

Kathryn L. Haas

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EDUCATION

National Institutes of Health, National Institute of Environmental Health Sciences Postdoctoral Intramural Research Training Fellow, Laboratory of Toxicology and Pharmacology	2010—2011
Duke University, Durham, NC Ph.D. in bioinorganic chemistry (Advisor: Prof. Katherine J. Franz)	2010
Gettysburg College, Gettysburg, PA B.S. in chemistry, cumulative GPA 3.8, chemistry GPA 4.0, <i>Summa cum laude</i>	2004
University of Melbourne, Victoria, Australia Semester abroad	2003

ACADEMIC APPOINTMENTS

Saint Mary's College Assistant Professor of Chemistry	2012—present
Polish Academy of Sciences (Warsaw, Poland) Visiting Research Professor, collaboration with Dr. Wojtek Bal	Summer 2016
Indiana University South Bend Visiting Assistant Professor of Chemistry, Sabbatical Replacement	2012

AWARDS AND HONORS

Cottrell Scholar Award, Research Corporation for Science Advancement (RCSA)	2016—2018
Lilly New Faculty Scholarship, Eli Lilly and Company	2012—2016
Gordon Conferences Predominantly Undergraduate Institution Travel Award	2012
The Bioinorganic Training Workshop at Penn State Poster Award	2012
Intramural Research Training Award, National Institutes of Health (NIH)	2011
Pelham Wilder, Jr. Fellowship for outstanding teaching assistants, Duke University	2007
John Herbert Pearson Teaching Award, Duke University	2007
Integrated Graduate Education and Research Traineeship, Duke University, NSF	2004—2007
Award for Achievement in Organic Chemistry, Gettysburg College	2004
G.S. Weiland Scholarship for Summer Undergraduate Research, Gettysburg College	2002, 2003

GRANTS

Extramural Awards

Cottrell Scholar Collaborative Award, Research Corporation for Science Advancement: Teacher Scholar Ambassadors for PUI – R1 Partnerships.	2016—2017
Cottrell Scholar Award, Research Corporation for Science Advancement: Transporting Cu(I) as cargo and using Cu(III) as a killer cofactor: Histidine-rich motifs in Ctr1 and Histatin 5 control Cu oxidation state and reactivity. Award # 23666.	2016—2018
Cultivating Cultures for Ethical STEM (CCE STEM) Collaborative Research Grant, National Science Foundation: Comparison of Communications across Campus Cultures (The 4C Project): Toward Evidence-based Customization of Learning Experiences. Award # 1540392.	2016—2020
Lilly USA Research Grant for Summer Research, Eli Lilly and Company: Synthesis and characterization of RGD-containing cyclic peptides and peptide-functionalized gold nanoparticles: Toward identifying integrin receptor drug targets. Award #100229732.	2015

Intramural Awards

Marjorie Neuhoff Summer Science Research Communities Grant, Saint Mary's College	2015, 2017
Maryjeanne R. Burke Student Independent Study and Research Grant, Saint Mary's College	2015
Sophia Learning Outcomes Course Development Grant, Saint Mary's College	2014
Women's Voices Course Development Grant, Saint Mary's College	2014
Center for Academic Innovation Research Grant	2013

COURSES TAUGHT

CHEM 118: General, Organic & Biological Chemistry Lecture	S 2013—17
CHEM 118-L: General, Organic & Biological Chemistry Lab	S 2014/17
CHEM 221: Organic Chemistry I Lecture	F 2012—16
CHEM 221-L: Organic Chemistry Laboratory	F 2012—16
CHEM 342: Bioinorganic Chemistry & Materials	F 2015—16
CHEM 361: Advanced Laboratory for Chemistry Majors, "Pro-Lab"	F 2016
CHEM 431: Advanced Inorganic Chemistry	F 2012/13/15
CHEM-C 335: Advanced Inorganic Chemistry Laboratory (Indiana Univ. South Bend)	S 2012
CHEM-C 342: Organic Chemistry II Lecture (Indiana Univ. South Bend)	S 2012
CHEM-C 430: Inorganic Chemistry Lecture (Indiana Univ. South Bend)	S 2012
CHEM 36S: The Science Behind Forensics (Duke University)	S 2006—2008

PUBLICATIONS

(*Corresponding Author ; undergraduate student author)

