**Influence of application method on disinfection byproduct formation during indoor cleaning: an example of phenol chlorination during bleach droplet generation**

Dr. Leif Jahn  
*Ph.D., Carnegie Mellon University*  
*Advisor: Dr. Pawel Misztal*

Large-scale disinfection methods that have become increasingly common following the COVID-19 pandemic utilize techniques such as electrostatic precipitators, foggers, or "no touch devices" that generate and disperse disinfectant-laden droplets. The dispersal of droplets may alter disinfection byproduct (DBP) formation and the partitioning of compounds away from or to the disinfectant compared to traditional disinfection techniques. In this work we applied bleach within an environmental chamber and measured gas-phase species using proton transfer reaction time of flight mass spectrometry. We observe gas-phase phenol concentrations to decrease as bleach is applied, indicating partitioning of phenol to the disinfectant, and the accompanying formation of a variety of multi-generation polychlorinated phenolic DBPs that volatilize from airborne droplets. The DBPs identified have not previously been observed during bleach usage and have been observed during prior wastewater disinfection work, primarily under slightly acidic to near neutral pH conditions not representative of bulk bleach with a pH ~10-12, suggesting unique aspects to these reactions within airborne droplets.

Leif Jahn is a postdoctoral researcher working with Dr. Lea Hildebrandt Ruiz (CHE) and Dr. Pawel K. Misztal (CEE) whose work focuses on atmospheric chemistry, oxidative processes, and air quality relevant to outdoor and indoor environments.

**Evaluating the PFAS-protein interaction for two cationic plant-based proteins**

Sophie De Respino  
*M.S., University of Texas at Austin*  
*Advisor: Dr. Manish Kumar*

Per- and polyfluoroalkyl substances (PFAS) are persistent chemicals in the environment that are difficult to treat and toxic to humans. Associated health effects include various types of cancer, thyroid disease, and liver damage. Thus, it is crucial to decrease human exposure to PFAS by removing them from water prior to consumption. This work focuses on the interaction of PFOA and PFOS with two cationic proteins extracted from *Moringa oleifera* seeds. Using NMR, molecular docking, and molecular dynamics, we demonstrate PFAS affinity for the proteins. We then utilize *M. oleifera* proteins in coagulation experiments to determine PFOA and PFOS removal.

Sophie received her undergraduate degree in Environmental Engineering from the University of Alabama. She then came to UT where she completed her Master’s degree in 2021 studying oil and bacteria removal from water using natural fiber filters. Sophie is now in her 4th year at UT working towards her Ph.D. Her current research project involves applying cationic proteins to PFAS treatment and removal.

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**EWRE Seminar Committee Members:** Danielle Angert, Sara Karimaghaei, Mathieu Medina, Erik Vosburgh, and Tulasi Ravindran  
**Supervising Faculty:** Dr. Howard Liljestrand