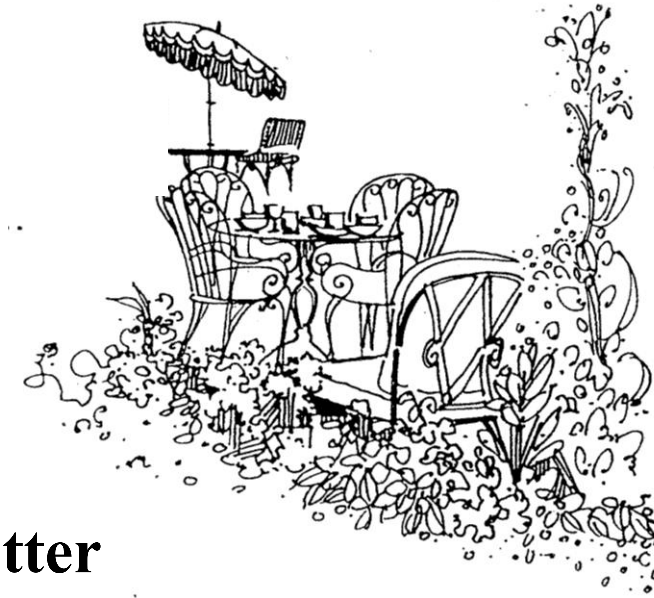
Chez Pierre



Presents ...

Monday, December 3, 2012
12:00pm
MIT Room 4-331

Peter Sutter
Brookhaven National Laboratory
Center for Functional Nanomaterials

“Adventures in Flatland - In-Situ Microscopy of 2D Materials”

Two-dimensional (2D) crystals, such as graphene, hexagonal boron nitride, and molybdenum disulfide, represent a new class of functional materials with a wealth of interesting physical and chemical properties. While fundamental studies have been enabled primarily by monolayer sheets isolated from layered bulk crystals, potential applications will require reliable and scalable methods for fabricating and processing high-quality 2D membranes.

I will discuss recent advances in understanding the synthesis and processing of 2D materials on metal substrates, derived from real-time observations by surface electron microscopy complemented by high-resolution scanning probe methods. Real-time low-energy electron microscopy and associated analytical methods provide insight into the fundamental growth mechanisms of 2D crystals, their interaction with a metal substrate, as well as processes that modify the substrate coupling and may be harnessed for the bottom-up assembly of functioning devices. Going beyond homogeneous 2D crystals, surface microscopy can guide efforts to develop complex materials that have no bulk equivalent, such as heterostructures integrating different 2D crystals in a single, atomically thin membrane. Our results illustrate the power of in-situ microscopy as a tool for achieving and probing novel functionalities in 2D materials.

Acknowledgments: Work performed under the auspices of the U.S. Department of Energy under contract No. DE-AC02-98CH10886.