Nathan E. Boland

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EDUCATION

Johns Hopkins University, Baltimore, MD **2011**
Ph. D. in Environmental Chemistry, defended August 2011 (conferral December 2011)
Department of Geography and Environmental Engineering
Advisor: Alan T. Stone

- NSF Graduate Research Fellow in Environmental Chemistry

Colby College, Waterville, ME **2001**
B.A. in Chemistry A.C.S., May 2001
Advisor: D. Whitney King

- Graduated Summa Cum Laude, with Honors, and with Distinction

TEACHING EXPERIENCE

Associate Professor of Chemistry **2019 – pres.**
Assistant Professor of Chemistry **2012 – 2019**
Whitman College, Walla Walla WA

- Courses taught: Problem Solving in Chemistry (CHEM 111), General Chemistry Lecture and Lab (CHEM 125, 126, 136), Global Chemical Cycles (CHEM 305), Quantitative Analysis and Chemical Equilibria (CHEM 310), Instrumental Methods of Analysis (CHEM 320), Environmental Chemistry and Engineering (CHEM 388), Capillary Electrophoresis (CHEM 432), Chemistry Seminar (CHEM 401/402).

Visiting Assistant Professor of Analytical Chemistry **2011 – 2012**
University of Puget Sound, Tacoma, WA

- Taught Instrumental Analysis lecture and laboratory (CHEM 330), Fundamental Chemistry laboratory (CHEM 110), Chemical Analysis and Equilibrium lecture and laboratory (CHEM 230).

Teaching Assistant/Laboratory Instructor **2005 – 2011**
Johns Hopkins University, Baltimore, MD

- Guest lectured for Environmental Inorganic Chemistry (570.441).
- Guest lectured and graded problem sets for Aquatic Chemistry (570.443).
- Developed, organized and facilitated laboratory for Experimental Methods in Environmental Engineering and Chemistry (570.452).
- Organized and facilitated the aquatic chemistry laboratory for Environmental Engineering and Science Laboratory (570.304).

Teach For America Corps Member/High School Teacher **2001 – 2004**
Scotlandville High School, Baton Rouge, LA

- Served as Teach For America corps member, 2001-2003.
- Taught Honors, Magnet, and Comprehensive Chemistry I (11^{th} Grade), Chemistry II (12^{th} Grade), Physical Science (9^{th} Grade).
- Chaired the Science Department, 2003-2004.
- School Improvement Team, 2002 – 2004, and Management Subcommittee, 2003-2004.]

Colby College/Teach For America Internship Co-Creator **2003**
Teach For America, Baton Rouge, LA
- Developed a curriculum and administered a January Term Internship for Colby College students to explore an educational topic within the context of rural and urban schools in South Louisiana.

Chemistry Content Seminar Co-Writer **2003**
The New Teacher Project, New York, NY
- Developed curriculum for a national alternative certification program for high school chemistry teachers.

Exploratory Geochemistry Summer Program for Minority Students Co-Creator **2002**
Colby College, Waterville, ME and Scotlandville High School, Baton Rouge, LA
- Developed a summer research program with Dr. D. Whitney King that was funded by a grant from the NSF Geosciences division (NSF EAR-0220224).
- Tutored, mentored, and supervised two minority high school students in preparation for and during a summer research internship.

GRANTS FUNDED

NSF, Division of Chemistry, Environmental Sciences - $362,929 (with 8 student stipends) **2020-2023**
"Effect of Multidentate Ligand Exchange Pathways on Metal Ion Uptake"

M. J. Murdock, Natural Sciences Grant - $75,000 (incl. matching funds) (with 6+ student stipends) **2017-2020**
"Influence of Low Molecular Weight Organic Acids on the Mechanism of Multidentate Ligand Exchange Reactions"

Whitman College, Louis B. Perry Research Awards - $16,500 (with 3 student stipends) **2019**
"Evaluating Chelating Resin Identity on Ligand Exchange for Metal Bioavailability Analyses"
"Effect of Low Molecular Weight Organic Acids on Rates of Ligand Exchange"

