

MARIE CUEVAS HEFFERN

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PROFESSIONAL EXPERIENCE

University of California, Davis (July 2017 – Present) **Davis, CA**
Assistant Professor, Department of Chemistry
CAMPOS Faculty Scholar

University of California, Berkeley (January 2015 – June 2017) **Berkeley, CA**
UC President's Postdoctoral Fellow, Department of Chemistry
Advisor: Christopher J. Chang

EDUCATION

Northwestern University (June 2014) **Evanston, IL**
Ph.D. in Chemistry
NSF Graduate Research Fellow
Thesis: "Cobalt(III) Schiff Base Complexes as Inhibitors of Proteins Involved in Disease Progression"
Thesis Advisor: Thomas J. Meade

University of Southern California (May 2009) **Los Angeles, CA**
B.S. in Chemistry; B.A. in Religion; Minor in Ancient Religions and Classical Languages
WiSE Undergraduate Research Fellow
Research Advisor: Prof. Richard L. Brutchey

PUBLICATIONS

<http://tinyurl.com/MCHscholar>

† Denotes equal contribution, * Denotes corresponding authorship by M.C.H.

Maiden Name – Cuevas, M. A.

Journal Publications

36. Uyeda, K. S., O'Sullivan, J. J., Stevenson, M. J., **Heffern, M. C.*** Investigation of Metal Modulation of Oxytocin Structure Receptor-Mediated Signaling. *Submitted*.
35. O'Sullivan, J. J., Lee, V. J., **Heffern, M. C.*** Copper Mediated Oxidation of Imidazopyrazinones Inhibits Marine Luciferase Activity. *Submitted*.
34. **Heffern, M. C.**, Medici, V. Monitoring and treatment of Wilson disease: progress and challenges. *Lancet Gastroenterol. Hepatol.* In press.
33. Lee, V. J., **Heffern, M. C.*** Structure-activity assessment of flavonoids as modulators of copper transport. *Front. Chem.*, **2022**. ASAP. DOI: <https://doi.org/10.3389/fchem.2022.972198>.
32. Janisse, S. E., Sharma, V. A., Caceres, A., Medici, V., **Heffern, M. C.*** Systematic Evaluation of Copper(II)-Loaded Immobilized Metal Affinity Chromatography for Selective Enrichment of Copper-Binding Species in Human Serum and Plasma. *Metallomics*, **2022**. ASAP. DOI: <https://doi.org/10.1093/mtomcs/mfac059>
31. O'Sullivan, J. J., **Heffern, M. C.*** Development of an ATP-independent bioluminescent probe for detection of extracellular hydrogen peroxide. *Org. Biomol. Chem.* **2022**, 20, 6231-6238.
30. Harder, N. H. O., Lee, H. P., Flood, V. J., San Juan, J. A., Gillette, S. K., **Heffern, M. C.*** Fatty Acid Uptake in Liver Hepatocytes Induces Relocalization and Sequestration of Intracellular Copper. *Front. Mol. Biosci.*, **2022**, 9, 863296.