- (1) Sendzik, M.; Pushie, M. J.; Stefaniak, E.; Haas, K. L.*, Structure and Affinity of Cu(I) Bound to Human Serum Albumin. *Inorg. Chem.* 2017, 56 (24), 15057-15065.
- (2) Haas, K. L.*; Heemstra, J. M.; Medema, M. H.; Charkoudian, L. K.*, Collaborating with Undergraduates to Contribute to Biochemistry Community Resources. *Biochemistry* 2017, *In Press*.
- (3) Larsen, D. S.*; Rusay, R.; Belford, R.; Kennepohl, D.; Bennett, D.; Soult, A.; McCollum, B.; Keasler, S.; Halpern, J.; Soderberg, T.; Kosti, K.; Stockwell, W. R.; Haas, K.; Morsch, L. A., Come Join the Party!: Recent Progress of the Community Based Libretexts (NéE Chemwiki) Project. *American Chemical Society Division of Chemical Education Committee on Computers in Chemical Education* 2017, *Spring Newsletter*.
- (4) Steven Conklin.; Bridgman, E.; Su, Q.; Riggs-Gelasco, P.; Haas, K. L.; Franz, K. J.*, Specific Histidine Residues Confer Histatin Peptides with Copper-Dependent Activity against *Candida albicans*. *Biochemistry* **2017**, 56 (32), 4244-4255.
- (5) Schwab, S.; Shearer, J.; Conklin, S. E.; Alies, B.; Haas, K. L.*, Sequence proximity between Cu(II) and Cu(I) binding sites of human copper transporter 1 model peptides defines reactivity with ascorbate and O₂. *J. Inorg. Biochem.* 2016, 158, 70-76.
- (6) Pushie, M. J.; Shaw, K.; Franz, K. J.; Shearer, J.; Haas, K. L.*, Model Peptide Studies Reveal a Mixed Histidine-Methionine Cu(I) Binding Site at the N-Terminus of Human Copper Transporter 1. *Inorg. Chem.* 2015.
- (7) Hall, J.; Haas, K.; Freedman, J.*, Role of MTL-1, MTL-2 and CDR-1 in Mediating Cadmium Sensitivity in *C. elegans*. *Toxicological Sciences* 2012.
- (8) Haas, K. L.; Putterman, A. B.; White, D. R.; Thiele, D. J.; Franz, K. J.*, Model Peptides Provide New Insights into the Role of Histidine Residues as Potential Ligands in Human Cellular Copper Acquisition via Ctr1. *J. Am. Chem. Soc.* 2011, 133 (12).
- (9) Ciesienki, K. L.; Heyman, L. H.; Yang, D. T.; Haas, K. L.; Dickens, M. G.; Franz, K. J.*, A Photo-Caged Platinum(II) Complex that Increases Cytotoxicity upon Light Activation. *Eur. J. Inorg. Chem.* 2010, (15), 2224-2228.
- (10) Ciesienki, K. L.; Haas, K. L.; Franz, K. J.*, Development of next-generation photolabile copper cages with improved copper binding properties. *Dalton transactions* 2010, 39 (40), 9538-9546.

- (11) Haas, K. L.; Franz, K. J.*, Application of Metal Coordination Chemistry to Explore and Manipulate Cell Biology. *Chem. Rev.* 2009, *109* (10), 4921-4960.
- (12) Ciesiński, K. L.; Haas, K. L.; Dickens, M. G.; Tesema, Y. T.; Franz, K. J.*, A photolabile ligand for light-activated release of caged copper. *J. Am. Chem. Soc.* 2008, *130* (37), 12246-+.
- (13) Charkoudian, L. K.*; Heymann, J. J.; Adler, M. J.; Haas, K. L.; Mies, K. A.; Bonk, J. F., Forensics as a Gateway: Promoting Undergraduate Interest in Science, and Graduate Student Professional Development through a First-Year Seminar Course. *J. Chem. Ed.* 2008, *85* (6), 807.