Whitman College, Louis B. Perry Research Award - $5,200 (with 1 student stipend) **2018**
"Evaluating Chelating Resin Identity on Metal Bioavailability Analyses"

Whitman College, Louis B. Perry Research Award - $7,175 (with 1 student stipend) **2016**
"Pathways for Inhibition of Chelating Agent Exchange Reactions"

Whitman College, Louis B. Perry Research Award - $10,850 (with 2 student stipends) **2015**
"Pathways and Catalysis of Chelating Agent Exchange Reactions"

Whitman College, Louis B. Perry Research Award - $12,500 (with 3 student stipends) **2014**
"Mechanisms and Rates of Ligand Exchange Reactions Involving Strong Chelating Agents"

Whitman College, Louis B. Perry Research Award - $8,500 (with 1 student stipend) **2013**
"Surface Catalysis of Ligand Exchange Reactions between Strong Chelating Agents"

HONORS, AWARDS AND FELLOWSHIPS

A.E. Lange Award for Distinguished Science Teaching, Whitman College	**2019**
NSF Graduate Research Fellowship in Environmental Chemistry	**2005 – 2008**
Dean Robert H. Roy Fellowship, Whiting School of Engineering, Johns Hopkins University	**2004 – 2005**
United Way Brotherhood/Sisterhood Award (for contribution to school community), Scotlandville Magnet High School	**2002 – 2003**
Teacher of the Year Award, Scotlandville Magnet High School	**2002 – 2003**

COLLEGE SERVICE

Pre-Education Professions Advising Group	**2012 – 2021**
Division III Secretary	**2013 – 2014**
Quantitative Reasoning and Literacy (QRL) Working Group	**2013 – 2015**
Whitman Fulbright Committee	**2015 – pres.**
HHMI Grant for Inclusive Excellence core planning team	**2016 – 2017**
Whitman's Beckman Scholars Program organizing committee	**2017 – 2021**
Whitman Inclusion Diversity and Equity (WIDE) Task Force	**2018 – 2019**
Admissions and Financial Aid Committee	**2018 – 2021**
Whitman STEM Hub Board	**2018 – pres.**
Financial Sustainability Review	**2020 – 2021**
Off-Campus Studies Committee	**2022 – pres.**
Faculty Committee on Compensation	**2022 – pres.**

PROFESSIONAL ACTIVITIES

Session Presider, Inorganic Chemistry Division, Spring 2023 ACS National Meeting, Indianapolis, IN	**March 2023**
Panelist for "Teaching at Primarily Undergraduate Institutions" Discussion, Towson U., MD	**January 2021**
Review Panel Member, EMSL Environmental Sciences Area Proposal Review Panel, Pacific Northwest National Laboratory, Richland, WA	**May 2018**
Review Panel Member, EMSL Terrestrial Subsurface Ecosystems Proposal Review Panel, Pacific Northwest National Laboratory, Richland, WA	**May 2015**
Symposium Co-Chair, "Approaching the surface: Interrogating chemical interactions at the mineral-water interface," 245th ACS National Meeting, New Orleans, LA	**Spring 2013**
Invited Participant, SCEWest Meeting for Civic Engagement Network in NW, Seattle University, Seattle, WA	**Spring 2013**

Peer Reviewer for International Journal of Environmental Protection and Policy, Environmental Science & Technology Letters, Journal of Chemical Education and Geochimica et Cosmochimica Acta.

Grant Reviewer for National Science Foundation and M. J. Murdock Trust

External search committee member for chemistry faculty search at another PUI

Member of American Chemical Society (Environmental Chemistry and Geochemistry Divisions), Council on Undergraduate Research

PUBLICATIONS (*UNDERGRADUATE STUDENT CO-AUTHOR, **HIGHSCHOOL STUDENT CO-AUTHOR)

Peer-Reviewed Articles

Boland, N.E.; Stone, A.T. Ligand Steric Interactions Modulate Multidentate Ligand Exchange Pathways: Kinetics of nickel(II) ion capture from N-substituted IDA complexes by CDTA. *Inorg. Chem.* **2022** doi:10.1021/acs.inorgchem.2c01330

