

# Jennifer J. Guerard, Ph.D.

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## RESEARCH INTERESTS

- Quantum chemical modeling of electron transfer processes in aqueous solution
- Characterization of dissolved organic matter source and composition
- Photo- and redox reactivity of natural aquatic constituents
- Contaminant transformation reactions and fate

## EMPLOYMENT

**Assistant Professor**, Department of Chemistry and Biochemistry, University of Alaska Fairbanks, Fairbanks AK (*starting Aug 2014*)

**Postdoctoral Researcher**, Environmental chemistry modeling laboratory, Institute of Environmental Engineering, École polytechnique fédérale de Lausanne, Lausanne, Switzerland, 2010-2014

*Advisor: J. Samuel Arey*

*Research: Quantum chemical determination of single-electron transfer oxidation potentials for organic compounds in aqueous solution*

## EDUCATION

**Ph.D., Environmental Sciences**, The Ohio State University, Columbus, OH, 2009

*Advisor: Yu-Ping Chin*

*Dissertation: The characterization of dissolved organic matter and its influence on the photochemical fate of antibiotics used in aquaculture*

**B.S., Chemistry**, Rose-Hulman Institute of Technology, Terre Haute, IN, 2005, *magna cum laude*  
Minors: Mathematics, Political Science

## FELLOWSHIPS AND AWARDS

- EPFL ENAC IIE Green Days, Poster Award, 2011
- US NSF International Research Fellowship Program (IRFP), 2009-2011
- C. Ellen Gonter Paper Award, ACS Environmental Division, 2009
- Graduate Student Award in Environmental Chemistry, ACS Environmental Division, 2009
- US EPA STAR (Science to Achieve Results) Graduate Fellowship, 2006-2009
- The Ohio State University Graduate Fellowship, 2005-2006
- John D. White Award, Rose-Hulman Institute of Technology Chemistry Department 2005
- US NSF-REU, Department of Chemistry, Columbia University, New York, NY 2003.  
*Advisor: Prof. Gerard Parkin, 2003*

## CONTRIBUTIONS TO FUNDED GRANTS

- Tentscher, P. R., Guerard, J. J., Arey, J. S. "Oxidation reactions by triplet state transients in aquatic environments", Swiss National Supercomputing Center (CSCS), 2000000 cpu hrs on Cray XT5, April 2011 – March 2012.
- Tentscher, P. R., Guerard, J. J., Arey, J. S. "Quantum chemical study of contaminant oxidation reactions in aquatic systems", Swiss National Supercomputing Center (CSCS), 1600000 cpu hrs on Cray XT5, Oct 2010 – March 2011.

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## PEER-REVIEWED PUBLICATIONS

- Guerard, J. J., J. S. Arey. Critical Evaluation of Implicit Solvent Models for Predicting Aqueous Oxidation Potentials of Neutral Organic Compounds. *J. Chem. Theory Comp.* **2013** 9:5046-5058.
- Cawley, K., D. McKnight, R. Cory, R. Fimmen, J. Guerard, M. Dieser, C. Jaros, Y. P. Chin, P. Miller, C. Foreman. Characterization of fulvic acid fractions of dissolved organic matter (DOM) during ice-out in a hyper-eutrophic, coastal pond in Antarctica. *Env. Res. Lett.* **2013** 8: 045015.
- Guerard, J. J. and Y. P. Chin. Photodegradation of ormetoprim in Mississippi dissolved organic matter. *J. Ag. Food Chem.* **2012** 60: 9801-9806.
- Cory, R., M. Miller, D. McKnight, J. Guerard, P. Miller. Effect of instrument-specific response on the analysis of fulvic acid fluorescence spectra. *Limnol. Oceanogr. Methods* **2010** 8:67-78.
- Guerard, J. J., Y.P. Chin, H. Mash, C.M. Hadad. Photochemical fate of sulfadimethoxine in aquaculture. *Environ. Sci. Technol.* **2009** 43: 8587-8592.
- Guerard, J. J., P. L. Miller, T. D. Trouts, Y. P. Chin. The role of fulvic acid composition in the photosensitized degradation of aquatic contaminants. *Aquatic Sci.*, **2009** 71: 160-170.

