New Mexico State University

College of Engineering Distinguished Lecture Series &
The Chemical Engineering Department Shires Graduate Seminar Series

"Time-gated imaging and sensing with porous silicon nanoparticles"

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Abstract:

This presentation describes the chemistry and properties of mesoporous silicon nanoparticles relevant to sensing and treating diseased tissues *in vivo*. Nanophase silicon is one of the few semiconductor "quantum dot" materials that is non-toxic and that degrades to non-toxic byproducts. For *in vivo* applications, advantages include the tissue-penetrating near-infrared wavelength of emission, the long-lived (microseconds) excited state lifetime, and the ability of the nanoscale silicon cage to protect and enhance the properties of guest molecules such as drugs, photoacoustic imaging agents, and proteins. Three aspects of the material will be highlighted: (1) condenser chemistries to protect a molecular fluorophore and enhance its photoacoustic image contrast within the cage; (2) time-gated intrinsic photoluminescence from the silicon cage to enhance photoluminescence image contrast; and (3) use of the photoluminescence response from the cage as a self-reporting indicator of drug release.

Biography

Sailor is Distinguished Professor of Chemistry and Biochemistry at the University of California, San Diego. He serves as Director of the UC San Diego Materials Research Science and Engineering Center (an NSF MRSEC), and co-Director of the UC San Diego Institute for Materials Discovery & Design. He holds Affiliate Appointments in the UCSD Bioengineering Department, the Nanoengineering Department, and the Materials Science and Engineering program. Trained as a chemist (B.S., Harvey Mudd College 1983; Ph.D., Northwestern University 1988), he joined the faculty of the UC San Diego Department of Chemistry & Biochemistry in 1990, after post-doctoral studies at Stanford and the California Institute of Technology. He has supervised more than 160 undergraduate, graduate, and post-doctoral students, he is the author of more than 350 research publications (h-index: 93; total citations >34,000), one book, and 29 patents. He has founded three companies and has served on the scientific advisory boards of six others. Sailor is an elected Fellow of the American Association for the Advancement of Science, the U.S. National Academy of Inventors, and the Royal Society of Chemistry. Professor Sailor's research focuses on nanotechnology, with emphasis on biomaterials, drug delivery, imaging, and sensing applications. He is an expert in the chemistry, electrochemistry, and optical properties of nanomaterials, in particular porous silicon-based systems

Please Join us Friday, September 17th, 2021 at 1:30pm Jett Hall Room 259

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