29. Choi, S., San Juan, J. A., **Heffern, M. C.**, Stevenson, M. J.* Quantifying the Binding Interactions between Cu(II) and Peptide Residues in the Presence and Absence of Chromophores. *J. Vis. Exp.* **2022**, 182, e63668.
28. O'Sullivan, J. J., Medici, V., **Heffern, M. C.*** A caged imidazopyrazinone for selective bioluminescence detection of labile extracellular copper(II). *Chem. Sci.*, **2022**, 13, 4352-4363.
27. Hussein, F. A., Janisse, S. E., **Heffern, M. C.**, Kinyua, M., Velazquez, J. M. Adsorption of Perfluorooctanoic Acid from Water by pH-modulated Brønsted Acid and Base Sites in Mesoporous Hafnium Oxide Ceramics. *iScience*. **2022**, 25, 104138.
26. Harder, N. H. O., Hieronimus, B., Stanhope, K. L., Shibata, N. M., Lee, V., Nunez, M. V., Keim, N. L., Bremer, A., Havel, P. J., **Heffern, M. C.***, Medici, V.* Effects of Dietary Glucose and Fructose on Copper, Iron, and Zinc Metabolism Parameters in Humans. *Nutrients* **2020**, 12, 2581.
25. Olugbeminiyi, O. F., **Heffern, M. C.**, Sanders Johnson, S., Townsend, S. D. What Comes Next? Simple Practices to Improve Diversity in Science. *ACS Cent. Sci.* **2020**, 6, 1231-1240. (Editorial)
24. O'Sullivan, J. J., Harder, N. H. O., **Heffern, M. C.*** Detecting liver disease via an endogenous pigment. *Nat. Biomed. Eng.* **2020**, 4, 761–762. (**News & Views**)
23. Stevenson, M. J., Janisse, S. E., Tao, L., Neil, R. L., Pham, Q. D., Britt, R. D., **Heffern, M. C.*** Elucidation of a Copper Binding Site in Proinsulin C-peptide and Its Implications for Metal-Modulated Activity. *Inorg. Chem.*, **2020**, 59, 9339–9349.
22. Stevenson, M. J., Farran, I. C., Uyeda, K. S., San Juan, J. A. **Heffern, M. C.*** Analysis of metal effects on C-peptide structure and internalization. *ChemBioChem*, **2019**, 20, 2447 –2453.
21. Baldari, S., Di Rocco, G., **Heffern, M. C.**, Su, T. A., Chang, C. J., Toietta, G. Effects of Copper Chelation on BRAFV600E Positive Colon Carcinoma Cells. *Cancer*, **2019**, 11, 659.
20. Juttukonda, L. J., Green, E. R., Lonergan, Z. R., **Heffern, M. C.**, Chang, C. J., Skaar, E. P. *Acinetobacter baumannii* OxyR Regulates the Transcriptional Response to Hydrogen Peroxide. *Infect. Immun.*, **2019**, 87, e00413-18.
19. Stevenson, M. J.†, Uyeda, K. S.†, Harder, N. H., **Heffern, M. C.*** Metal-dependent hormone function: the emerging interdisciplinary field of metalloendocrinology. *Metallomics*, **2019**, 11, 85-110. (**Review Article**)
18. Su, T. A., Shihadh, D., Cao, W., Detomasi, T., **Heffern, M. C.**, Jia, S., Stahl, A., Chang, C. J. A Modular Ionophore Platform for Liver-Directed Copper Supplementation in Cells and Animals. *J. Am. Chem. Soc.*, **2018**, 140, 13764-13774.
17. Stevenson, M. J., **Heffern, M. C.*** Sounding out dysfunctional oxygen metabolism: a small-molecule probe for photoacoustic imaging of hypoxia. *Biochemistry*, **2018**, 57, 893-894. (**Commentary**)
16. **Heffern, M. C.*** Diversifying the Glowing Bioluminescent Toolbox. *ACS Cent. Sci.*, **2017**, 3, 1234-1236. (**First Reactions**)
15. Aron, A. T.,† **Heffern, M. C.**,† Lonergan, Z. R.,† Vander Wal, M. N., Baker, B. R.,† Spangler, B., Zhang, Y., Park, H., Stahl, A., Renslo, A. R., Skaar, E. P., Chang, C. J. In vivo bioluminescence imaging of labile iron accumulation in a murine model of *Acinetobacter baumannii* infection. *Proc. Natl. Acad. Sci.*, **2017**, 114, 12669-12674.
14. Heffern, M.C.,† Park, H.,† Au-Yeung, H.,† Van de Bittner, G. C., Ackerman C. M.; Stahl, A., Chang, C. J. In vivo bioluminescence reveals copper deficiency in a murine model of non-alcoholic fatty liver disease. *Proc. Natl. Acad. Sci.*, **2016**, 113, 14219-14224.
13. Heffern, M.C.,† Reichova, V.,† Coomes, J. L., Harney, A. S., Bajema, E.; Meade, T. J. Tuning Cobalt(III) Schiff Base Complexes as Activated Protein Inhibitors. *Inorg. Chem.*, **2015**, 18, 9066-74.
12. **Heffern, M. C.**, Velasco, P. T., Matosziuk, L. M., Coomes, J. L., Karras, C., Eckermann, A. L., Klein, W. B., Meade, T. J. Modulation of Amyloid- β Oligomerization by Co(III) Schiff Base Complexes. *ChemBioChem*, **2014**, 15, 1584-1589.
11. **Heffern, M. C.**,† Matosziuk, L. M.,† Meade, T. J. Lanthanide Probes for Bioresponsive Imaging. *Chem. Rev.*, **2014**, 114, 4496-4539.
10. **Heffern, M. C.**; Kurutz, J.; Meade, T. J. Spectroscopic Elucidation of the Inhibitory Mechanism of Cys₂His₂ Zinc Finger Transcription Factors by Cobalt(III) Schiff Base Complexes. *Chem. Eur. J.*, **2013**, 19, 17043-17053.

