

**Jeffra K. Schaefer**  
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## **EDUCATION**

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### **Ph.D., Rutgers University**

Microbiology and Molecular Genetics, 2005

### **B.A., University of California at Berkeley**

Biochemistry and Molecular Biology, 1997

## **RESEARCH FOCUS**

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The specific mechanisms of Hg(II) uptake and methylation in Hg methylating bacteria.

## **RESEARCH EXPERIENCE**

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### **Associate Research Scholar, Princeton University**

Department of Geosciences, 2008 – Present

### **Post-doctoral Research Associate, Princeton University**

Department of Geosciences, 2005 – 2008

Research on the mechanism of mercury methylation in sulfate-reducing bacteria and in the open ocean. Dr. François Morel, Advisor

### **Graduate Research Assistant, Rutgers University**

Department of Biochemistry and Microbiology, 1999 – 2005

Dissertation: "The Role of Mercury Resistance Genes in the Environment and the Factors Controlling their Expression". Dr. Tamar Barkay, Advisor

### **Biologist, US Geological Survey**

Water Resources Division, Menlo Park, CA, 1994 – 1999

Research on microbial transformations of methylhalides in water, soils, and sediments. Dr. Ron Oremland, Principal Investigator

## PUBLICATIONS

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R.-Q. Yu, I. Adatto, **J. K. Schaefer**, T. Barkay, M. E. Hines. Bacterial diversity in an acidic freshwater wetland: potential links to mercury methylation. *Submitted to JGR-Biogeosciences*.

T. Cardona-Marek, **J. K. Schaefer**, K. Ellickson, T. Barkay, J. R. Reinfelder. Mercury speciation, reactivity, and bioavailability in a highly contaminated estuary, Berry's Creek, New Jersey Meadowlands. *Environ. Sci. Technol.* 41: 8268-8274.

S. M. Ní Chadhain<sup>\*</sup>, **J. K. Schaefer<sup>\*</sup>**, S. Hicks, G. J. Zylstra, and T. Barkay. 2006. Analysis of mercuric reductase (*merA*) gene diversity in an anaerobic mercury-contaminated sediment enrichment. *Environ. Microbiol.* 8: 1746-1752.

<sup>\*</sup>Authors contributed equally to this manuscript.

**J. K. Schaefer**, J. Yagi, J. Reinfelder, T. Cardona, K. M. Ellickson, S. Tel-Or, T. Barkay. 2004. The role of the bacterial organomercury lyase (MerB) in controlling methylmercury accumulation in mercury contaminated natural waters. *Environ. Sci. Technol.* 38: 4304-4311.

**J. K. Schaefer**, J. Letowski, and T. Barkay. 2002. *mer*-mediated resistance and volatilization of Hg(II) under anaerobic conditions. *Geomicrobiol. J.* 19: 87-102.

**J. K. Schaefer**, K. D. Goodwin, I. R. McDonald, J. C. Murrell, R. S. Oremland. 2002. *Leisingera methylohalidivorans*, gen. nov., sp. nov., a marine methylotroph that grows on methyl bromide. *Int. J. Syst. Evol. Microbiol.* 52: 851-859.

T. Barkay and **J. Schaefer**. 2001. Metal and radionucleotide bioremediation: issues, considerations and potentials. *Curr. Opin. Microbiol.* 4: 318 – 323.

R. S. Oremland, P. R. Dowdle, S. Hoefft, J. P. Sharp, **J. K. Schaefer**, L. G. Miller, J. S. Blum, R. L. Smith, N. S. Bloom, D. Wallschlaeger. 2000. Bacterial Dissimilatory Reduction of Arsenate and Sulfate in Meromictic Mono Lake, California. *Geochimica et Cosmochimica Acta* 64: 3073-3084.

**J. K. Schaefer** and R. S. Oremland. 1999. Oxidation of Methyl Halides by the Facultative Methylotroph Strain IMB-1. *Appl. Environ. Microbiol.* 65: 5035-5041.

K. D. Goodwin, **J. K. Schaefer**, and R. S. Oremland. 1998. Bacterial Oxidation of Dibromomethane and Methyl Bromide in Natural Waters and Enrichment Cultures. *Appl. Environ. Microbiol.* 64: 4629-4636.

A. M. Laverman, J. S. Blum, **J. K. Schaefer**, E. J. Philips, D. R. Lovley, and R. S. Oremland. 1995. Growth of Strain SES-3 with Arsenate and Other Diverse Electron Acceptors. *Appl. Environ. Microbiol.* 61: 3556-3561.

