



# FAMU-FSU Engineering

**FAMU - FSU COLLEGE OF ENGINEERING**  
**DEPARTMENT OF CIVIL & ENVIRONMENTAL ENGINEERING**

## **Technical Awareness Group (TAG) Meeting No. 1**

**Tuesday, April 27, 2021 4:00 – 5:20 pm Eastern Time**

**Meeting location: Zoom**

**Project Title:** Non-Thermal Plasma Degradation of Per- and Polyfluoroalkyl Substances (PFAS) from Landfill Leachate

**TAG Members:** Bruce Marvin (Geosyntec Consultants), Chao Zhou (Geosyntec Consultants), Claudia Mack (Geosyntec Consultants), Kevin Warner (Geosyntec Consultants), Stephanie Sanchez (Geosyntec Consultants), Terry Johnson (Waste Management Inc.), Sterling Carroll (Florida Rural Water Association), Joseph Dertien (Florida Department of Environmental Protection), Kerry Tate (Florida Department of Environmental Protection), Lauren J. Coleman (Florida Department of Environmental Protection), Owete S. Owete (Florida Department of Environmental Protection), Ryan Barker (Florida Department of Environmental Protection), Shanin Speas-Frost (Florida Department of Environmental Protection), Walsta Jean-Baptiste (Florida Department of Environmental Protection)

**Principle Investigators:** Youneng Tang, Tarek Abichou, Bruce R. Locke, Huan Chen

**In Attendance:** Bruce Locke, Bruce Marvin, Chao Zhou, Claudia Mack, Huan Chen, Joseph Dertien, John Schert, Karam Eeso, Kevin Warner, Owete S. Owete, Rachel Gallen, Radha Bulusu, Robert Wandell, Ryan Barker, Shanin Speas-Frost, Stephanie Sanchez, Sterling Carrol, Tarek Abichou, Terry Johnson, Walsta Jean-Babtiste, Youneng Tang, Zeljka Popovic

### **Project Overview and Introduction**

The meeting was called to order by Dr. Tang at 4:00 PM. Dr. Tang began by discussing what PFAS are, how the regulations of PFAS are more relaxed for leachate than drinking water and how there is an increase in the need for their removal. Different removal technologies were discussed and their respective energy efficiencies, with nonthermal plasma being potentially among the most energy-efficient.

### **Project Tasks and Team**

Dr. Tang presented four tasks to address four questions, respectively, including: 1) does the reactor work for other PFAS at low concentrations (partially complete), 2) what types of leachate can be treated by non-thermal plasma (partially complete), 3) what intermediates are produced (partially complete), 4) what is the toxicity of the intermediates (not started).

The research team mainly consists of Dr. Youneng Tang (PI), Dr. Bruce R. Locke (co-PI), Dr. Tarek Abichou (co-PI), Dr. Huan Chen (co-PI), Mojtaba Goukeh (graduate student), Rachel Gallen (graduate student), Karam Eeso (undergraduate student).

## Results

- A removal of about 75% for Perfluorooctansulfonic acid (PFOS), but more trials are required.
- Fluoride production does not vary with an increase in conductivity (conductivity ranging from that of DI water to seawater). The practical implication is that high conductivity solutions can be treated.
- Energy efficiency does seem to decrease with very high conductivities but does not seem to decrease within the conductivity ranges for most landfill leachates except for leachate that has conductivity at the same magnitude of seawater. A practical implication is that we may not have to worry about efficiency for most leachates.
- FT ICR-MS and LC-MS-MS results show that the liquid intermediates can be measured.
- GC-MS results show that the gas phase intermediates can be measured, but the detection limit is too high.

## Group Discussion

Major comments and suggestions from the TAG:

- Can the activity at the interface be measured? Possibly measuring the interfacial surface tension and adding different sets of surfactants and measure the degradation.
- Is the water actually being split? Measuring pH may help with that. Testing the degradation at various pH may help.
- Determining the location of degradation in the reactor will be helpful.
- Testing other power supplies to solve the efficiency problem. We only have two power supplies, so this would be out of the scope of this project. Possible in another project.

The meeting was adjourned at 5:20 PM, minutes taken and submitted by Karam Eeso.