

NCN Nano Electro-Mechanical Systems

NEMS is an integration of mechanical, electrical, fluidic, optical, chemical, biological and other components. We often think of this integration as occurring on a chip, but self-sensing/actuating probes in Scanning Probe Microscopy instruments are also true nanoelectro-mechanical systems. NEMS-based technologies tend to be expensive because they require multi-year development cycles. This physical prototyping paradigm takes several design and fabrication cycles typically takes several years from concept to product realization. Computational prototyping, when fast and accurate, could be far more economical. The NCN NEMS theme has a vision to develop the basic and applied knowledge along with cyber-enabled software tools that will be used to realize fundamentally new NEMS devices. The grand challenge to realizing this vision is the development and verification of multi-scale, multi-physics approaches along with modeling and simulation tools to predict the thermal, mechanical, and electrical behavior of NEMS devices and systems. Close partnerships with major, center-scale efforts at Berkeley (the [Center Of Nanomechanical Systems](#), COINS), Illinois ([DARPA IMPACT Center for Advancement of MEMS/NEMS VLSI](#)), and Purdue (Center for Prediction of Reliability, Integrity and Survivability of Microsystems, PRISM) support this research and link it very tightly with a broad range of experimental research.

This page is a starting point for nanoHUB users. It lists a few resources developed or recommended by the NCN NEMS team. You can find other resources by browsing through the list with the tags (nems not found) or [nanofluidics](#), or by using the nanoHUB search box to locate other resources.

Selected Resources

- [NCN NEMS: Tutorials](#)
- [NCN NEMS: Research Seminars](#)
- **Course:** [Overview of Computational Nanoscience: a UC Berkeley Course](#)
- [NCN NEMS: Simulation Tools for Education and Research](#)

Special Initiatives

- [Excellence in Computer Simulation](#) **New!**

Recommended Links

- [Frontiers in Scanning Probe Microscopy](#)
- [COINS: Center Of Nanomechanical Systems](#)
- [DARPA IMPACT Center for Advancement of MEMS/NEMS VLSI](#)
- [PRISM: Center for Prediction of Reliability, Integrity and Survivability of Microsystems](#)
- [Purdue University Birck Nanotechnology Center](#)
- [BNC Annual Research Review: An Introduction to PRISM and MEMS Simulation](#)

Announcements