

Technical Awareness Group (TAG) Meeting No. 1
Wednesday, October 15, 2025, 1:00 – 2:00 pm Eastern Time
Meeting location: Microsoft Team

Project Title: Revealing Landfill Microplastic-PFAS Interactions via Field investigation and Machine-Learning Enhanced Prediction

TAG Members:

Dr. Natalia Soares Quinete, Assistant Professor, Department of Chemistry & Biochemistry, Florida International University

Dr. Yelena Katsenovich, Sr. Research Scientist, Applied Research Center, Florida International University

Ms. Nandra Weeks, PE, Senior Principal Environmental Engineer, Geosyntec consultants

Mr. Zuley Lay Chang, Solid Waste Program, Florida Department of Environmental Protection

Mr. Joe Dertien, Solid Waste Program, Florida Department of Environmental Protection

Mr. Danny M. Gallagher, E.I., Project Manager of Sustainability & Disposal Operations, Solid Waste Management Department, Hillsborough County

Ms. Shanin T. Speas-Frost, P.E., MBA, Professional Engineer III, Oil & Gas Program, Division of Water Resource Management, Florida Department of Environmental Protection

Dr. Luke A. Mulford, Ph.D., P.E., Senior Professional Engineer, Water Resources Department, Hillsborough County

Mr. Joel Woolsey, Assistant Director, New River Solid Waste Association

In Attendance:

Joel Woolsey, Yelena Katsenovich, Nandra Weeks, Daniel Gallagher, Zuley Lay Chang, Luke A. Mulford, Natalia Soares Quinete, Shanin Speas-Frost, Gang Chen, Maisha Salsabil, Bismark Odum, Sanjeeta Ghimire, Mara Wallace, JeShawn Williams, Judah Hudson, Kade Robinson, Michael Blake, Lin Qi, Sanim Acharya, Steven Laux, Ashley Lin, Modupe Ojewumi, Yudi Wu, and Timothy Townsend

Project Presentation

Dr. Wu introduced the project by summarizing the research efforts by the Hinkley Center.

Dr. Wu then discussed microplastics (MPs) in landfills, which served as significant reservoirs for MPs. MPs were defined as plastics ranging in size from 0.1 μm to 5 mm, and acted as carrier for heavy metals and organic pollutants, facilitating their transport. The co-occurrence of MPs and other emerging micropollutants amplifies the environmental risks associated with landfills. Since MPs had high surface areas that enabled extensive adsorption interactions with PFASs, MP-PFAS association brought potential risk of MP-facilitated PFAS spreading. Although virgin MPs were typically engineered with smooth surfaces via undisclosed modification methods such as emulsion-aided polymerization, their surface characteristics often changed substantially once these MPs were introduced into the environment.

Dr. Wu would like to answer the following questions for this project:

How many microplastic are existing in Florida landfill leachate?

What percentage of microplastic are associated with PFAS?

What is the mechanism of microplastic-PFAS interaction?

Can we predict its long-term retention and associated risk for solid waste management?

Corresponding to the above questions, the tasks of this project include:

Task 1: Identification of MP-PFAS composites in field sampling of landfill leachate

Task 2: Elucidation of MP-PFAS interaction mechanisms via bench-scaled investigation

Task 3: Construction of machine learning enhanced MP-PFAS prediction models

Dr. Wu presented Task 0, MP quantification methods and Task 1. For Task 0, physical density separation combined with chemical dissolution of different MPs were discussed. In task 1, 90 samples were sampled from 25 landfills in 19 counties of northern and central Florida. These landfills included ash landfills, C&D landfills, household landfills, municipal landfills, etc., which were active, closed or inactive. PFAS quantification will following EPA 1633 method revision A, MPs will be characterized and quantified to explore their interactions.

Group Discussion

Dr. Natalia Soares Quinete pointed out that DCM was regulated by EPA and should not be used as a solvent for MP separation. She suggested using FTIR for MP characterization and quantification.

The meeting was adjourned at 2:00 pm with minutes taken and submitted by Gang Chen.