

Environmental Chemistry of Lake Sediments



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Chemistry and
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Education and experiences

Ph.D., State University of New York (1987)

A.B., Princeton University (1981)

Hope College, Associate Professor (1994-)

Areas of expertise

Nuclear Chemistry, Environmental Chemistry

Grants and awards

NSF-RUI: Multifaceted Opportunities in Nuclear Physics for Undergraduates at Hope College (2004-2006)

NSF MRI/RUI: Acquisition of a Nuclear Microprobe System for Interdisciplinary Research and the Integration of Research and Undergraduate Education at Hope College (2003-2005)

NSF-MRI: Acquisition of an ICP for environmental metals analysis for undergraduate training (2001-2003)

"Stakeholder of the Year" award from Macatawa Watershed Project (2005)

"Hope Outstanding Professor Educator" (H.O.P.E.) award (2000)

Recent publications

P. Boutachkov, et al., "Doppler Shift as a Tool for Studies of Isobaric Analog States of Neutron-Rich Nuclei: Application to ${}^7\text{He}$ ", *Phys. Rev. Lett.* **95**, 132502 (2005).

R.H. Howes, et al., "Fabrication of a modular neutron array: A collaborative approach to undergraduate research", *Am. J. Phys.* **73**, 122 (2005).

G.V. Rogachev, et al., "Isobaric analog states as a tool for spectroscopy of exotic nuclei", *Nucl. Instrum. Methods Phys. Res.* **B241**, 977 (2005).

P.A. DeYoung, et al., "Two-neutron transfer in the ${}^6\text{He} + {}^{209}\text{Bi}$ reaction near the Coulomb barrier", *Phys. Rev.* **C71**, 051601 (2005).

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We have been studying the biogeochemical characteristics of sediment in natural lakes and artificial ponds. We combine laboratory analyses of metals, organics and nutrients with field sampling and data analysis to provide understanding of the interplay between natural and anthropogenic effects on the sediment chemistry. For example, we study differences between treated ponds in comparison to "natural" (untreated) ponds, with an emphasis on the fate and transport of copper. We have also been investigating the occurrence of heavy metal (manganese and arsenic) and organic pollutants in Lake Michigan and Lake Macatawa sediments. We have combined radiodating techniques with chemical analyses to produce historical profiles of pollution events as well. We are also studying the resuspension of phosphorus in Lake Macatawa. In addition to sediment chemistry studies, we have also been developing novel methods for the detection of trace metals in the environment.