Dr. Trent P. Vorlicek, Professor
Ford Hall 241
Department of Chemistry and Geology
Minnesota State University, Mankato
e-mail: trenton.vorlicek@mnsu.edu
Phone: 507-389-1598

Professional Preparation

University of Maryland (College Park, MD)
Ph.D. in Aqueous Geochemistry, August 2002
Thesis Advisor: Prof. George R. Helz

Saint Mary's University (Winona, MN)
B.A. in Chemistry, *cum laude*, May 1997

Lawrence Livermore National Lab (Livermore, CA)
DOE intern laboratory assistant, Summer 1997

San Jose State University (San Jose, CA)
ACS/DOE Nuclear Chemistry Summer School, Summer 1996

University of Minnesota, Hormel Institute (Austin, MN)
Biochemistry Research Laboratory Assistant, Summer 1995

Employment History

Professor, Minnesota State University, Mankato, 2015-present
Associate Professor, Minnesota State University, Mankato, 2007-2015
Assistant Professor, Minnesota State University, Mankato, 2002-2007

Professional Appointments

- Chair, Department of Chemistry and Geology Personnel Committee, 2020-
- Co-chair, Organic search committee, 2020
- Biochemistry search committee, 2017-
- CSET Associate Chair Search Committee, 2016
- MSUM Faculty Association Research Committee, College Representative, 2011-2014
- Undergraduate Research, Scholarship and Creative Works Advisory Group, 2009-present
- Co-Chair, MSUM Undergraduate Research Conference Steering Committee, 2006-2009
- Department of Chemistry and Geology Personnel Committee, 2006-2009
- Advisor, American Chemical Society Student Chapter, 2004-present
- Department of Chemistry and Geology Program Review Committee, 2004
- MSUM Undergraduate Research Conference Committee, 2003-2006
- Reviewer, *Geochimica et Cosmochimica Acta* and *Chemical Geology*
- Reviewer, National Science Foundation, ACS Petroleum Research Fund

Honors

- *Excellence in Student Advising and Leadership*, 2014
  The award is given to one professor each year by the College of Science, Engineering, and Technology at Minnesota State University, Mankato.
- *Excellence in Teaching Award*, 2009
  The award is given to one professor each year by the College of Science, Engineering, and Technology at Minnesota State University, Mankato.
- *Outstanding Senior*, St. Mary's University, 1997
  The award is given to a graduating male and female student. It is the highest honor bestowed upon an undergraduate by SMU. As described by SMU, "recognized for demonstrating the ideals of scholarship, character, leadership and service. Above all, these men and women show genuine concern for meeting the needs of others."

Courses Taught

General Chemistry (CHEM 201), *Chemistry and Biochemistry Professional Foundations* (CHEM 281), *Analytical Chemistry* (CHEM 305), *Environmental Chemistry* (CHEM 407), *Instrumental Analysis* (CHEM 475)

Professional Affiliations

- American Chemical Society, 1996-present
- Geochemical Society of America, 2001-present

Publications

***underlined authors indicate undergraduate research advisees**

Hlohowskyj S.R., Chen X., Romaniello S.J., Vorlicek T.P., Anbar A.D., Lyons T.W., and Chappaz A. New approach to quantify molybdenum isotopic speciation in sulfidic water: Implications for the paleoredox proxy. *Submitted for review with ACS Earth Space Chem.*

Miller N., Dougherty M., Du R., Sauers T., Yan C., Pines J.E., Meyers K., Dang Y.M., Nagle E., Ni Z., Pungsrisai T., Wetherington M.T., Vorlicek T.P., Plass K.E., and Morford J.L. (2020) Adsorption of tetrathiomolybdate to iron sulfides and its impact on iron sulfide transformations. *ACS Earth Space Chem.* **4**: 2246-2260**.**

Helz G.R. and Vorlicek T.P. (2019) Precipitation of molybdenum from euxinic waters and the role of organic matter. *Chem. Geol.* **509**: 178-193**.**

Vorlicek T.P., Helz G.R., Chappaz A., Vue P., Vezina A., and Hunter W. (2018) Mechanism of Molybdenum burial in sulfidic sediments: Iron-Sulfide pathway. *ACS Earth Space Chem.* 2: 556-567.

