



Department of Civil Engineering and Engineering Mechanics  
Columbia University

**Tuesday, November 1, 2011 (2:30-3:30 pm)**

**644 Mudd**

**The Structural Materials and Mechanics Program at the National Science Foundation  
and Recent Research on Long-Term Behavior of Geosynthetics**

**Prof. Y. (Grace) Hsuan**

*Program Director,*

*Structural Materials and Mechanics Program*

*Civil, Mechanical, and Manufacturing Innovation Division*

*Engineering Directorate*

(Host: Prof. Huiming Yin)

The Structural Materials and Mechanics (SMM) program at the National Science Foundation is in the Engineering Directorate and within the Civil, Mechanical, Manufacturing Innovation (CMMI) division. The SMM program along with its description, research themes, research communities, example awards, complementary NSF programs, and ongoing initiatives are presented. Issues pertaining to proposal submission to the SMM program are delineated.

Recent research on long-term behavior of geosynthetics will be introduced. High-density polyethylene is the most widely used polymer in geosynthetics. To assess the long-term behavior of HDPE geosynthetics, both chemical and mechanical degradation mechanisms must be identified and evaluated. In the past two decades, extensive research has been carried out nationally and internationally to understand the degradation of HDPE, including stress cracking, oxidation, ultraviolet degradation, etc. In this presentation, the degradation mechanisms as well as the methods used will be described.

**Biosketch**

Grace Hsuan currently is the program director for the Structural Materials and Mechanics at the National Science Foundation. Dr. Hsuan is a Professor in the Department of Civil, Architectural, and Environmental (CAEE) Engineering, and Affiliated Professor in the Department of Mechanics and Mechanical Engineering of Drexel University. In addition to research and education responsibilities, Dr. Hsuan has held administrative responsibilities as the Associated Department Head of the CAEE department, and Associate Director of Geosynthetic Research Institute. Dr. Hsuan received her doctoral degree in Materials Science at Imperial College, United Kingdom. Her research has focused on the chemical and mechanical durability of polymeric construction materials, particularly geosynthetics and pipes. She has been funded by the National Science Foundation, National Cooperation Highway Research Program, Environmental Protection Agency, and Department of Transportation.

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