

“Nanophotonics: Research at the Intersection of Chemistry, Materials Science, and Optics”



SAVE THE DATE!!! You have been invited to the *Electrical and Computer Engineering Seminar Series* on **Friday, March 7, 2014**. Find details of the presentation below.

When: Friday, March 7, 2014

Time: 10:00 AM - 11:00 AM

Where: FIU Engineering Center, EC 1115

Contact: 305-348-2807

Map: <http://campusmaps.fiu.edu/>

Dr. Stephen M. Kuebler

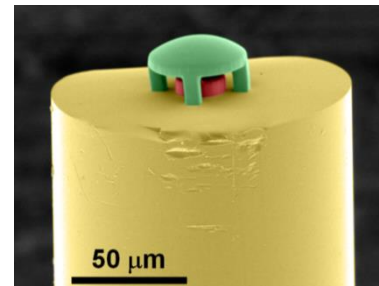
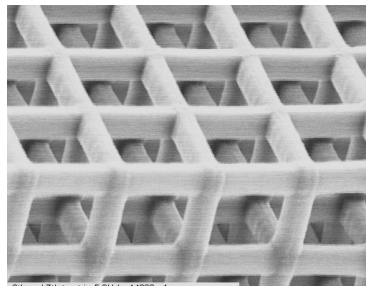
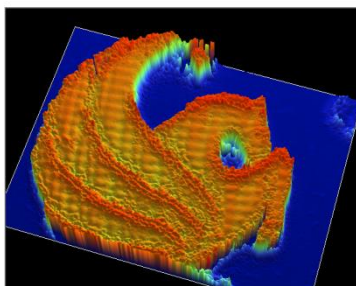
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ABSTRACT

Nanophotonics involves the development of fundamental science, materials, and applications that leverage the interaction of light and matter on the nanometer to micrometer length scales. This growing and highly interdisciplinary field involves chemistry, materials science, physics, engineering, and bio-science. In this presentation Dr. Kuebler will introduce nanophotonics and describe some work done in this field by his students. He will focus on their development of multi-photon direct laser writing and show how they used it to fabricate three-dimensional photonic crystals, including aperiodic structures that behave like artificial anisotropic media. He will also show how his team has used direct laser writing to create micro-optics on the tip of optical fibers. This approach can be used to create new integrated photonic devices, including low-profile sensors.



Micro-structures created by students in the Kuebler Group using multi-photon direct laser writing. **(Left)** 3D micron-scale rendering of the UCF crest, imaged by reflectance interferometry. **(Center)** Scanning electron micrograph of a functional 3D photonic crystal that can be used to control light on the micro-scale. **(Right)** Compound micro-lens (green and red) fabricated on the tip of an optical fiber (yellow).

BIOGRAPHY

Stephen M. Kuebler joined the faculty at the University of Central Florida in August of 2003 as an Assistant Professor through a joint appointment with the Department of Chemistry and CREOL, The College of Optics and Photonics. Kuebler earned a BS degree in chemistry and a BA degree in German from Tulane University. He was awarded a Marshall Scholarship and an NSF Graduate Fellowship to pursue graduate research in chemistry at the University of Oxford. There he earned the DPhil degree for his studies of the third-order nonlinear optical properties of molecular materials with Professors Robert G. Denning and Malcolm L. H. Green. Before joining UCF, Kuebler worked as a postdoctoral researcher at Caltech and later at the University of Arizona with Professors Joseph W. Perry and Seth R. Marder investigating the photophysics, photochemistry, and applications of two-photon absorbers. In 2008 he was awarded an NSF CAREER Award and promoted to Associate Professor. His broader interests include the physical and chemical properties of optical and electronic materials and their development for new technologies. His group's research has been supported by NSF, DARPA, the Petroleum Research Fund, Lockheed-Martin, Prime Photonics, Florida High-Tech Corridor Council, Florida Space Research Institute, and the Florida Space Grant Consortium.

Recent Publications

1. Z. Luo and S. M. Kuebler. "Axial superresolution of focused radially polarized light using diffractive optical elements." *Opt. Commun.* **2013**, in press.
2. A. Dutta, C. J. Clukay, C. N. Grabill, B. Yuan, D. J. Freppon, A. Bhattacharya, S. M. Kuebler and H. Heinrich. "Nanoscale characterization of gold nanoparticles for electroless deposition on polymeric surfaces." *J. Microscopy* **2013**, 251(1), 27-34.
3. H. E. Williams, Z. Luo and S. M. Kuebler. "Effect of refractive index mismatch on multi-photon direct laser writing." *Opt. Express* **2012**, 20(22), 25030 - 25040.
4. D. T. Restrepo, K. E. Lynch, K. Giesler, S. M. Kuebler and R. G. Blair. "Low-temperature (210 °C) deposition of crystalline germanium via in situ disproportionation of GeI₂." *Mater. Res. Bull.* **2012**, 47, 3484–3488.
5. S. M. Kuebler*, H. E. Williams, D. J. Freppon, R. C. Rumpf and M. A. Melino. "Creation of three-dimensional micro-photonic structures on the end-face of optical fibers." *J. Laser Micro Nanoeng.* **2012**, 7(3), 293 - 298.

