

THE DEPARTMENT OF CHEMICAL ENGINEERING presents the



# PETER SUTTER, PH.D

## SPECIAL SEMINAR

CENTER FOR FUNCTIONAL  
NANOMATERIALS

MONDAY, MARCH 24TH, 2014

3:00 P.M. IN WEB 1650 (ECCLES BOARDROOM)

### In-Situ Microscopy and Spectroscopy of Advanced Materials

#### Abstract:

Experiments capable of interrogating materials with high spatial, temporal, chemical, and energy resolution in complex environments promise to play a central role in accelerating the discovery of new materials synthesis and processing routes, and in fostering a fundamental understanding of the functionality of advanced materials. Here, I discuss our recent development of surface sensitive in-situ and in-operando methods applied to two-dimensional (2D) materials and materials for sustainable energy conversion.

2D crystals represent a new class of multifunctional materials that show promise for a wide range of applications. Real-time surface microscopy and associated analytical methods provide unique opportunities for studying the synthesis, processing and properties of atomically thin materials such as graphene, hexagonal boron nitride, as well as engineered nanoscale 2D heterostructures. Novel in-operando probes promise insight into the interaction of materials for sustainable and energy-efficient chemical processes (e.g., heterogeneous catalysis, greenhouse gas capture) with their environment, thereby providing a basis for the rational design of systems that function optimally under industrially relevant conditions. Our combined results illustrate the power of in-situ and in-operando methods for achieving and probing novel functionalities in advanced materials.

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#### Short Biography:

Peter Sutter is a Group Leader and Staff Scientist in the Center for Functional Nanomaterials (CFN) at Brookhaven National Laboratory. He received his M.S. and Ph.D. degrees in Physics at ETH Zurich, Switzerland, and was subsequently a Swiss National Science Foundation Postdoctoral Fellow at the University of Wisconsin-Madison. He became Assistant Professor and then tenured Associate Professor in Physics at the Colorado School of Mines before joining the CFN at Brookhaven in 2004. At the CFN he leads the Interface Science & Catalysis research group and directs an associated user facility that comprises advanced laboratory- and synchrotron-based instrumentation for in-situ surface microscopy and spectroscopy, including unique tools for in-operando experiments on functional surface systems. His current research focuses on the growth and physical/chemical properties of 2D materials, as well as surface chemistry and catalysis for greenhouse gas capture and energy conversion processes. He has played an active role in organizing scientific meetings, among them several topical workshops, MRS symposia, and the LEEM/PEEM 7 International Conference. He was recently elected co-chair of the International Conference on Nanoscience + Technology 2014. Among his several awards are the NSF Career Award, the Scientific American 50 Award, and the Sapphire Prize. He has authored more than 100 peer-reviewed publications, presented numerous invited talks, and holds 4 U.S. Patents.