

# Immense Small-Scale Studies

NanoEngineering's  
Materials Research  
Center

## NanoEngineering's Materials Research Center

Directed by Kenneth Vecchio, NanoEngineering

### CURRENT RESEARCH

#### Enabling nanomaterials-based research with state-of-the-art microscopy

Dr. Kenneth Vecchio, and the Department of NanoEngineering at UCSD pursues research related to Materials Science for the 21st Century, which if focused in nanomaterials enables technologies ranging from Nanomedicine, Nanomaterials functionality, and Nanotechnologies related to Materials in Energy technologies. In every aspect of the research conducted in the NanoEngineering department, the ability to image, determine the chemical composition, and crystallographic structure of nanoscale materials is necessary. This type of materials characterization requires the utilization of highly specialized electron microscopes.

- The unique capability of this instrument is that it allows researchers, for the first time, to image the distribution of elements, which are either difficult or impossible to detect by conventional x-ray microanalysis techniques.
- These elements include: lithium, beryllium, boron, carbon, oxygen, nitrogen, etc. Elements like Li are critical to improved battery technologies, but our inability to locate Li in Li-electrode materials makes material design difficult. Similarly, detecting elements such as C, O, and N are critical for organic-based nanomaterials critical to most nanomedicine technologies.
- The very unique energy-filtered imaging that can be performed with this Zeiss Libra 200 instrument can revolutionize the materials research capabilities of our department, enabling new technology development in nanomedicine, energy technologies, sensor devices, and new materials development.

The impact of being able to secure this instrument for continued use on our research programs...

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### AFFILIATION

 University of California, San Diego

### RESEARCH AREAS

Technology, Nanotechnology

### FUNDING REQUEST

Your donations will be applied towards the acquisition of the Zeiss Libra 200 Energy Filtered Scanning Transmission Electron Microscope, which is currently being installed in our shared user facility in the Structural and Materials Engineering building in the Jacobs School of Engineering. The instrument is on loan for one-year and it is during this year that we must raise the funding to keep the instrument.

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