9. **Heffern, M. C.**; Yamamoto, N.; Holbrook, R. J.; Eckermann, A. E.; Meade, T. J. Cobalt Complexes as Promising Therapeutic Agents. *Curr. Opin. Chem Biol.* **2013**, 17, 189-196.
8. Matosziuk, L.M.; Leibowitz, J. H.; **Heffern, M. C.**; Macrenaris, K. W.; Ratner, M. A.; Meade, T. J. Structural Optimization of Zn(II) Activated MR Imaging Probes. *Inorg. Chem.*, **2013**, 52, 12250-12261.
7. Manus, L. M.; Holbrook, R. J.; Atesin, T. A.; **Heffern, M. C.**; Harney, A. S.; Eckermann, A. E.; Meade, T. J. Axial Ligand exchange of N-heterocyclic Cobalt(III) Schiff Base Complexes: Molecular Structure and NMR Solution Dynamics. *Inorg. Chem.*, **2013**, 52, 1069-1076.
6. Matosziuk, L. M.; Holbrook, R. J.; Manus, L. M.; Heffern, M. C.; Ratner, M. A.; Meade, T. J. Rational Design of [Co(acacen)L₂]⁺ Inhibitors of Biological Activity. *Dalton Trans.*, **2013**, 42, 4002-4012.
5. Velasco, P. T.; **Heffern, M. C.**; Sebollela, A.; Popova, I. A.; Lacor, P. N.; Lee, K. B.; Zun, X.; Tiano, B. N.; Viola, K. L.; Eckermann, A. L.; Meade, T. J.; Klein, W. L. Synapse-Binding Subpopulations of A β Oligomers Sensitive to Peptide Assembly Blockers and scFv Antibodies. *ACS Chem. Neurosci.*, **2012**, 3, 972-981.
4. Hurtado, R.; Harney, A. S.; **Heffern, M. C.**; Holbrook, R. J.; Holmgren, R.; Meade, T. J. Specific inhibition of the transcription factor Ci by a Cobalt(III)-Schiff base-DNA conjugate. *Mol. Pharm.*, **2012**, 9, 325-333.
3. Beier, C. W.; Cuevas, M. A.; Brutchey, R. L. Low-Temperature Synthesis of Solid-Solution Ba_xSr_{1-x}TiO₃ Nanocrystals. *J. Mater. Chem.*, **2010**, 20, 5074-5079.
2. Beier, C. W.; Cuevas, M. A.**; Brutchey, R. L. Effect of Surface Modification on the Dielectric Properties of BaTiO₃ Nanocrystals. *Langmuir*, **2010**, 26, 5067-5071.
1. Beier, C. W.; Cuevas, M. A.**; Brutchey, R. L. Room-Temperature Synthetic Pathways to Barium Titanate Nanocrystals. *Small*, **2008**, 4, 2102-2106.

Patents:

Chang, C. J.; Su, T. A.; **Heffern, M. C.** Targeted Ionophore-Based Metal Delivery. U.S. Patent WO US-2020-0113937, April 16, 2020.

SEMINARS AND PRESENTATIONS (SINCE JULY 2017)

