. To showcase research, interior glazing will be provided so that other researchers or visitors can see ongoing laboratory activities. Laboratories will be designed as open spaces where multiple users can collaborate.

Because of the equipment proposed for the EMB, special attention to vibration and HVAC will be needed. For example, portions of the MCF (Zeiss, JEOL TEM, and Tecnai areas) will require vibration isolation as will other spectroscopy equipment in the Laser Laboratory. The MCF will require laboratory air, chilled water, and dry nitrogen feeds. Over 25 fume hoods will be installed in the EMB which will significantly challenge our ability to attain LEEDS Gold certification. Sustainability and fume hoods will be a targeted research area for the Buildings

Efficiency group with the EMB serving as a test case. Because of the nature of the Energy Materials Building, it is our intention to design the building with sufficient corridor widths to allow for natural ingress and egress; plus provide space for the moving of equipment. The EMB design groups laboratories in zones in order to share piped services. A perimeter office design layout is planned to ensure natural light in all offices with support core spaces placed in the interior of the plan.