

## CER Technology Fellowship Program –2008

**Project Team:** David Gracias, Assistant Professor, Chemical and Biomolecular Engineering, Whiting School of Engineering; Martin Rietveld, Staff, Institute for Nanobiotechnology, Whiting School of Engineering; David Filipiak, Undergraduate Student, Chemical and Biomolecular Engineering, Whiting School of Engineering

**Project Title:** Micro and Nanotechnology: Self Assembly

**Audience:** Students enrolled in the *Micro and Nanotechnology (540.440/540.640)* courses, students in the CTY program, and members of the local community.

**Pedagogical Issue:** Both in class and in public lectures, the faculty member has felt the need for visualization resources to get his point across. Nanotechnology, is the science of extreme miniaturization; the structures being devised are too small to see by the naked eye. Hence, visualization tools such as animations are extremely crucial for the understanding of this field.

Drawing inspiration from biological fabrication, engineers are seeking to self-assemble structures from the bottom up. This manufacturing paradigm has been largely unexplored in human engineering as the process is generally perceived to be indeterministic and uncontrollable.

**Solution:** This team will create a teaching module on self-assembling devices and structures. David Filipiak will develop animations and integrate these with real videos of self-assembling micro and nanoscale devices. The goal of this project is to develop a stand-alone teaching module on nanotechnology with special emphasis on self-assembly in engineering.

**Technologies Used:** Animation, Digital Audio, Digital Video, Graphic Design

**Project Abstract:** Nanotechnology, the new science of extreme miniaturization is a rapidly growing field in engineering. On this size scale, it is extremely difficult to fabricate analogs of macroscale engineering such as grippers. Drawing inspiration from biological fabrication, engineers are seeking to self-assemble structures from the bottom up. This manufacturing paradigm has been largely unexplored in human engineering since the process is generally perceived to be indeterministic and uncontrollable.

We wish to create a teaching module on self-assembling devices and structures. Specifically, David Filipiak will develop animations and integrate these with real videos of self-assembling micro and nanoscale devices. The goal of this project is to develop a stand-alone teaching module on nanotechnology with special emphasis on self-assembly in engineering. The module will be used primarily to teach students in *Micro and Nanotechnology (540.440/540.640)*, a popular class taught by Professor Gracias. Additionally, the module can be "lent out" for use in public lectures and by the media. The impact of these modules in teaching will be extremely powerful.