Invited Seminars and Conference Talks

- 8th International Symposium on Metallomics. Hybrid/Kanazawa, Japan. 2022 July 14. *Invited Talk.*
- California State University, Sacramento. Virtual. 2022 April 22. *Invited Seminar.*
- Scripps Research Institutes Joint Seminar. Virtual. 2022 March 28. *Invited Seminar.*
- American Chemical Society National Meeting. San Diego, CA. 2022 Mar 22. *Invited Talk.*
- SBIC Electronic Biological Inorganic Meeting. Virtual. 2021 July 21. *Invited Talk.*
- Stanford University. Virtual 2021 June 3. *Invited Talk for Annual ChemAIMS Seminar.*
- ISMRM 2021 Study Group. Virtual. 2021 June 2. *Invited Talk.*
- University of Wisconsin, Milwaukee. Virtual. 2021 April 23. *Invited Seminar.*
- Symposium in Honor of Katherine Franz. National ACS Meeting. Virtual. 2021 April 15. *Invited Talk*
- *ChemBioChem* Virtual Symposium: Metals in Biology. Virtual. 2020 Jul 8. *Invited Seminar.*
- Gordon Research Conference: Metals in Biology. Ventura, CA. 2020 Jan 23. *Invited Talk for Keynote Session* (joint session with Gordon Research Seminar: Bioinorganic Chemistry).
- Colorado School of Mines. Golden, CO. 2019 Oct 4. *Invited Seminar.*
- Willamette University. Salem, OR. 2019 Sep 2. *Invited Seminar.*
- Reed College. Portland, OR. 2019 Sep 26. *Invited Seminar.*
- American Chemical Society National Meeting. San Diego, CA. 2019 Aug 25. *Contributed Talk.*
- International Conference on Biological Inorganic Chemistry. Interlaken, Switzerland. 2019 Aug 15. *Contributed Talk.*
- Canadian Chemistry Conference & Exhibition, Quebec, Canada. 2019 June 4. *Invited Talk.*
- California State University, Chico. Chico, CA. 2018 Sep 14. *Invited Seminar.*
- C&EN Talented 12 Symposium, National ACS Meeting. Washington, D.C. 2017 Aug 20-24. *Invited Seminar by Chemical & Engineering News and the American Chemical Society.*

Conference Poster Presentations

- Gordon Research Conference: Metals in Biology. Ventura, CA. 2019 Jan 27-Feb 1.
- European Biological Inorganic Chemistry Conference 14. Birmingham, UK. 2018 Aug 26-30.
- Gordon Research Conference: Metals in Medicine. Andover, NH. 2018 June 24-29.
- Gordon Research Conference: Inorganic Chemistry. Biddeford, ME. 2018 June 17-22.
- Gordon Research Conference: Metals in Biology. Ventura, CA. 2018 Jan 21-26.

Selected Internal/Departmental/UC Presentations

- UC Davis CAMPOS Colloquium. Davis, CA. 2021 April 1. *Invited Speaker.*
- UC Davis Liver Research Day Symposium. Davis, CA. 2019 Oct 9. *Invited Speaker.*
- UC Davis Department of Biomedical Engineering - Seminar Speaker. Davis, CA. 2019 January 17. *Invited Speaker.*
- UC President's Postdoctoral Fellowship Program Northern California Luncheon. Berkeley, CA. 2019 Aug 29. *Keynote Speaker.*
- Career Conference in Chemistry. 2019 March 9. Davis, CA. *Keynote Speaker.*
- Cancer Therapeutics Program Quarterly Meeting (UC Davis). Sacramento, CA. 2018 Aug 24.
- UC President's Postdoctoral Fellowship Program Spring Academic Retreat. Lake Arrowhead, CA. 2016 Apr 15-17.

SELECTED HONORS, AWARDS, AND AFFILIATIONS

Current Funding

- National Science Foundation CAREER Award (2021 – 2026)
- National Institutes of Health NIGMS R35 MIRA Award (2019 – 2024)

Past Support

- Hartwell Foundation Individual Biomedical Research Award (2019 – 2022)
- Support from CAMPOS Faculty Scholar Award (2017 – 2022)
- Campus Research Core Research Facilities Pilot and Feasibility Program Grant (UC Davis, 2018)
- Cancer Therapeutics Program Pilot Funding (NIH funding to Comprehensive Cancer Center at UC Davis, 2018 - 2019)
- University of California President's Postdoctoral Fellowship (2015-2017): *Awarded to 3-5% of all applicants across the ten University of California campuses*
- National Science Foundation Graduate Research Fellowship (2011-2014)
- National Institutes of Health Ruth Kirschstein Pre-doctoral National Research Service Award (Awarded 2011; Declined)
- Women in Science and Engineering Undergraduate Research Award (2008)
- Undergraduate Associates Research Fellowship (2008)

