



Mark Anthony Thomas was born in Kingston, Jamaica and was the first of seven siblings to pursue a college degree. Mark was originally awarded a fellowship by the Organization of American States (OAS) to pursue a bachelor in the environmental area. Within two years, he completed his B.S. in Bioenvironmental Engineering (summa cum laude) from North Carolina A&T State University, obtained a Waste Management Certificate and successfully passed the eight hour written fundamentals of engineering (EIT) examination. He was featured in the Marquis Who's Who in Science and Engineering and has received numerous awards for teaching, research and services while at Purdue University as well as a national ASABE award for outstanding oral and written research. Mark is a member of Phi Kappa Phi, Gamma Sigma Delta, and Alpha Epsilon honor societies. Mark has 6 peer-reviewed publications and 18 presentations at local, national, international conferences, and invited workshops. He has provided technical writing support for 4 grants and significantly contributed to the development of two funded research projects (exceeding \$2M). Mark has accepted a position with Monsanto as an Environmental Modeler.

Agricultural & Biological ENGINEERING

Dissertation Defense

Speaker: Mark A. Thomas
Title: ENVIRONMENTAL IMPLICATIONS OF FEEDSTOCK PRODUCTION PRACTICES FOR BIOENERGY
Major Professor: Dr. Bernard Engel
Date: Tuesday, November 01, 2011
Time: 8:30 a.m.
Location: ABE 301

Abstract:

The overall goal of this project was to quantify the long-term water quality impacts associated with bioenergy feedstock production scenarios on intensively-managed landscapes in the United States. A field-scale modeling framework (GLEAMS-NAPRA model) was used to quantify long-term runoff, percolation and annual losses in erosion, total phosphorus, nitrate-nitrogen, herbicide and foliar fungicides attributed to biofeedstock production. This study considered cropping system shifts to meet corn-based biofuel production, corn grain plus stover harvest production scenarios, and whole plant corn silage on prime agricultural lands as well as switchgrass and *Miscanthus x giganteus* on agronomically marginal lands in Indiana. To address erosion concerns, the model results suggest that corn stover removal with no-till practice would produce 0.06 to 3.24 t/ha in soil erosion. For silage production, cover crops and no-till practices could be insufficient in addressing long-term total phosphorus concerns. Given tillage operations in perennial establishment year, switchgrass failure scenarios would produce erosion higher than the soil loss tolerance (4.48 to 6.72 t/ha) on agronomically marginal land, suggesting that conservation measures would be required when establishing dedicated perennial grasses on highly erodible soils. Nitrates leached from fertilized miscanthus production were low (0.2 to 1.2 kg/ha) when compared with switchgrass and corn production systems.

Application:

- Promote the understanding of land management practices that could mitigate potential environmental risks associated with biofeedstock production.
- Support sustainable agricultural practices and development of a decision support tool.