PROFESSIONAL DEVELOPMENT

Cottrell Scholar Collaborative (CSC) Academic Leadership Training Workshop (ALT)	2017
Cottrell Scholar Conference: Building Bridges	2016
Council for Undergraduate Research (CUR), Proposal Writing Institute (PWI)	2014
Instructional Uses of Technology Course (Duke University)	2007
Leadership in Chemistry Workshop (Duke University)	2007
Teaching College Chemistry Course (Duke University)	2005—2007
Introduction to College Teaching Course (Duke University)	2005

PROFESSIONAL SERVICE

Poster Chair and Organizing Committee: 2018 Biennial Conference on Chemical Education.	2016—present
Ad hoc Manuscript Reviewer: <i>Journal of the American Chemical Society (ACS)</i> , <i>Inorganic Chemistry (ACS)</i> , <i>Journal of Physical Chemistry (ACS)</i> , <i>Journal of Inorganic Biochemistry (Elsevier)</i> .	2014—present
Panelist: Junior Faculty Q&A, University of Notre Dame Postdoc Women's Group.	2015
Judge: Northern Indiana Science Fair.	2012—2015
Session Chair: Bioinorganic Chemistry Workshop at Penn State.	2014
Research Mentor: American Chemical Society SEED Program.	2009/10/12

OTHER SERVICE

Outreach

Mentor: Marion High School Research Course.	2015—2016
Mentor: Chemistry Women Mentoring Network.	2015—present
Laboratory Guide for middle school tours and chemistry demonstrations, Duke University	2013
Discussion Leader: community book discussion on <i>The Immortal Life of Henrietta Lacks</i>	2013
Event organizer: "The Chemistry of Soap Making" at Indiana Univ. South Bend	2012
Event facilitator: "The Environment - A Human Health Perspective" professional development workshop for high school science teachers.	2011

Institutional Service at Saint Mary's College

Admissions and Scholarship Committee	2015—2018
Teaching, Learning, and Technology Roundtable	2014—2017
College Library Committee	2014—2017
College Curriculum Committee	2014
Chemistry & Physics Department Hiring Committee for tenure-track Biochemist	2014
Chemistry & Physics Department Hiring Committee for tenure-track Physicist	2013
Science Hall Building Renovation Committee	2012—2016

PROFESSIONAL AFFILIATIONS

Member, The Council on Undergraduate Research	2013—present
Member, The American Chemical Society	2014—present
Member and Mentor, Chemistry Women Mentorship Network	2014—present
Member, Society of Toxicology	2011/12

MENTORED UNDERGRADUATE RESEARCH STUDENTS

Current Research Students

- (1) Erica Slogar, '19, Chemistry Major.
- (2) Morgan Matthews, '18, Chemistry Major.
- (3) Ellen Rabut, '18, Nursing Science Major.
- (4) Madison Sendzik '17 (Dec), Chemistry Major.
- (5) Ewelina Stefaniak (graduate student visiting scholar from W.Bal Lab at Polish Academy of Science)

Research Lab Alumni

- (1) Alicia Twisselman, '19, Neuroscience Major.
- (2) Emma Bridgeman '17, Chemistry Major. Thesis: *Evaluation of the Cu(I) binding properties of the antifungal peptide histatin-5*. Co-mentored by Dr. K.J. Franz, Duke University. Currently analytical chemist at AbbVie, Chicago, IL.
- (3) Christina Kaucic (Marion High School, '17), Currently undergraduate at Purdue University.
- (4) Jennie Connell, '16, Chemistry Major. Thesis: *Quantitative analysis of methylated and unmenthylated nucleosides in enzymatically-digested DNA*. Currently analytical chemist at Pfizer, Grand Rapids, MI.
- (5) Katie Shaw, Chemistry Major. Project Title: *Synthesis and characterization of RGD-containing cyclic peptides and peptide-functionalized gold nanoparticles: Toward identifying integrin receptor drug targets*. Co-mentored by Dr. Z. Schultz, U. Notre Dame.
- (6) Samantha Moorhead, '15, Chemistry Major. Thesis: *Toward overcoming Ctr1-dependent Pt Drug Resistance in ovarian cancer: Synthesis of a novel Pt chelator-nuclear localizing peptide chimera*. Currently an Orr Fellow as a Technology Analyst at Apparatus, Indianapolis, IN.
- (7) Erin Reinhart. '15, *Pb-binding to the CxxC Zn-Finger Domains of DNMT-1 as an explanation for changes in the epigenome*. 2016 National Science Foundation Graduate Student Research Fellowship Awardee. Currently Ph.D. student at Dartmouth College.
- (8) Stefanie Schwab, '13, Chemistry Major. Thesis: *Reduction of Cu(II) bound to Ctr1 model peptides depends on sequence proximity of the Cu(II)-binding ATCUN site to downstream His and Met ligands*. Currently Masters Student at Purdue University.