## ORAL CONFERENCE PRESENTATIONS (select list)

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**J. K. Schaefer** and F. M. M. Morel. Relationship between mercury emissions and methylation, Water and Ecosystem Area Council Meeting. Electric Power and Research Institute (EPRI), Cleveland, OH. Sep. 2007.

**J. K. Schaefer**, T. Barkay, and F. M. M. Morel. Inorganic mercury bioavailability studies in iron-reducing bacteria. ASLO Aquatic Sciences Meeting. Sante Fe, NM. February 2007.

**J. K. Schaefer**, J. Yagi, T. Cardona-Marek, K. Ellickson, S. Tel-Or, J. Reinfelder, and T. Barkay. The role of the bacterial enzyme, organomercurial lyase, in controlling methylmercury accumulation in mercury contaminated natural waters. 7<sup>th</sup> International Conference on Mercury as a Global Pollutant. Ljubljana, Slovenia. June 2004.

**J. K. Schaefer**, T. Cardona-Marek, K. Ellickson, J. Yagi, T. Barkay, and J. Reinfelder. Mercury contamination in Berry's Creek and downstream ecosystems. Meadowlands Symposium. Lyndhurst, NJ. October 2003.

**J. K. Schaefer**, K. D. Goodwin, I. McDonald, J. C. Murrell, R. S. Oremland. Methylhalide oxidation by a novel marine methylotroph, *Ruegeria* sp. strain MB2. American Geophysical Union Fall Meeting. San Francisco, CA. December 2000.

## POSTER CONFERENCE PRESENTATIONS (select list)

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**J. K. Schaefer**, M. J. Walsh, B. Ahner, and F. M. M. Morel. Complexation of inorganic mercury by cysteine promotes bacterial mercury methylation. American Geophysical Union Fall Meeting. San Francisco, CA. Dec. 2008.

**J. K. Schaefer** and T. Barkay. Diversity of mercuric reductase (*merA*) genes and transcripts in natural waters. 105<sup>th</sup> Annu. Meet. Am. Soc. Microbiol. Atlanta, GA. May 2005.

**J. K. Schaefer**, J. Yagi, J. Reinfelder, S. Tel-Or, and T. Barkay. The potential role of *mer*-mediated resistance in controlling methylmercury accumulation in freshwater ecosystems in New Jersey. 102<sup>nd</sup> Annu. Meet. Am. Soc. Microbiol. Salt Lake City, UT, May 2002.

## TEACHING EXPERIENCE

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**Instructor.** General Microbiology. Rutgers University, Summer 2008.

- Lectured 1/3 of lecture course

**Lecturer.** ENV202b: Fundamentals of Environmental Studies: Climate, Air Pollution, Toxics, and Water Lab Course, Princeton University, Spring 2007 and 2008. Dr. E. Zerba, Professor

**Part-Time Lecturer and Teachers Assistant.** Microbial Ecology and Biodiversity Lab Course. Rutgers University, Spring and Fall 2003. Dr. T. Barkay, Professor

**Teachers Assistant.** General Microbiology Laboratory. Rutgers University, 2003. Dr. Diane Davis, Professor

**Research training and mentoring experience.**

- Trained and mentored a technician, Cristina Cobb-Adams, in the techniques associated with mercury and methylmercury analyses at Princeton University.
- Trained graduate and undergraduate students in their research at Rutgers University.

**OUTREACH EXPERIENCE**

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Science Expert for the Hamilton Township School district group in the ConnectEd (Consortium for New Explorations in Coherent Teacher Education) program for the designing of a Big Idea Module (BIM) on the topic of natural selection

Presented topics in biology in the Oceans Unit of QUEST for Middle School Teachers Princeton Environmental Institute, Princeton University, 2006  
Topics included: marine food webs, mercury accumulation and biomagnification, the practice and consequences of commercial fisheries, and effects of climate change on coral and phytoplankton.

Designed and presented a display at the Science and Engineering Expo for Middle School students. Princeton Environmental Institute, Princeton University, 2006.  
“Life without Oxygen – Photosynthetic Bacteria and the Sulfur Cycle”

**JOURNAL REVIEWER (select list)**

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Environmental Science and Technology  
Environmental Microbiology  
NOAA’s National Sea Grant College Program  
The International Society for Microbial Ecology Journal  
Geomicrobiology Journal

**AWARDS**

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2000 – 2004 New Jersey Farmer’s Scholarship  
2002 ASM Corporate Sponser Student Travel Grant Award

**PROFESSIONAL MEMBERSHIPS**

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American Geophysical Union (AGU)  
Advancing the Science of Limnology and Oceanography (ASLO)  
American Society for Microbiology (ASM)