

**The Temple University Nanotechnology Undergraduate Education Initiative:  
A Sustainable Urban Environment Advanced  
by Engineers Empowered with Nanotechnology**

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In the fall of 2011 a group of researchers and educators at the College of Engineering at Temple University received a National Science Foundation award under the auspices of the Nanotechnology Undergraduate Education (NUE) program to carry out an initiative aimed at the broad-based introduction of nanotechnology into the undergraduate curriculum. The program which sees participation from the Mechanical, Civil and Environmental, and Electrical and Computer Departments has a unifying theme of advancing a sustainable urban environment through the use of nanotechnology. The overall goals of the initiative are twofold: (i) the broad inclusion of a nanotechnology component within the undergraduate engineering curriculum and (ii) to provide undergraduate engineering students with a hands-on experience directed towards the use of nanotechnologies in advancing a sustainable urban environment. The first objective is founded on the premise that nanotechnology will become a ubiquitous part of a modern society and should, therefore, become a ubiquitous part of the engineering curriculum. Already, nanotechnology modules have been introduced into the seven undergraduate courses: *The Bionic Human (ME 0844)*, *Material Science for Engineers (ENGR 3496)*, *Introduction to Bioengineering (ENGR 3719)*, *Renewable and Alternative Energy (ME 4040)*, *Mechanics of Composite Materials (ME 4311)*, *Photovoltaic System Design for Engineers (ME 4110)*, and *Water and Wastewater Systems Design (CE 4721)*. The 2011 fall semester will also see the introduction of the College of Engineering's first course offering dedicated solely to nanotechnology. The course, *Nanotechnology Solutions for a Sustainable Urban Environment (ENGR 4577)*, will be offered as an elective to junior and senior students from all engineering departments. The second objective is advanced through the introduction of five undergraduate laboratory modules and through ten week summer research internships in nanotechnology. In the 2011 summer semester seven undergraduates have worked in research laboratories undertaking projects which advance nanotechnology in such disparate topics as water purification, fuel cell technologies for the transportation sector, renewable energy, self-assembly and bioengineering. The presentation will describe the initiative in detail, highlight its successes and examine its effectiveness in advancing both knowledge and interest in nanotechnology.