

Thursday, October 13 at 12:15 p.m. in 1315 Chemistry

Analytical Seminar

Presented by

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“Molecular Composition and Photoreactivity of Dissolved Matter”

Dissolved organic matter (DOM) is a complex mixture of naturally occurring organic molecules that is derived primarily from plant or microbial residues. This heterogeneous mixture is found in all natural waters, with concentrations ranging from 1-3 mg-C/L in oligotrophic systems to 10-35 mg-C/L in rivers and wetlands. DOM plays an important role in many biogeochemical processes, including the carbon and nitrogen cycles, metal complexation and redox reactions, contaminant fate and transport, and microbial metabolism. Our work seeks to link the composition of DOM with its photochemical reactivity, with a focus on the indirect photolysis of polar organic contaminants (e.g., pharmaceuticals and pesticides). We characterize DOM using a suite of complementary analytical techniques, including UV-visible spectroscopy, size fractionation, and Fourier transform-ion cyclotron resonance mass spectrometry. We then use both well-characterized probe molecules and selected target contaminants to assess the photoreactivity of DOM from a variety of sources, including rivers, lakes, and wastewater effluent collected in Wisconsin and Minnesota. Our work shows that molecular composition of DOM is critical to its reactivity. In particular, DOM that is low in molecular weight and low in aromaticity is highly photoreactive.