PROFESSIONAL TALKS AND PRESENTATIONS

Invited oral presentations (since August 2012)

- (1) *Memory Metal: The strange case of copper in the human brain*: The Saint Mary's Symposium, Saint Mary's College, Notre Dame, IN. April 2017.
- (2) *The strange case of copper in human health and disease*: Research Corporation for Science Advancement Board Meeting, Tucson, AZ. February 2017.
- (3) *A Video Web for Pro-Lab and Advanced Chemistry Students*: Cottrell Scholar Conference, Research Corporation for Science Advancement, Tucson AZ. July, 2016.
- (4) *Copper transporter 1 (Ctr1)*: Polish Academy of Sciences, Warsaw, Poland. March 2016.
- (5) *Transition metals in human health and disease*: Faculty Research Colloquium, Saint Mary's College, November 2016.
- (6) *Transition metals in human health and disease*: Indiana University Northeast, Gary, IN. May 2016.
- (7) *Transition metals in human health and disease*: Belles of the Last Decade alumni event, Saint Mary's College, Notre Dame, IN. August 2016.
- (8) *Chemistry undergraduate research*: Saint Mary's College Board Meeting and Madeleva Society, Saint Mary's College, Notre Dame, IN. April 2016.
- (9) *Transition metals in human health and disease*: Winter Colloquium, Saint Mary's College, Naples, FL. February 2016.
- (10) *Transition Metals in Human Health and Disease*: New England Biolabs, Ipswich, MA. August 2015.
- (11) *Peptides Provide New Insights into the role of Histidine in Human Cellular Copper Acquisition via Ctr1*. Inorganic Chemistry Division Meeting, University of Notre Dame, Notre Dame, IN. October 2012.

Contributed Presentations (undergraduate researcher)

- (1) Haas, K.L.; Sendzik, M.; Slogar, E. Stefaniak, E. *Cu on the Outside: Spectroscopic Investigations of Cu bound to Ctr1 and Human Serum Albumin*. Oral Presentation, The American Chemical Society National Meeting, Many Colors of Copper Symposium, Washington, D.C., August 2017.
- (2) Haas, K.L. *Video-led active learning in a 1-semester GOB course for allied health majors*. Oral Presentation, The Biennial Conference on Chemical Education (BCCE), University of Northern Colorado, Greeley, CO, July 2016.
- (3) Haas, K.L.; Schwab, S.; Shaw, K.; Franz, K. J.; Pushie, M. J.; Shearer, J. *Ctr1 controls Cu redox through bis-His coordination structure*. Poster, Midwest Enzyme Chemistry Conference, Illinois Institute of Technology, September 12, 2015.
- (4) Haas, K.L.; Schwab, S.; Shaw, K.; Franz, K. J.; Pushie, M. J.; Shearer, J. *Ctr1 controls Cu redox through bis-His coordination structure*. Poster, Cell Biology of Metals Gordon Conference, Mount Snow, VT. July 2015.
- (5) Haas, K.L.; Schwab, S.; Shaw, K.; Franz, K. J.; Pushie, M. J.; Shearer, J. *Ctr1 controls Cu redox through His & Met coordination*. Poster, 5th Canadian Conference for Bioinorganic Chemistry (CanBIC), Perry Sound, Ontario, Canada. May 2015.
- (6) Haas, K.L.; Schwab, S.; Su, Q; and Franz, K. J. *Coordination environment defines copper as cargo or cofactor*. Invited Poster, Bioinorganic Training Workshop and Frontiers in Metallobiochemistry Symposium at Penn State, May 28 - June 7, 2014.
- (7) Haas, K.L.; Schwab, S. Franz, K. J.; Thiele, D.J. *Model Peptides Provide New Insights into the mechanisms of Ctr1-dependent cellular copper transport*. Poster, Cell Biology of Metals Gordon Conference, Mount Snow, VT. July 2013.
- (8) Haas, K.L.; Schwab, S. Franz, K. J.; Thiele, D.J. *Model Peptides Provide New Insights into the role of Histidine in Human Cellular Copper Acquisition via Ctr1*. Poster, 4th Canadian Conference for Bioinorganic Chemistry (CanBIC). Parry Sound, Ontario, Canada; May 2013.
- (9) Haas, K.L.; Franz, K. J.; Thiele, D.J.; *Model Peptides Provide New Insights into the role of Histidine in Human Cellular Copper Acquisition via Ctr1*. Poster, Metals in Biology Gordon Conference and Research Seminar in Bioinorganic Chemistry, Ventura, CA; January 2013.
- (10) Haas, K.L.; Putterman, A. B.; White, D. R.; Thiele, D. J.; Franz, K. J. *Model Peptides Provide New Insights into the role of Histidine in Human Cellular Copper Acquisition via Ctr1*. Poster Award, The Second Bioinorganic Training Workshop at Penn State. 2012.
- (11) Haas, K.L.; Hall, J.; Freedman, J. *MTL-1, MTL-2, and CDR-1 are not essential in C. elegans resistance to cadmium*. Poster, 18th International C. elegans Meeting, UCLA, Los Angeles, CA, June 2011.

