Nitrogen Systems: Policy-oriented Integrated Research and Education

NSPIRE

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The NSPIRE IGERT Program is a multidisciplinary student doctoral training program designed to create a new generation of scientists with broad and rigorous training in nitrogen cycling who seamlessly integrate nitrogen cycle science for effective communication with public policy makers.

Research title: How nitrate controls mercury cycling in freshwater at the sediment water interface.

Ricardi is interested in using nitrate as a remediation technique to prevent methylmercury contamination of freshwater biota in lakes, contamination that can cause severe heath effects in wildlife and humans. Ricardi plans to investigate the dynamics and mechanisms of nitrate control on mercury cycling in surface waters, as well as policy and management implications of using nitrate to ameliorate mercury contamination of aquatic biota. This investigation will include a number of multidisciplinary components including: (1) the use of replicate experimental sediment-water mesocosms to evaluate the effects of nitrate on methylmercury production ; (2) related microbial ecology studies to elucidate the effects of nitrate on bacterial activity and diversity in aquatic sediments; and (3) multi-year field investigations to determine the environmental factors that influence nitrate control of methylmercury bioaccumulation in aquatic ecosystems. In summary, this research would combine lab studies, field studies, and microbial ecology studies to illuminate the dynamics, mechanisms and effectiveness of nitrate control on methylmercury cycling at the sediment-water interface of lakes. Results of this work could contribute to the form and content of new regulatory action towards mercury contamination, the acceptance and use of new technology, and the development of alternative ways to implement policies that effectively mitigate mercury contamination in aquatic biota.

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