# Designer nanoporous materials for energy storage and energy conversion

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Frontiers in Chemical Imaging
Seminar Series


## Presented by

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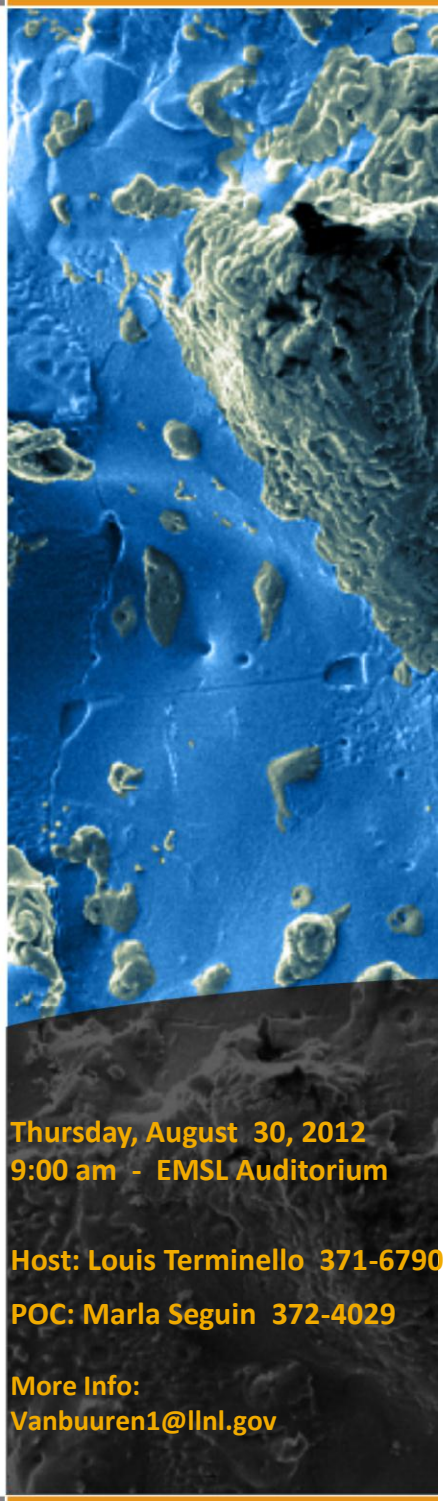
## Abstract


Securing this nation's energy future will require the development of new materials for energy storage applications as well as for energy conversion. Here, nanostructured – specifically nanoporous – solids have the potential to lead to many technological breakthroughs. Their high surface area, electrical conductivity, environmental compatibility and chemical inertness make them very promising materials for use as electrode materials in supercapacitors and rechargeable batteries. At LLNL research on nanoporous materials is driven by their use in targets for high energy physics experiments. Ironically, understanding how the pore structure and materials strength evolve as the surface environment is manipulated is a common theme in designing new porous materials for both these two diverse applications. The ability to measure changes in morphology and chemistry of the nanoporous materials in-situ with a combination of small-angle x-ray scattering (SAXS), tomography and diffractive x-ray imaging has provided the needed feedback to develop nanoporous materials with optimized microstructures for these applications. In many cases unique properties are observed in nanoporous materials as the surface environment and density are manipulated. We will present examples how SAXS measurements have led to the development of carbon aerogels able to wick cryogenic hydrogen needed for laser fusion targets and development of super strong carbon aerogels able to with stand volume changes associated charge-discharge in super capacitors and rechargeable batteries.


## Bio

van Buuren received the PhD. in physics, in 1996, from the University of British Columbia, Canada. After his PhD he did his postdoctoral work at Lawrence Livermore National Laboratory (LLNL). In 1998, he became a staff scientist and in 2007 became the group leader of the Nanoscale Materials Science and Technology Group of the Physical and Life Science Directorate at LLNL. His main research interest is on materials characterization using synchrotron radiation. His current research projects include porous materials and membranes, group IV nanomaterials for energy storage and SAMS and nano interfaces. He has authored and coauthored more than 100 technical articles.

Host: Louis Terminello 371-6790
POC: Marla Seguin 372-4029



**Thursday, August 30, 2012**
**9:00 am - EMSL Auditorium**

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