Student Posters and Presentations at Professional Conferences (undergraduate researcher, presenter)

- (1) Sendzik, M.; Stefaniak, E.; M.J. Pushie; Haas, K.L. *New Insights into Copper(I) Binding Properties of Human Serum Albumin*. The American Chemical Society National Meeting, Many Colors of Copper Symposium Poster Session, Washington, D.C., August 2017.
- (2) Slogar, E.; Matthews, M.; Nelson, D.; M.J. Pushie; Schultz, Z.D.; Haas, K.L. *Investigating the Structure of Ctr1 bound to Cu(I) and Cu(II) using X-ray Absorption and SERS*. Undergraduate Poster Session, The American Chemical Society National Meeting, Many Colors of Copper Symposium Poster Session, Washington, D.C., August 2017.
- (3) Schwab, S.; Franz, K.J.; Haas, K.L. *Reduction of Cu(II) bound to Ctr1 model peptides depends on sequence proximity of the Cu(II)-binding ATCUN site to downstream His and Met Ligands*. Gordon Research Seminar in Bioinorganic Chemistry, Ventura, CA; January 2013.

Student Posters and Presentations at Saint Mary's College and Collaborating Institutional Events

- (1) Madison Sendzik. *New Insights into Copper(I) Binding Properties of Human Serum Albumin*. Fall STEM Research Day, Saint Mary's College. September 8, 2017.
- (2) Erica Slogar. *Investigating the Structure of Ctr1 bound to Cu(I) and Cu(II) using X-ray Absorption and SERS*. Fall STEM Research Day, Saint Mary's College. September 8, 2017.
- (3) Emma Bridgman. *Evaluation of Cu(I) Binding Properties of the Antifungal Peptide Histatin-5*, The Saint Mary's Symposium Poster Session, Saint Mary's College. April 2017.

- (4) Emma Bridgman. *Evaluation of Cu(I) Binding Properties of the Antifungal Peptide Histatin-5*, Women Chemist Symposium, Saint Mary's College. February 24 and March 4, 2017.
- (5) Emma Bridgman. *Evaluation of Cu(I) Binding Properties of the Antifungal Peptide Histatin-5*, REU Poster Session, Duke University. July, 2016.
- (6) Christina Kaucic. *The Role of Methionine in Ctr1 During Cu Transport and How the Positioning of Methionine Affects the Reduction of Cu(II)*. Northern Indiana Regional Science Fair, The University of Notre Dame, February 24, 2016.
- (7) Jennie Connell. *Quantitative Analysis of Methylated Versus Unmethylated Nucleosides in Enzymatically-Digested Plant DNA*, Women Chemist Symposium, Saint Mary's College. February 5 and 13, 2016.
- (8) Samantha Moorhead. *Toward Overcoming Platinum Drug Resistance in Ovarian Cancer: Synthesis of a Novel Platinum Chelator-Nuclear Localizing Peptide Chimera*. Women Chemist Symposium, Saint Mary's College. February 6 and 14, 2015.
- (9) Erin Reinhart. *Pb-Binding to CxxC Zn-Finger Domains of DNMT1 as an Explanation for Changes to the Epigenome*. Women Chemist Symposium, Saint Mary's College. February 6 and 14, 2015.
- (10) Stefanie Schwab. *Proximity of Two Important Cu Binding Sites Effect on Extracellular Cu Reduction*. Women Chemist Symposium, Saint Mary's College. March 23, 2013.