Rea, L.T.*; Xu, Y.*; Boland, N.E. Effects of calcium ion on the kinetics of a model disjunctive ligand exchange reaction. *Environ. Sci.: Process. Impacts.* **2019,** *21*, 89-103 doi:10.1039/C8EM00301G

Boland, N.E.; Stone, A.T. Rates of Nickel(II) Capture from Complexes with NTA, EDDA, and Related Tetradentate Chelating Agents by the Hexadentate Chelating Agents EDTA and CDTA: Evidence of a "semijunctive" ligand exchange pathway. *Geochim. Cosmochim. Acta* **2017**, *212*, 176-195 doi:10.1016/j.gca.2017.06.003

Boland, N.E.; Stone, A.T. Capillary electrophoresis facilitates determination of metal complex stoichiometry by Job's method of continuous variation. *Environ. Chem.* **2013**, *10*, 409. doi:10.1071/EN13103

Dissertations/Theses

Boland, N.E. Nickel and Chelating Agent Speciation by Capillary Electrophoresis: Exploration of pathways, rates and structure-reactivity relationships pertaining to exchange reactions. Johns Hopkins University: Baltimore, MD, **2011**.

Boland, N. E.; King, D.W. Flow Injection Analysis of Superoxide in Aqueous Solution: A quantitative determination using the chemiluminescent probe MCLA. *Senior Honors Thesis*. Chemistry Department, Colby College, Waterville, ME, **2001**.

Other Publications

Boland, N. E. Inspiring a New Generation of Chemists. *inChemistry Magazine,* March/February **2003**, pg 21-23.

Maddin, B.; Boland, N. *Teaching for Results: Secondary Chemistry, 1st Edition*. New York, NY: The New Teacher Project, Inc., **2003**.

Presentations

Boland, N.E.; Briody-Pavlik, L.*; Wildman, A.*; Dick-Neal, H.*; Huang, Z.*; Hoffman, R.*; McCracken, K.* Evidence of Catalysis of Multidentate Ligand Exchange by Small Organic Ligands. *Abstracts of Papers, American Chemical Society Spring 2023 National Meeting.* Indianapolis, IN, March **2023**. (oral)

Briody-Pavlik, L.*; Huang, Z.*; Boland N. ENVR 370 Effect of Low Molecular Weight Organic Acids on the Kinetics of Disjunctive Ligand Exchange: Lewis base identity and chelate ring size. *Abstracts of Papers, American Chemical Society Spring 2019 National Meeting.* Orlando, FL, April **2019**. (poster)

Boland, N.E.; Stone, A.T.; Rea, L.T.*; Xu, Y.*; Wildman, A.*; Briody-Pavlik, L.*; Huang, Z.* GEOC 85 Constituent ions and "spectator" low molecular weight organic acids influence ligand exchange kinetics: geochemical implications. Abstracts of Papers, 255th American Chemical Society National Meeting. New Orleans, LA, March **2018**. (oral)

Rea, L.*; Boland, N.E. Modeling the Kinetics of Trace Metal Ion Speciation: The influence of calcium ion on disjunctive ligand exchange. Abstracts of Papers, 253rd American Chemical Society National Meeting. San Francisco, CA, April **2017**. (poster)

Wildman, A.*; Boland, N.E. The Influence of a Metal Oxide Surface on Ligand Exchange Reactions between Strong Chelating Agents. Abstracts of Papers, 251st American Chemical Society National Meeting. San Diego, CA, March **2016**. (poster)

Xu, Y.*; Boland, N.E. The Influence of a Metal Oxide Surface on Ligand Exchange Reactions between Strong Chelating Agents. Abstracts of Papers, 251st American Chemical Society National Meeting. San Diego, CA, March **2016**. (poster)

Boland, N.E.; Stone, A.T.; Nelson, T.*; Wildman, A.*; Harned, M.*; Xu, Y.* Structure-reactivity relationships for multidentate ligand exchange reaction pathways. Chemistry Department Seminar, Eastern Washington University, February 10, **2016** (invited oral)