## OTHER PUBLICATIONS

- Guerard, J. J., P. R. Tentscher, P. R., J. S. Arey, Simulating environmental oxidation chemistry in water. *Zetta* **2012**, 1:46-51. (a publication of EPFL, Lausanne, Switzerland)

## TEACHING EXPERIENCE

- Guest Lecture**, "Partitioning of organic compounds in the environment – Natural organic matter and colloids", Environmental Chemistry, taught by J. Samuel Arey, Urs von Gunten, and Tamar Kohn, EPFL, 2011.
- Guest Lecture** "Contaminants in Aquatic Systems" Guest Lecturer, The Dynamic Earth (EarthSci121), taught by Yu-Ping Chin, OSU, 2009.
- Teaching Assistant**, Aquatic Inorganic Chemistry (EarthSci718), taught by Yu-Ping Chin, OSU, 2009.
- Lab Mentor**, to 3 undergraduate students, instructing them in analytical instrumentation, lab experiments, and photochemical experiment design, 2006-2009
- Workshop Assistant**, Parallel Factor Analysis (PARAFAC) of Dissolved Organic Matter, University of Colorado, Boulder, CO, 2005

## SEMINARS

- "A quantum chemical method for estimating redox potentials of organic contaminants" Eawag, Dübendorf, Switzerland, September 2010.
- "Understanding the influence of dissolved organic matter on the photochemical fate of sulfadimethoxine and ormetoprim" Eawag, Dübendorf, Switzerland, September 2009.
- "Understanding the influence of dissolved organic matter on the photochemical fate of sulfadimethoxine" Environmental Engineering Seminar Series, EPFL, Lausanne, Switzerland, September 2009.
- "Understanding the influence of dissolved organic matter on the photochemical fate of sulfadimethoxine and ormetoprim" Dept. of Civil and Environmental Engineering, University of Connecticut, Storrs, CT, September 2009.
- "Photodegradation of antibiotics in aquaculture" U.S. E.P.A., Cincinnati, OH, April 2008.
- "Investigating the photochemical reactivity of dissolved organic matter from Pony Lake, Antarctica" OSU School of Earth Sciences, Division of Global and Environmental Change Seminar Series, Columbus, OH, February, 2008.
- "Into the Antarctic," Tri-Beta Honors Society, Shawnee State University, Portsmouth, OH, Feb. 2007.
- "Into the Antarctic" with P. L. Miller, R.H.I.T., Terre Haute, IN, May 2005.

## CONFERENCE PRESENTATIONS AND MEETING ABSTRACTS

- Guerard, J. J.\*, P.R. Tentscher, J. S. Arey. "Quantum chemical estimation of oxidation potentials of environmental organic contaminants in aqueous systems," Gordon Research Conference – Environmental Sciences: Water, Holderness, NH, June 2014. *Poster Presentation*.
- Arey, J. S.\*, Tentscher, P. R., Guerard, J. J., Winter, B., Seidel, R., Canonica, S. "Molecular modeling of vertical and equilibrium one-electron oxidation processes in water", Eawag Symposium, Dübendorf, Switzerland,

September 2013. *Poster Presentation.*

**Guerard, J. J.\***, Tentscher, P. R., Arey, J. S. "Aiming for high accuracy redox potentials of environmental organic contaminants in aquatic systems using QM molecular dynamics", EPFL IIE Green Days, Champoussin, Switzerland, September 2011. *Poster Presentation.*

Arey, J. S.\*, **Guerard, J. J.**, Tentscher, P. R., Sivey, J. D., Roberts, A. L. "Quantum chemical insights into the roles of reactive species in aquatic systems", ACS, Denver CO, August 2011.

