Nanoscale Science Seminar

30 Years of Nanostructured Materials: Enabling Nanotechnology to Benefit Society

Co-sponsored by
Department of Physics
School of Molecular Sciences
The LeRoy Eyring Center for Solid State Science

Guest Speaker: Dr. Richard W. Siegel
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Time: 4:00 – 5:00 pm; Refreshments: 3:45 pm
Location: GWC 487
Host: Dr. John Venables

Abstract
Over the past three decades, creative developments worldwide have continually increased our ability to synthesize and assemble nanoscale building blocks of various sizes and morphologies to create advanced nanostructured materials and devices with novel properties and functionalities. These materials and devices, based firmly upon the early pioneering research, have enabled the continued development of nanotechnology for the increasing benefit of society. The special properties of nanostructured materials are derived from the unique atomic structures, confined sizes, and very large surface-to-volume ratios of their nanoscale constituents. Nanostructured surfaces exhibit specific functions through their nanoscale topography and the controlled dispersion of high surface area nanoscale fillers with precise surface modification in conventional matrices also enable novel multifunctional nanocomposites. These emerging nanoscale attributes continue to create new opportunities for solutions to important societal problems. A brief retrospective of this exciting and ever-developing field, with highlighted examples from our nanoscale research at Rensselaer, will be presented that focuses on some of the seminal contributions that have made it possible, as well as a number of current advances in our understanding that indicate a bright and impactful future.

Biography
Dr. Richard W. Siegel is Robert W. Hunt Professor of Materials Science and Engineering at Rensselaer Polytechnic Institute serving as Department Head from 1995 to 2000. He was the founding Director of both the Rensselaer Nanotechnology Center (2001-15) and its NSF-funded Nanoscale Science and Engineering Center for Directed Assembly of Nanostructures (2001-13). Following a Physics AB from Williams College, he obtained MS (Physics) and PhD (Metallurgy) at University of Illinois (UIUC). Before joining RPI, he was a postdoc at Cornell, and had extended periods in MSE faculty positions at SUNY Stony Brook and as Research Scientist/Group Leader at Argonne National Laboratory. Siegel has been centrally involved in local, national, and international professional organizations, and has enjoyed visiting positions in Germany, Israel, India, Switzerland, Japan and China. He was a member of the Nanotechnology Technical Advisory Group of the US President's Council of Advisors on Science and Technology, chaired the WTEC worldwide study of nanostructure science and technology for the US government, which led in 2001 to the US National Nanotechnology Initiative (NNI), and served as the first chairman of the International Committee on Nanostructured Materials (ICNM). Active in materials research all his professional life, Siegel has studied many topics including the properties of nanostructured metals, ceramics, composites, and biomaterials. He is a founder and Director of Nanophase Technologies Corporation, a publicly held manufacturing company started in 1989; his early work with them was recognized by a 1991 US Federal Laboratory Consortium Award for Excellence in Technology Transfer. Among other awards, Siegel was a Humboldt Senior Researcher in Germany, a RIKEN Eminent Scientist in Japan, and in the US is an MRS Fellow, and recognized in the College of Fellows of the American Institute of Medical and Biological Engineering (AIMBE).