Vorlicek T.P., Chappaz A., Groskreutz L.M., Young N., and Lyons T.W. (2015) A new analytical approach to determining Mo and Re speciation in sulfidic waters. *Chem. Geol.* **403**: 52-57.

Helz G.R., Erickson B.E., and Vorlicek T.P. (2014) Stabilities of thiomolybdate complexes of iron; Implications for retention of essential trace elements (Fe, Cu, Mo) in sulfidic waters. *Metallomics.* **6**, 1131 – 1140.

Vorlicek T.P., Kahn M.D., Kasuya Y., and Helz G.R. (2004) Capture of molybdenum in pyrite-forming sediments: Role of ligand-induced reduction by polysulfides. *Geochim. Cosmochim. Acta* **68**, 547-556.

Helz G.R., Vorlicek T.P., Kahn M.D., and Kasuya Y. (2004) Scavenging of molybdenum by iron monosulfide. *Environ. Sci. Technol.* **38**, 4263-4268.

Vorlicek T.P. and Helz G.R. (2002) Catalysis by mineral surfaces; implications for Mo geochemistry in anoxic environments. *Geochim. Cosmochim. Acta*, **66**, 3679-3692.

Grant Awards

***denotes joint PIs**

Vorlicek T.P. (2018) Advancing the Vanadium paleoredox proxy: Defining the chemistry controlling vanadium speciation in sulfidic and polysulfidic natural waters. ACS Petroleum Research Fund Undergraduate Research Grant. (PRF#: 59061-UR2) $70,000.

Chappaz A.*, Vorlicek T.P.* (2014) Collaborative research: Unraveling Molybdenum and Rhenium speciation: Identifying the burial pathways of redox proxies in sulfidic settings. Early Concept Grants for Exploratory Research (EAGER): Geobiology and Low Temperature Geochemistry (NSF#: 1503567). *$80,000 total award; $16,577 MSUM award.*

Vorlicek T.P. (2012) Speciation and sequestration of Rhenium in sulfidic and polysulfidic natural waters. American Chemical Society Petroleum Research Fund (PRF#: 52201-UR2). *$65,000*

Vorlicek T.P. (2011) Defining the Isotopic Ratios of Anoxic Proxies: Chromatographic Separation and Quantification of Thiomolybdates and Thioperrhenates. Minnesota State University, Faculty Research Grant. *$5,000*

Hoppie B.W. and Vorlicek T.P. (2008) Surface water assessment of Lake Titlow, Sibley County, Minnesota. Minnesota Pollution Control Agency Grant. *$81,760*

Hadley M., Vorlicek T.P., Thoemke J.T., Quirk Dorr D., and Swart D.J.(2008) Acquiring a high performance liquid chromatography system with mass spectral capabilities. United States Department of Agriculture, Equipment Grant. *$50,000.00*

Vorlicek T.P. (2005) Chemical interactions between antibiotics and clay minerals: Effects on antibiotic and metal mobility in soil environments. Minnesota State University, Faculty Research Grant. *$4,970.00*

Vorlicek T.P. (2003) The influence of mineral surfaces on the fate of pharmaceuticals in the environment. Minnesota State University, Faculty Research Grant. *$3,870.00*

Presentations

Underlined Authors Denote Undergraduate Researcher Advisees
¥designates presenting author if not first name listed

Weston S., Medina M. and Vorlicek T.P. (2019) Ion Pair Chromatographic Separation of V^{V}, VI^{V}, and V^{III} Ions in Sulfidic Waters. Presented at the Chemical Education Undergraduate Poster Session, Geochemistry, Spring 2019 American Chemical Society National Meeting, Orlando, FL.