Boland, N.E.; Stone A.T.; Nelson, T.*; Harned, M.V.*; Wildman, A.* GEOC 108 Adjunctive, Disjunctive and "Interjunctive"? Influence of ligand structure on kinetic pathways of ligand exchange. *Abstracts of Papers, 249th American Chemical Society National Meeting*. Denver, CO, March **2015**. (oral)

Conrad, J.P.*; Boland, N.E. The Influence of a Metal Oxide Surface on Ligand Exchange Reactions between Strong Chelating Agents. *Abstracts of Papers, 249th American Chemical Society National Meeting*. Denver, CO, March **2015**. (poster)

Harned, M.V.*; Nelson, T.*; Boland, N.E. Influence of pH on Ligand Exchange Rate with Phosphonate-Containing Chelating Agents *Abstracts of Papers, 249th American Chemical Society National Meeting*. Denver, CO, March **2015**. (poster)

Hinkle, S.M.*; Boland, N.E. The use of CYCLAM and other tetraamines to probe the mechanism of surface-influenced ligand exchange. *Abstracts of Papers, 249th American Chemical Society National Meeting*. Denver, CO, March **2015**. (poster)

Nelson, T.*; Boland, N.E. Influence of Lewis base identity on rates of ligand exchange. *Abstracts of Papers, 247th American Chemical Society National Meeting*. Dallas, TX, April **2014**. (poster)

Stone, A.T.; Boland, N.E.; Carbonaro, R.F. Chelating Agent Selection From A Kinetic Perspective: New Insights From Capillary Electrophoresis. *3rd Annual American Chemical Society Green Chemistry Institute Roundtable, 17th Annual Green Chemistry & Engineering Conference*, North Bethesda, MD, June 19, **2013**. (poster)

Boland, N.E.; Stone, A.T. Capillary Electrophoresis-Based Methods for Determining Metal Ion and Chelating Agent Speciation, and Their Use in Environmental Chemistry. *17th International Symposium on Electro- and Liquid Phase-separation Techniques*. Baltimore, MD, August **2010**. (poster, oral)

Boland, N.E.; Stone, A.T. Nickel Exchange Reactions: Effect of chelating agent functional groups and structure on pathways and rates. *Gordon Conference on Environmental Sciences: Water*. Holderness School, Holderness, NH, June **2010**. (poster)

Boland, N.E.; Stone, A.T. GEOC 27 Chelating Agent Capture of Nickel in Heterogeneous Media: Structure-reactivity relationships. *Abstracts of Papers, 238th American Chemical Society National Meeting*. Washington, DC, August **2009**. (oral)

Boland, N.E.; Stone, A.T. Chelating Agents, Surfaces, and Nickel: Structure-Reactivity Relationships. *Chemodynamics of Ecosystems*. Monte Verità, Ascona, Switzerland, October **2008**. (poster, oral)

Boland, N.E.; Stone, A.T. GEOC 76 Siderophores, surfaces, and metals: How siderophore structure affects exchange rates. *Abstracts of Papers, 236th American Chemical Society National Meeting*. Philadelphia, PA, August **2008**. (oral)

Boland, N.E.; Stone, A.T.; Chaney, R.L. Yehuda, Z. Phytosiderophore Speciation by Capillary Electrophoresis. *Gordon Conference on Environmental Bioinorganic Chemistry*. Proctor Academy, Andover, NH, June **2006**. (poster)

King, D.W.; Boland, N.E. An Exploratory Summer Research Program: Creating opportunities for under-represented high school students and their teachers. *Abstracts of Papers, 225th American Chemical Society National Meeting*. New Orleans, LA, March **2003**. (poster)

Bazille, C.;** Jackson, S.;** Boland, N.E.; King, D.W. Superoxide Detection in Surface Waters of Maine Lakes. *Sigma Xi Student Research Conference*. Galveston, TX, November **2002**. (poster)

Boland, N. E.; King, D.W. Flow Injection Analysis of Superoxide in Aqueous Solution: A quantitative determination using the chemiluminescent probe MCLA. *Abstracts of Papers, 219th American Chemical Society National Meeting*. San Diego, CA, March **2001**. (poster)