

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

Presentation:

"How to Keep *Introduction to Nanomaterials Science and Engineering Current*"

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Presenter Biography:

Lisa C. Klein is professor of Materials Science & Engineering and Graduate Director for the MS&E Program at Rutgers University. She specializes in the synthesis and processing of ceramics and glasses using the sol-gel process. Her use of the sol-gel process finds applications in planar waveguides, ceramic membranes, organic-inorganic hybrids, solid electrolytes and components for fuel cells and batteries. In particular, Klein has explored the use of the sol-gel process in the preparation of solid electrolytes. Klein proposed that sol-gel processed ion conductors would have higher conductivities than conventional ion conductors because of their open molecular structure. This concept lead to the use of lithium-containing gel thin films as the solid electrolyte in electrochromic devices. This invention is described in 3 US Patents on solid-state "smart" windows that darken or lighten in response to ambient illumination. Since 2002, she has taught an interdisciplinary course called "Introduction to Nanomaterials Science and Engineering", which draws more than 30 undergraduate students a year from Mechanical, Electrical, Biomedical and Materials Engineering, as well as Chemistry and Physics.

Abstract:

As topics in nanomaterials become mainstream materials science, more and more concepts from nanotechnology are incorporated into required courses. However, a key aspect of nanotechnology is that it is interdisciplinary. For this reason, the focus of a course on nanotechnology has to be its relevance to many fields, including biology, chemistry, materials and electronics, for example. Using a Case Study approach with 4 parts – Overview, Situation Analysis, Alternatives, and Recommendation – is one way to emphasize an interdisciplinary approach to finding nanotechnology solutions to practical problems. Some examples will be discussed.