

**Texas Tech University
Department of Chemical Engineering
Seminar Schedule**



Andrew C. Hillier

Professor and Reginald R. Baxter Endowed Department Chair
Department of Chemical and Biological Engineering
Iowa State University

Using Light to Fabricate, Interrogate, and Activate Nanostructured Materials and Interfaces

Abstract

Light is a powerful tool for nanoscale materials research that can be used to fabricate complex structures, as a probe for interfacial and bulk processes, and to activate various plasmonic and photonic phenomena. In this presentation, I will describe recent work from my group involving the use of laser interference lithography as a platform for creating a wide variety of surfaces with nanoscale patterns ranging from simple one-dimensional gratings to chirped structures, quasi-crystalline lattices, and other meta-surfaces. Curved reflecting elements, for example, can be used to pattern surfaces with spatially varying undulations in one or more dimensions. Multiple exposures can be used to create a host of complex patterns and surfaces. Example applications of these nanopatterned surfaces will be described for various processes, including as templates to control the growth of colloidal crystals, as designer substrates for surface plasmon resonance sensing, and as tunable platforms for surface enhanced infrared spectroscopy.

Bio

Andrew C. Hillier is Professor and Reginald R. Baxter Endowed Department Chair of the Department of Chemical and Biological Engineering at Iowa State University. Dr. Hillier received his B.S. in chemical engineering from the University of Nebraska in 1990 and his Ph.D. in chemical engineering from the University of Minnesota in 1995. Following a postdoctoral appointment at the University of Texas at Austin, he started his academic career at the University of Virginia, where he rose to the rank of Associate Professor. While at Virginia, Hillier was a member of the Department of Chemical Engineering and the Center for Electrochemical Science and Engineering (CESE). In 2003, Hillier moved to Iowa State University to join the faculty of the Department of Chemical and Biological Engineering and the Department of Chemistry. At Iowa State, Hillier has been on the Executive Committee of the Institute for Combinatorial Discovery, Associate Scientist with the Ames Laboratory, director of the W.M. Keck Laboratory for High Throughput Atom Scale Analysis, and has served as Chair of the Department of Chemical and Biological Engineering since 2013. Hillier's research interests include electrochemistry, thin film design and characterization, scanning probe microscopy, optical sensing at nanostructured surfaces, and atom probe tomography. Hillier has been recognized with several awards during his career, including the Camille and Henry Dreyfus New Faculty Award, a National Science Foundation CAREER Award, and a Young Investigator Award from the Office of Naval Research, a Young Investigator Award by the Society of Electroanalytical Chemistry, and is a Fellow of the American Association for the Advancement of Science.

**Friday, Feb 21st
Livermore 101
3:00 pm**