

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

Presentation:

"The Development of a Comprehensive Undergraduate Degree Program in Nanoscale Science"

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Presenter Biography:

Richard J. Matyi received his degrees in Materials Science and Engineering from Northwestern University (B.S., 1975; Ph.D., 1983) and M.I.T. (S.M., 1976). From 1982 to 1988 he was a Member of the Technical Staff at Texas Instruments, Inc., where his research involved materials characterization by X-ray methods and the growth of semiconductor materials by molecular beam epitaxy. In 1988 he joined the University of Wisconsin-Madison as a Professor in the Department of Materials Science and Engineering, where his research focused on advanced X-ray methods for materials analysis, epitaxial growth of semiconductors, and materials modification by ion implantation. Dr. Matyi left Wisconsin in 2000 to join the National Institute of Standards and Technology (Gaithersburg, MD) where his work included precision X-ray metrology, the analysis of defects in inorganic and organic crystalline materials with high resolution X-ray diffraction and the application of X-ray reflectometry to semiconductor manufacturing processes. In 2004 Dr. Matyi joined the State University of New York at Albany as a Professor in the College of Nanoscale Science and Engineering. His research at Albany centers on the processing and fabrication of nanostructures from various materials (primarily elemental and compound semiconductors) and their characterization with X-ray probes, particularly high resolution X-ray diffractometry and reflectometry. He is also actively involved in the development of both graduate and undergraduate curricula in nanoscale science and engineering.

Abstract:

The College of Nanoscale Science and Engineering (CNSE) at the University at Albany has developed an academic curriculum leading to the degree of Bachelor of Science in Nanoscale Science. This curriculum represents a 132-credit program designed for completion in eight academic semesters and is consistent with the SUNY General Education Program requirements as implemented at the University at Albany. This curriculum comprises a cutting-edge, inherently interdisciplinary, academic program centered on scholarly excellence, educational quality, and technical and pedagogical innovation. The blueprint for this curriculum is comprised of four basic components: a "**Foundational Principles**" component, a "**Core Competency**" component, a "**Concentration**" component and a "**Capstone Research/Design**" component. The first two components are designed to integrate the dissemination of fundamental, cross-disciplinary, nanoscale science and engineering principles with the cultivation of the critical skill set necessary for advanced undergraduate coursework and interdisciplinary research. The remaining two components expand on these foundational skills to develop the topical expertise, technical depth, and independent research abilities that are essential to a well-rounded undergraduate educational experience. The combination of these instructional tools ensures a customizable and coherent undergraduate degree program that trains the student's intellect how to explore, discover, and innovate, while ensuring its proficiency in a specific nanoscale discipline. The outcome is a unique undergraduate experience that taps into CNSE's global academic leadership in nanoscale science and engineering to attract and educate a diverse and talented pool of qualified scientists and engineers at the baccalaureate level.