

**Symposium on Undergraduate Nano-Education:  
"Addressing the Challenges of Nanoscale Science & Engineering Education"**

**Presentation:** "Designing Research-based Courses for Undergraduates and Hands-on Activities for the Developing World"

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**Presenter Biography:**

Teri W. Odom is an associate professor and Dow Chemical Company Research Professor in the Department of Chemistry and Materials Science and Engineering at Northwestern University. Odom's research focuses on controlling materials at the 100-nanometer scale and investigating their size and shape-dependent properties. She has developed multi-scale nanopatterning tools that can generate noble metal (plasmonic) structures with exceptional optical properties. Odom has received numerous awards and honors, most recently including an NIH Director's Pioneer Award from the National Institutes of Health; the Materials Research Society Outstanding Young Investigator Award; the National Fresenius Award from the American Chemical Society; an Alfred P. Sloan Research Fellowship; a National Science Foundation CAREER Award; and a David and Lucile Packard Fellowship.

Odom is very active in educational and public outreach. She has developed research-based, hands-on laboratory courses in nanoscale science and technology for undergraduates. The nanopatterning labs are simple, facilitating their dissemination worldwide via print and the web. The experiments have also been tested by local high school students and teachers as well as by international educators in Africa. Odom has delivered many public talks on nanotechnology, including keynote addresses sponsored by Chicago's Museum of Science and Industry and the Chicago Humanities Festival.

**Abstract:**

This talk will describe two projects in nanoscience and engineering curriculum development: (1) a research-based course for undergraduates; and (2) hands-on nanopatterning activities for students and faculty in the developing world. First, I will describe the principles for designing a research-based course in nanoscience and provide an example of such a course that has been offered at Northwestern University (NU) for the past five years. Next, I will provide an overview of our local Chicago and international outreach activities based on some of the nanopatterning labs developed in (1). Most of the initial work was supported by an NSF Nanotechnology in Undergraduate Education Award, and current work is supported by the NSF National Center for Learning and Teaching (NCLT). Online videos of the nanoscale labs can be found at [http://www.nanoed.org/courses/nano\\_experiments/](http://www.nanoed.org/courses/nano_experiments/).

**Other references:**

1. Visawanathan, M.; Babayan, Y.; Odom, T.W. "Benchtop Nanoscale Patterning using Soft Lithography," *J. Chem. Educ.* **2007**, *84*, 1795.
2. Odom, T.W. "Research-Based Courses in Nanotechnology for Undergraduates and Nanoscience Modules for High School and Community College Students." In *Nanoscale Science and Engineering Education*, Sweeney, A.E.; Seal, S., Eds. American Scientific Publishers: Stevenson Ranch, **2008**, p. 111-131 (Chapter 7).
3. Babayan, Y.; Visawanathan, M; Odom, T.W. "Benchtop Nanoscale Patterning Experiments," *ACS Nanotechnology in Undergraduate Education Book Series*, editor: Kim O. Pacheco, *in press*.