

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

Presentation:

Undergraduate Students' Understanding of Surface Area to Volume Ratio

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Presenter Biography:

Denise Drane is Associate Director for Research and Evaluation at the Searle Center for Teaching Excellence at Northwestern University. She leads on a range of research projects including the impact of peer-led collaborative learning in STEM disciplines, using personal response systems in calculus, involving undergraduates in early research experiences and admitting and retaining under-represented students in doctoral programs in the biosciences. She has worked with the National Center for Learning & Teaching in Nanoscale Science & Engineering (NCLT) for the past 5 years in the area of faculty development and higher education research. Her research has focused on developing a nanoscience concept inventory, students' attitudes towards nanoscience and how students understand size and scale and surface area to volume ratio.

Abstract:

An understanding of surface area to volume ratio is critical for understanding size dependent properties of matter. This talk will review results of a series of research studies conducted at Northwestern University on undergraduate students' conceptions of surface area to volume ratio. Typical conceptions of surface area to volume ratio will be presented. These range from relatively unsophisticated conceptions where students see no connection between surface area to volume ratio and properties, to more sophisticated conceptions where they see property changes as being dependent on changes in surface area but not volume, to the most sophisticated conceptions where students relate changes in both surface area and volume to property changes. Implications for developing instructional approaches for teaching surface area to volume ratio will be discussed.