ACS Local Section Pittsburgh

Environmental Lectures

Molecular Approaches to Understanding and Tackling the PFAS Problem

June 7, 2023, 7:00-8:00pm (EST)

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Per- and polyfluoroalkyl substances, or PFAS, are a class of chemicals once praised as engineering marvels. They are the chemicals behind Teflon, Stainmaster, and GoreTex—they made our frying pans non-stick, our upholstery and carpets stain-resistant, and our outdoor gear breathable, yet waterproof. But now these same chemicals have been dubbed "forever chemicals" because some of the same properties that made them such durable and useful substances in everyday products have made them extremely durable in the environment. More concerningly, they are now known to accumulate in wildlife and humans, and some PFAS have been linked to multiple toxic effects, including cancer and reproductive impairment. PFAS can now be found in the blood of >99% of Americans and populations around the globe. This talk will highlight some our research group's approaches to understand the biological behavior of PFAS and devise novel methods to remove them from the environment by modeling and exploiting the interactions of PFAS with key biological receptors including membrane transporters and lipid-binding proteins. In silico and in vitro approaches such as molecular dynamics simulations and surface plasmon resonance will be discussed.

Dr. Carla Ng is an Associate Professor in the in Department of Civil and Environmental Engineering at the University of Pittsburgh, with secondary appointments in Environmental and Occupational Health and in Chemical and Petroleum Engineering. The research in her group focuses on developing models to understand where chemicals go in organisms and ecosystems, build using tools from chemistry, biology and engineering. Active research areas include the modeling the accumulation of the "forever chemicals" PFAS in wildlife and humans, tracking the complex chemical mixtures in the environment, and exploring the role of the industrial food system on human exposure to persistent and toxic chemicals. Dr. Ng received her BS and MS degrees in Chemical Engineering from the State University of New York at Buffalo and her PhD degree in Chemical and Biological Engineering from Northwestern University.

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