**Guerard, J. J.\***, Tentscher, P. R., Arey, J. S. "Aiming for high accuracy redox potentials of environmental organic contaminants in aquatic systems using QM molecular dynamics" WATOC, Santiago de Compostela, Spain, July 2011. *Poster Presentation.*

**Guerard, J. J.\*** "Environmental chemistry applications: Using CP2K for estimation of redox potentials of organic micropollutants in aquatic systems" 2nd CP2K tutorial, CECAM, Zurich, Switzerland, February 2011.

**Guerard, J. J.\***, J. S. Arey. "Evaluation of a quantum chemical method for estimating redox potentials of organic contaminants" Gordon Research Conference – Environmental Sciences: Water, Holderness, NH, June 2010. *Poster Presentation.*

**Guerard, J. J.\***, Y. P. Chin. "The Photochemical Fate of Ormetoprim in Aquaculture Waters" ACS National Meeting, Washington, D.C., August 2009.

**Guerard, J. J.\***, S. Agrawal, Y. P. Chin. "Remediation of Contaminants by Natural Surface Waters and Pore Waters" 69th Midwest Fish and Wildlife Conference, Columbus, OH, December, 2008.

**Guerard, J. J.\***, H. Mash, Y. P. Chin. "Photodegradation of antibiotics used in aquaculture" ASLO, St. Johns, Newfoundland, June, 2008.

Miller, P. L.\*, M. Dieser, C. M. Foreman, R. L. Fimmen, **J. J. Guerard**, R. M. Cory, Y. P. Chin, D. M. McKnight. "Direct and indirect effects of UV radiation on bacterial abundance and community structure in Pony Lake, Antarctica" ASLO, Orlando, Florida, March, 2008.

Fimmen, R. L.\*, **J. J. Guerard**, P. L. Miller, R. M. Cory, Y. P. Chin, C. M. Foreman, D. M. McKnight. "Linking photochemical transformation of an Antarctic fulvic acid to diminished bioavailability and oxidation of organic electron shuttles" AGU, San Francisco, CA, Dec. 2007.

**Guerard, J. J.\***, Y. P. Chin. "Photodegradation of antibiotics in aquaculture" ACS, Chicago, IL, Mar. 2007.

**Guerard, J. J.\***, Y. P. Chin. "Photodegradation of antibiotics used in aquaculture" EPA Graduate Fellowship Conference, Washington, D.C., September, 2006. *Poster Presentation.*

Miller, P. L.\*, C. Foreman, **J. J. Guerard**, R. L. Fimmen, R. M. Cory, K. M. Cawley, D. M. McKnight, Y. P. Chin "Changes in chemical properties and bioavailability during photolysis of Pony Lake dissolved organic matter" XXIX SCAR Meeting with Open Science Conference, Hobart, Tasmania, July, 2006. *Poster Presentation.*

**Guerard, J. J.\***, R. L. Fimmen, P. L. Miller, Y. P. Chin, R. M. Cory, D. M. McKnight, C. Foreman "Changes in chemical properties and bioavailability during photolysis of Pony Lake dissolved organic matter" ASLO, Victoria, BC, June, 2006.

**Guerard, J. J.\***, R. M. Cory, D. M. McKnight, P. L. Miller, R. L. Fimmen. "Spectrofluorometric and Spectrophotometric Evaluation of the Photoreactivity of Dissolved Organic Matter from a Coastal Lake on Ross Island, Antarctica" ACS, Washington, D.C., August, 2005.

## FIELDWORK

2007–2008 Delta Research and Extension Center, USDA, Stoneville, MS

2006–2009 Old Woman Creek, Huron, OH

2004–2005, 2005–2006 Pony Lake - McMurdo Station, Ross Island, Antarctica

## PROFESSIONAL ACTIVITY

Membership: *ASLO, ACS - Environmental Division*

Reviewer: *Aquatic Sciences, Chemosphere, Environmental Science and Technology*