

# The Maurice A. Biot Lecture

Department of Civil Engineering & Engineering Mechanics, Columbia University  
Engineering Mechanics Committee, ASCE Metropolitan Section  
Engineering Mechanics Institute, ASCE

## 21<sup>ST</sup> CENTURY CEMENT TECHNOLOGY: ADDRESSING SUSTAINABILITY THROUGH INNOVATION

Professor Kimberly E. Kurtis  
Georgia Institute of Technology

Monday, October 17, 2016 (2:30PM - 3:30PM)  
750 Schapiro CEPSR (Costa Engineering Commons)



**Abstract:** Over the past ½ century, global per capita consumption of concrete has increased from less than 1 metric ton/person/year to nearly 2.5 metric tons/person/year today. At the same time, the world population has increased from 3.7 billion to more than 7 billion people, meaning 20 *gigatons* of concrete are placed *each* year. Because of the vast quantity of cement-based materials produced annually, there is much to be gained through improvements in the manufacture of cement and the production of concrete in terms of meeting societal demand in an increasingly sustainable manner. However, meaningful innovation in the design of these materials – to facilitate more sustainable development – requires new insights into their fundamental nature, which in turn prompts a re-examination of the validity and appropriateness of existing models, test methods, and specifications. In this talk, recent research toward upscaling of emerging innovations in cement (or more generally ‘binder’) technology are explored.

**Biosketch:** Kimberly Kurtis is Associate Dean in Georgia Tech’s College of Engineering and Professor in the School of Civil and Environmental Engineering, where she joined the faculty after obtaining her Ph.D. at the University of California at Berkeley. Prof. Kurtis’s innovative research on the multi-scale structure and performance of cement-based materials has resulted in more than 150 technical publications and two U.S. patents. In addition to her technical and educational service contributions at professional societies and government agencies and editorial service to *Cement and Concrete Research*, *Cement and Concrete Composites*, and *ASCE Journal of Materials in Civil Engineering*, she has held two leadership positions – Chairman of ACI Committee 236: *Materials Science of Concrete* and Chair of ACerS Cements Division – central to advancing science-based research on cement-based materials. Prof. Kurtis is Fellow of the American Ceramics Society and of the American Concrete Institute (ACI), where she also serves on their 12-member Technical Activities Committee (TAC). She has been honored with ACI’s Walter P. Moore, Jr. Faculty Achievement Award (2005), ACI’s Del Bloem Award for Service (2013), Outstanding Senior Undergraduate Research Mentor Award at Georgia Institute of Technology (2013), the ACI James Instruments Award for Research on NDE of Concrete (2008), Award for Outstanding Article in ASTM’s *Journal of Testing and Evaluation* (2010), and ASCE’s Huber Civil Engineering Research Prize (2013).



The Maurice A. Biot Lecture was established at Columbia University in 2004 in remembrance of the late Professor Maurice Anthony Biot and his renowned achievements as an engineer, physicist, and applied mathematician. Biot was a professor of mechanics at Columbia University in the period 1937-1945.



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