Vorlicek T.P., Helz G.R., Chappaz A., Vue P., and Vezina A. (2018) Molybdenum burial mechanism: Iron-sulfide pathway. Oral talk presented at the V.M. Goldschmidt Conference sponsored by the Geochemical Society of America. Boston, MA.

Vue P., Vezina A., Miller S., Casperson M. and Vorlicek T.P. (2018) Advancing the vanadium paleoredox proxy: Defining the chemistry controlling vanadium speciation in sulfidic natural waters. Presented at the Chemical Education Undergraduate Poster Session, Geochemistry, Spring 2018 American Chemical Society National Meeting, New Orleans, LA.

Vorlicek T.P., Helz G.R., Chappaz A., Vue P., and Vezina A. (2017) Inorganic fixation of molybdenum. Poster presented at the V.M. Goldschmidt Conference sponsored by the Geochemical Society of America. Paris, France.

Vue P., Vezina A., Chappaz A., and Vorlicek T.P. (2017) Reductive pathway to Mo deposition in anoxic sediments: Aqueous Mo^{VI} to insoluble Mo^{IV} via variable-composition Fe-Mo^{IV}-S precipitates. Presented at *Sci-Mix* at the Spring 2017 American Chemical Society National Meeting, San Diego, CA.

Vue P., Hunter W., Chappaz A., and Vorlicek T.P. (2016) Toward a better understanding of Mo burial in anoxic sediments: Roles of Fe^{II}-Mo^{IV}-S clusters, sol stability, and ionic strength. Presented at *Sci-Mix* at the Spring 2016 American Chemical Society National Meeting, San Diego, CA.

Stong E., Young N., Groskreutz, L.M. and Vorlicek T.P. (2015) Reverse phase ion pair chromatographic separation of oxythiomolybdate and oxythioperrhenate mixtures. Presented at *Sci-Mix* at the Spring 2015 American Chemical Society National Meeting, Denver, CO.

Vorlicek T.P., Chappaz, A., Groskreutz, L.M., and Myslicki, N. (2014) Formation of Fe-Mo-S solid(s): Possible Sequestration Vehicle. Presented at the V.M. Goldschmidt Conference sponsored by the Geochemical Society of America. Sacramento, CA.

Yanez P.J., Stong E., and Vorlicek T.P. (2014) Formation of iron-molybdenum-sulfide solid phase(s) in anoxic natural waters: Possible pathway to Mo deposition. Presented at *Sci-Mix* at the Spring 2014 American Chemical Society National Meeting, Dallas, TX.

Chappaz A. and Vorlicek T.P.[¥] (2013) Importance of measuring thiometalates for understanding Mo and Re geochemistry in sulfidic waters. Presented to the Geochemistry Division at the Fall 2013 American Chemical Society National Meeting, Indianapolis, IN.

Wagner C.T., Maloney M.M., Yanez P., and Vorlicek T.P. (2013) Re(VII) reduction in the presence of sorbed Fe(II): Plausible removal pathway in suboxic porewaters. Presented at the Chemical Education Undergraduate Poster Session, Environmental Chemistry, Spring 2013 American Chemical Society National Meeting, New Orleans, LA.

Groskreutz L.M. and Vorlicek T.P. (2013) Quantification of thioperrhenates using reverse phase ion pair chromatography with suppressed conductivity detection. Presented to the Analytical Chemistry Division at the Spring 2013 American Chemical Society National Meeting, New Orleans, LA.

Groskreutz L.M. and Vorlicek T.P. (2012) Influence of mineral surfaces on Re speciation in sulfidic porewaters. Presented at the V.M. Goldschmidt Conference sponsored by the Geochemical Society of America. Montreal, Canada.

Wagner C.T., Maloney M.M., and Vorlicek T.P. (2012) Verifying Mo speciation in sulfidic and polysulfidic natural waters using ion chromatography with suppressed conductivity detection. Presented to the Environmental Chemistry Division at the Spring 2012 American Chemical Society National Meeting, San Diego, CA.

