PFAST Network (Per- and Polyfluoroalkyl Substance Testing Network)

Meet Team 2: Private well risk modeling

David Genereux, Ph.D., co-lead, is a Professor of Marine, Earth, and Atmospheric Sciences at NC State University. His research focuses on hydrogeology and the coupled fluxes of water and chemicals at the interface between groundwater and surface water, including agricultural nutrients, volatile organic compounds (VOCs), and more recently GenX and related PFAS.

Jacqueline MacDonald Gibson, Ph.D., co-lead, is a Professor of Environmental Sciences and Engineering at UNC Chapel Hill. She applies her multi-disciplinary background in mathematics, engineering, and science to study risk assessment, policy, and communication. Her research focuses on quantifying the burden of disease from environmental pollutants and developing models to predict population health impacts of alternative environmental policy decisions.

Detlef Knappe, Ph.D., collaborator, is a Professor of Civil, Construction, and Environmental Engineering at NC State University. His research focuses on source water protection by identifying contaminants through targeted and non-targeted analyses and on the development of treatment approaches for the removal of unregulated contaminants.

Javad Roostaei, **Ph.D.**, Postdoc at UNC Chapel Hill, data collection and data analysis using machine-learning approaches
Sandrine Duboscq, Graduate student at NC State, data analysis
Lydia Koropeckyj-Cox, Graduate student at NC State, data analysis

Team Objective:

This project directly addresses Section 13.1 (l) of NC Senate Bill 99 which mandates the development of "quantitative models to predict which private wells are most at risk of contamination from the discharge of PFAS, including GenX." Team 2 aims to uncover factors influencing the risk of PFAS contamination in water supply wells near the Chemours plant and will develop a user-friendly, interactive quantitative model for predicting which private wells are at risk of contamination from the discharge of GenX at chemical manufacturing facilities. Specific aims include:

- Advance quantitative understanding of PFAS transport, focusing on PFAS input to and output from the surficial aquifer and on PFAS distribution within the aquifer. Fate-and-transport data will be used to predict the time needed for PFAS contamination to flush out of the aquifer in areas where contamination currently is present.
- Build machine-learned Bayesian Network computer models for predicting the risk of PFAS contamination in water supply wells and validate the models by evaluating their accuracy in predicting PFAS occurrences in testing data sets not used for model learning.
- Create an interactive, user-friendly, web-based predictive model suitable for use by members of the public concerned about these risks and by the NC Department of Environmental Quality (DEQ). The model will be pilot tested with private well owners near the Chemours facility and with DEQ staff and will be linked to a GIS mapping application for easy visualization.