

LSU-CAMD Hosts Workshop on a Light Source for the Future



A workshop entitled **“Enabling Grand Challenge Science: The Light Source of the Future”** was held from January 28-30 at the Lod and Carole Cook Conference Center and Hotel, LSU, Baton Rouge campus. It was jointly sponsored by the offices of Research and Economic Development at LSU, Southeastern Universities Research Association (SURA), Vice President for Research, Florida State University, and Vice Chancellor for Research, University of Tennessee. It was held in response to an initiative begun almost a decade ago by the Department of Energy (DoE) and the National Academy of Sciences (NAS) to crystallize the five “Grand Challenges” in the sciences. The Basic Energy Science Advisory Board of the US Department of Energy (DoE BESAC) has appointed subcommittees to conduct workshops and write reports on crucial issues in energy, communication and environmental research. The five challenges have been identified as follows:

- How do we control material processes at the level of electrons?
- How do we design and perfect atom-and energy-efficient synthesis of revolutionary new forms of matter with tailored properties?
- How do remarkable properties of matter emerge from complex correlations of the atomic or electronic constituents and how can we control these properties?

- How can we master energy and information on the nanoscale to create new technologies with capabilities rivaling those of living things?
- How do we characterize and control matter away- especially very far away- from equilibrium?

The present workshop focused on exploring and explaining the dynamic and functional behavior of gases and solids at the atomic scale. Since an “ultimate” light source is viewed as the perfect research tool for future science, a part of this larger objective was to acquaint the scientific community of the enhanced benefits of using possible fourth generation light sources to probe and understand natural phenomena in order to fulfill the “grand challenges.” CAMD, with its unique research facilities and as the only advanced light source in the South, hosted the event. The workshop will generate an important report that would recommend a configuration for a “Light Source for the 21st Century” and would be the first of 23 such reports commissioned by the BESAC.

The workshop consisted of about eight sessions and was inaugurated by LSU’s Acting Chancellor, William Jenkins, University System President, John Lombardi, Executive Vice Chancellor and Provost, Astrid Merget, and the Vice Chancellor for the Office of Research and Economic Development, Brooks Keel. The wide-ranging and manifold implications of using fourth generation light sources in science were discussed in introductory remarks by John Hemminger, Professor and Dean, School of Physical Sciences, University of California, Irvine, Wolfgang Eberhardt, Director, BESSY Laboratory, and Ward Plummer, Professor and Special Assistant to the Vice Chancellor of Research and Economic Development, LSU, and Distinguished Professor, University of Tennessee. The various sessions that were conducted in the workshop were on topics that correspond directly to DoE BESAC’s five stipulated “grand challenges” in science; they were as follows:

- Control of Electrons in Atoms, Molecules and Materials: Creating a New Language for the Behavior of Electrons
- Basic Architecture of Matter: Directed Assembly, Structures and Properties: The Challenge of Creating Robust Soft Matter and Tailorable Hard Materials
- Emergence, Complex Phenomena and Strongly Correlated Multiparticle Systems: The Challenge of Creating New Correlated Electron Materials
- Nanoscale Communication-Energy and Information: The Challenge of Creating Nanotechnology with Functionalities that Rival Living Systems
- Matter Far Beyond Equilibrium: The Challenge of Understanding and Controlling Systems that are Far from Equilibrium

Additional sessions included:

- Source Parameters
- Writing the Report

The workshop was attended by about 97 participants and included contributions from a gamut of distinguished professors, researchers, and world-renowned experts from engineering, basic sciences, and synchrotron-based research.

Please visit the following websites for additional information on related topics:

<http://www.sc.doc.gov/bes/reports/abstracts.html#GC>

http://www.sc.doc.gov/production/bes/reports/files/GC_rpt.pdf