Selected Honors and Recognitions

- Paul Saltman Young Investigator Award (Presented at 2022 Conference, Selected 2021)
- Graduate Program Advising and Mentoring Award from UC Davis Graduate Studies (2020)
- Highlight in Emerging Investigators Issue of *Org. Biomol. Chem.* (2022)
- Highlight in ChemBioTalents Issue of *ChemBioChem* (2020)
- Highlight in Emerging Investigators Issue of *Metallomics* (2019)
- Highlight in *Communications Biology*: Early Career Spotlight (2018)
- CAMPOS Faculty Scholar (2017): *Selected among incoming STEM faculty at UC Davis*
- Chemical & Engineering News' Talented 12 (2017)

Current Affiliations

- American Chemical Society, Division of Inorganic Chemistry
- Society of Biological Inorganic Chemistry
- UC Davis Comprehensive Cancer Center; Dual Membership: Cancer Therapeutics and Molecular Oncology
- Sigma Xi Honor Society

TEACHING AND MENTORING EXPERIENCE AT UC DAVIS

Bioinorganic Chemistry CHE 228A (Winter 2017, Spring 2019)

Inorganic Chemistry: Fundamentals CHE 124A (Fall 2017, Fall 2018, Winter 2020, Spring 2020, Fall 2020)

First-Year Seminar CURE: Metal Micronutrients in Metabolic Diseases: a Course in Data-Driven Biomarker Discovery (Instructor-designed course) FRS 003 (Winter 2019, Fall 2019, Winter 2021)

First-Year Seminar: Science in Cinema (Instructor-designed course) FRS 003 (Fall 2020)

Research Mentor currently mentoring 9 graduate students and 2 undergraduate students; served as mentor for UC LEADS program Mentorship and Development Program at UC Davis (past: 1 postdoctoral scholar, 1 junior research specialist, 15 undergraduate students, 1 high-school student)

External Training New Faculty Workshop by the American Chemical Society; NSF Grant Workshop by the National Science Foundation

SELECTED LEADERSHIP EXPERIENCE AND PROFESSIONAL SERVICE

Editorial Advisory Board for *ACS Central Science* (Jan 2019 – Present)

Journal Reviewer (Past 3 years) for *Metallomics* (2022), *Chemical Science* (2022), *ACS ACS Measurement Science* (2022), *Redox Biology* (2022), *Nutrients* (2021), *ACS Sensors* (2021), *BioEssays* (2021), *ACS Central Science* (2017, 2018, 2019, 2020), *Journal of American Chemical Society* (2018, 2019, 2020), *Chemical Society Reviews* (2020), *Scientific Reports* (2017, 2020), *Nature Biomedical Engineering* (2019, 2020), *Journal of Biological Inorganic Chemistry* (2018, 2019), *ChemBioChem* (2019), *Accounts of Chemical Research* (2019), *Journal of Nutritional Biochemistry* (2019)

Session Chair for Power Hour at the Metals in Biology Gordon Research Conference (Ventura, CA, 2020); Bioinorganic Chemistry Gordon Research Seminar (Ventura, CA, 2020); ACS National Meeting (San Diego, CA, 2019); Inorganic Chemistry Gordon Research Seminar (Biddeford, ME, 2018); Southern California Bioinorganic Symposium (Irvine, CA, 2018)

Invited Panelist for Northwestern Alumni Panel; UC President's Postdoctoral Fellowship Academic Retreat: "Perspectives on the Job Search"; special webinar "Who Will Win the ChemNobel? Predicting the 2017 Nobel Laureate(s) in Chemistry" by Chemical & Engineering News; "Pair of Faculty Voices" for the UC Davis CAMPS/MURPPS Program

Advisory Committee Member for UC Davis Graduate Student Mentoring Initiative

Planning Committee Member for ADEPT (2020 – Present): program to foster graduate research experiences with Sacramento State University students in collaboration with UC Davis Graduate Students

Advisory Committee Member for UC Davis CAMP/MURPPS (2020 – 2021)

Educational Outreach Committee, Department of Chemistry (2017 – 2019): organize department-run activities for science engagement including chemistry demonstrations, panels, and shows

Panelist and Moderator for the Northern California Diversity Forum in Graduate Education (2016, 2018, 2019): annual series of workshops to encourage students from underrepresented groups to consider graduate education

Panelist for Grad School Scoop (2018): event to encourage underrepresented groups to enter graduate school