

Northeastern University Distinguished Seminar Series Civil & Environmental Engineering

Claire Welty, Ph.D.

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Center for Urban Environmental Research and Education
UNIVERSITY OF MARYLAND, BALTIMORE COUNTY**

Regional Climate Variability and Patterns of Urban Development - Impacts on the Urban Water Cycle and Nutrient Export

The goal of this project is to evaluate the interactions between urban development patterns and the hydrologic cycle and its associated nutrient cycles, within the context of regional and local climate variability. Our specific objective is to create a modeling system capable of simulating the feedback relationships that control urban water sustainability. Core elements include spatial modeling of urban development patterns and individual land use and location processes at parcel and neighborhood scales and for different policy scenarios; three-dimensional modeling of coupled surface water-groundwater and land surface-atmospheric systems at multiple scales (including consideration of the engineered water system), where development patterns are incorporated as input; and field work and modeling aimed at quantifying flow paths and fluxes of water and nitrogen in this system. The project team is evaluating linkages among (1) how human locational choices, water-based ecosystem services, and regulatory policies affect the supply of land and patterns of development over time; (2) how the changing composition and variability of urbanizing surfaces affect local and regional climate; and (3) how patterns of development (including the engineered water system) and climate variability affect fluxes, flow paths and storage of water and nitrogen in urban areas. The Baltimore Ecosystem Study LTER (<http://beslter.org>) is being used as a platform to carry out the work. This capability enables us to take advantage of a 15-year database of hydrologic and chemical characterization data; high-resolution land-cover, land use, and socio-demographic information; and a high-density hydrologic observing system.



Dr. Claire Welty is Director of the Center for Urban Environmental Research and Education and Professor of Chemical, Biochemical, and Environmental Engineering at University of Maryland, Baltimore County (UMBC). Her research focuses on quantifying the urban water cycle at multiple scales, using a combination of mathematical modeling and field instrumentation. At UMBC, she also hosts the field headquarters of the Baltimore Ecosystem Study Long-Term Ecological Research site. Prior to her appointment at UMBC, Dr. Welty was a faculty member at Drexel University from 1989-2003 in Environmental Engineering. Dr. Welty has served as Chair of Water Science and Technology Board of the National Research Council and as Chair of the Board of Directors of the Consortium of Universities for the Advancement of Hydrologic Science Inc. Dr. Welty holds a PhD in Civil and Environmental Engineering from MIT.

Monday, February 11, 2013

**12:00 p.m. – 1:00 p.m.
135 Shillman Hall**