Waste to Energy Lab

**Vision**
The Waste to Energy Lab, led by Dr. Stephanie Lansing, quantifies turning waste to renewable energy, investigates nutrient transformations during treatment, energy production, removal of antimicrobial resistance (AMR) through treatment, and improving water quality.

**Current Projects**
- Quantifying cattle manure-AMR perceptions and treatment system variabilities to develop a novel communication framework for conveying AMR science and mitigation opportunities
- Biogas enhancement and ammonia extraction for increased revenue in waste-to-energy systems
- Use of Nanoparticles to Enhance Performance and Viability of Anaerobic Digesters
- UMD Global STEWARDS (STEM Training at the Nexus of the Energy Water Reuse and Food systems).

**PRIZES & AWARDS**
- Faculty Mentor of the Year, Institute on Teaching and Mentoring, The Compact for Faculty Diversity (national award/Lansing)
- Young Engineer of the Year, Northeast Agricultural and Biological Engineers Conference (NABEC) given to one member each year for outstanding accomplishments in research, design, extension (US and Canada Northeast region/Lansing)
- NSF Global Stewards Fellow (Poindexter)
- Media Coverage
  - Tolley, J., 2018. Maryland is turning algae into electricity AND cleaning up the Chesapeake Bay: BTN Livestrong

**Grants**
- NSF
- USDA-AFRI
- US Air Force
- USAID
- US Dept. of Transportation
- Sustainable Agri. Res. & Edu.
- Gates Foundation

**Publications**
- Nutrient Recovery During Treatment
- Life Cycle Assessments (LCA) & Energy (eMergy) of Bioenergy
- Anaerobic Digestion and Biochemical Methane Potential
- Nutrients (TKN, TP, NH₄, PO₄)
- pH and alkalinity
- chemical oxygen demand (COD), total solids (TS), and volatile solids (VS)
- volatile fatty acids (VFAs)
- Gas analysis (CH₄, CO₂, H₂, H₂S)
- Transformations of Antibiotics and Antimicrobial Resistance Genes during Waste Treatment
- Nanotechnology and Waste Management

**Waste to Energy Lab Research**

**Lab Group**
- Dr. Stephanie Lansing: Principal Investigator
- Dr. Amro Hassanein: Associate Professor
- Akinbasade Choudhary: Ph.D. Student
- Joan Briggs: PostDoc, Associate EnSE
- Jean Briggs: PostDoc, Associate EnSE
- Emily Kohler: Undergraduate Student
- Tomlinson Nimpson: Undergraduate Student
- Derrick Sanders: High School Student
- Danielle Delays: ORISE Fellow
- Carlson Poindexter: MS Student
- Hannah-delays: Undergraduate Student

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**Effects of nanoparticles on anaerobic digestion and post-digestion transformations of antibiotics**

**Nutrients**
- Biogas potential, with more than 34 million tons of food waste entering landfills each year, diverting food waste to digesters could increase biogas production
- Carbon-rich substrate digested for biogas production. Food waste has a high biogas potential, with more than 34 million tons of food waste entering landfills each year, diverting food waste to digesters could increase biogas production
- Biogas enhancement and ammonia extraction for increased revenue in waste-to-energy systems
- UMD Global STEWARDS (STEM Training at the Nexus of the Energy Water Reuse and Food systems)

**What Is Anaerobic Digestion?**
- Anaerobic Digestion Benefits Include:
  - Large reductions in noxious odors
  - Creation of a fertilizer that is high in dissolved nutrients
  - Wastewater treatment, with large decreases in organic pollutants
  - Antimicrobial resistance, persistence and treatment in dairy and beef
  - Life cycle assessments (LCA) and Energy (eMergy) of bioenergy
  - Waste to Energy Research: Anaerobic digestion, microbial fuel cells, bioenergy and waste treatment using ecological engineering

**Biogas enhancement and ammonia extraction for increased revenue in waste-to-energy systems**

**Waste to Energy**
- Anaerobic Digestion
- Waste Management
- Nanotechnology and Waste Management
- Microbial Fuel Cells & Microbial Electrolysis Cells
- Anaerobic Digestion and Biochemical Methane Potential
- Nutrient Recovery During Treatment
- Life Cycle Assessments (LCA) & Energy (eMergy) of Bioenergy

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