Groskreutz, L.M. and Vorlicek, T.P. (2012) Speciation and removal mechanisms of rhenium in anoxic and sulfidic waters. Presented to the Environmental Chemistry Division at the Spring 2012 American Chemical Society National Meeting, San Diego, CA.

Whitaker, D.D. and Vorlicek, T.P. (2011) Laboratory exercise demonstrating systematic error in instrumental analyses: Aberrant atomic absorption spectroscopy of cadmium. Presented at the Chemical Education Undergraduate Poster Session, Analytical Chemistry, Spring 2010 American Chemical Society National Meeting, San Francisco, CA.

Weeramantri, I., Smith, T., Ayers, T., and Vorlicek, T.P. (2010) Antibiotic complexes involving heavy metals, ciprofloxacin, and phenolic degradation products: Potential relevance in ground and waste water systems. Presented at the Chemical Education Undergraduate Poster Session, Environmental Chemistry, Spring 2010 American Chemical Society National Meeting, San Francisco, CA.

Weeramantri, I. and Vorlicek, T.P. (2010) Antibiotic complexes involving heavy metals, ciprofloxacin, and phenolic degradation products: Relevance in ground and waste water systems. Presented at the Spring 2010 Council of Undergraduate Research Posters on the Hill Event, Washington D.C.

Danberry, A., Wingen, H., and Vorlicek, T.P. (2008) Synergetic reaction pathways of fluoroquinolone antibiotics and metals: Roles of metal-fluoroquinolone complexes and clay mineral surfaces. Presented to the Environmental Chemistry Division at the Spring 2008 American Chemical Society National Meeting, New Orleans, LA.

Vorlicek T.P. and Hoppie, B.W. (2007) MSUM Lake Titlow Study. Invited presentation to the Minnesota House of Representatives, Natural Resources Committee, in support of a bonding bill to reclaim Lake Titloe, Gaylord, MN.

Hoppie B.W. and Vorlicek T.P. (2007) MSUM Lake Titlow Study. Invited presentation to the Minnesota Senate, Capital Investment Committee, in support of a bonding bill to reclaim Lake Titloe, Gaylord, MN.

Vorlicek T.P., Swart D.J., and Hoppie B.W. (2006) Abnormal Hydrogeochemistry within the Prarie Du Chien confined bedrock aquifer, Southeastern Minnesota, USA. Presentation given to the ACS Environmental Division, 231st American Chemical Society National Meeting. Atlanta, GA.

Haycraft R.M., Bednar H.R., Hoppie B.W., Swart D.J., and Vorlicek T.P. (2006) Enhancing the undergraduate experience through field-based research in environmental geochemistry. Presentation given at the Undergraduate Research Poster Session of the Chemical Education Division, 231st American Chemical Society National Meeting. Atlanta, GA.

Hoppie B.W., Vorlicek T.P., and Swart D.J. (2005) Rapid recharge of a deeply buried carbonate aquifer, Rice County, Minnesota. *Geological Society of America Abstracts with Programs.* **37** (7), 32.

Vorlicek, T.P. (2005) The problem of coastal anoxia. Presentation given at the 2nd Annual Sustainability Conference. Minnesota State University, Mankato, MN.

Helz G.R. and Vorlicek, T.P. (2003) Capture of Mo in pyrite-forming environments: Seemingly parodoxical effect of polysulfides. Presented to the Geochemistry Division at the Spring 2003 American Chemical Society National Meeting. New Orleans, LA.

Vorlicek T.P. and Helz G.R. (2001) Mineral Catalysis of Thiomolybdate Hydrolysis: Implications for Mo Fixation in Anaerobic Sediments. Presented at the V.M. Goldschmidt Conference sponsored by the Geochemical Society of America. Hot Springs, VA.

Vorlicek T.P. and Helz G.R. (2000) Mineral Oxide Catalysis of MoS_4^{2-} Hydrolysis: Implications for Mo Speciation and Fixation. Presented to the Geochemistry Division at the Spring 2000 American Chemical Society National Meeting. Washington D.C.