

**Mercury methylation in biofilms and rapid detection of
microbial pollution in water:
two issues relevant to public health worldwide**

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Mercury is a truly global pollutant; with a half-life in the atmosphere of two years, it travels long distances and reaches poisonous levels in food webs in pristine and deteriorated regions alike. With field and laboratory studies, we are investigating the conversion of mercury to its most toxic form, methylmercury, by attached bacteria in the environment. We have observed that when sulfate-reducing bacteria form biofilms, per cell methylation rates increase by an order of magnitude, and an additional mercury methylation pathway is evident.

Fecal pollution, human and non-human, is a major cause of water impairment in coastal areas. However, our understanding fecal pollution in coastal ecosystems, as well as our ability to identify and mitigate its sources, is greatly limited by both the lack of a rapid detection method and the uncertainties surrounding its behavior in beach sediments. We have been studying the fate and persistence of pathogen indicator bacteria and pathogens in water and sediments near point sources such as sewage spills and storm drains, as well as non point sources. We are using human specific markers to track the origin of microbial contamination in impaired watersheds, and have developed a field-portable, near real-time method for the quantification of pathogen indicators.

Dr. Jay has been an Associate Professor in the Civil and Environmental Engineering Department at UCLA for the last seven years. She teaches courses in aquatic chemistry, environmental microbiology, chemical fate and transport, and a service-learning course in which UCLA undergraduates conduct community-based environmental research with local 7th graders. She currently directs an active program research related to mercury and arsenic biogeochemistry, and microbial contamination of water and sand at local beaches. In 2003 she received the Presidential Early Career Award in Science and Engineering (PECASE) to study mercury cycling in environmental biofilms. She was recently recognized as a Carnegie Foundation Faculty Fellow for Service Learning for Political Engagement, and also recently received the Northrop Grumman Award for Excellence in Teaching. Dr. Jay received her B.S., M.S., and Ph.D. in the Civil and Environmental Engineering Department at MIT.