

# MARIE CUEVAS HEFFERN

University of California President's Postdoctoral Fellow

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## EDUCATION

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### Ph.D. Northwestern University (June 2014)

Inorganic Chemistry, Subfield: Life Processes (June 2014)

Thesis: "Cobalt(III) Schiff Base Complexes as Inhibitors of Proteins Involved in Disease Progression"

### B.S./B.A., University of Southern California (May 2009)

Dual Degree: Chemistry, B.S; Religion, B.A.;

Ancient Religions and Classical Languages, Minor

## RESEARCH EXPERIENCE

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### University of California, Berkeley (January 2015 – Present)

#### *UC President's Postdoctoral Fellow (July 2015 – Present)*

Advisor: Prof. Christopher J. Chang, Department of Chemistry

Objective: Develop molecular imaging probes for investigating redox-active metals in disease pathology

### Northwestern University (December 2009 – November 2014)

#### *NSF Graduate Research Fellow (June 2011 – June 2014)*

Advisor: Prof. Thomas J. Meade, Department of Chemistry

Objective: Develop cobalt(III) Schiff base complexes as inhibitors of metal-protein interactions relevant to development, cancer, and neurodegeneration

### University of Southern California (January 2008 – May 2009)

#### *WiSE Undergraduate Research Fellow (January 2008 – December 2008)*

Advisor: Prof. Richard L. Brutchey, Department of Chemistry

Objective: Develop facile low-temperature synthetic routes to perovskite nanocrystals

## PEER-REVIEWED PUBLICATIONS

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<http://tinyurl.com/MCHscholar>

\* Maiden Name – Cuevas, Marie A.

**Heffern, M.C.**,<sup>†</sup> Park, H.,<sup>†</sup> Au-Yeung, H.,<sup>†</sup> 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. (<sup>†</sup> Denotes equal contribution). **Featured in C&E News.**

**Heffern, M.C.**,<sup>†</sup> Reichova, V.,<sup>†</sup> 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. (<sup>†</sup> Denotes equal contribution)

**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- $\beta$  Oligomerization by Co(III) Schiff Base Complexes. *ChemBioChem*, 2014, 15, 1584-1589.

**Heffern, M. C.**,<sup>†</sup> Matosziuk, L. M.,<sup>†</sup> Meade, T. J. Lanthanide Probes for Bioresponsive Imaging. *Chem. Rev.*, 2014, 114, 4496-4539. (<sup>†</sup> Denotes equal contribution). **>200 Citations to date.**

**Heffern, M. C.**; Kurutz, J.; Meade, T. J. Spectroscopic Elucidation of the Inhibitory Mechanism of Cys<sub>2</sub>His<sub>2</sub> Zinc Finger Transcription Factors by Cobalt(III) Schiff Base Complexes. *Chem. Eur. J.*, 2013, 19, 17043-17053. **Featured Key Article by Global Medical Discovery (June 2014).**

**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.

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.

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.

Matosziuk, L. M.; Holbrook, R. J.; Manus, L. M.; **Heffern, M. C.**; Ratner, M. A.; Meade, T. J. Rational Design of [Co(acacen)L<sub>2</sub>]<sup>+</sup> Inhibitors of Biological Activity. *Dalton Trans.*, 2013, 42, 4002-12.

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 $\beta$  Oligomers Sensitive to Peptide Assembly Blockers and scFv Antibodies. *ACS Chem. Neurosci.*, 2012, 3, 972-981.

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.

Beier, C. W.; **Cuevas, M. A.\***; Brutchey, R. L. Low-Temperature Synthesis of Solid-Solution BaSr<sub>1-x</sub>TiO<sub>3</sub> Nanocrystals. *J. Mater. Chem.*, 2010, 20, 5074-5079.

Beier, C. W.; **Cuevas, M. A.\***; Brutchey, R. L. Effect of Surface Modification on the Dielectric Properties of BaTiO<sub>3</sub> Nanocrystals. *Langmuir*, 2010, 26, 5067-5071.

Beier, C. W.; **Cuevas, M. A.\***; Brutchey, R. L. Room-Temperature Synthetic Pathways to Barium Titanate Nanocrystals. *Small*, 2008, 4, 2102-2106. **Most Accessed List for November and December 2008.**

## PRESENTATIONS

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### Conference Talks

- Gordon Research Conference: Metals Medicine. Andover, NH. 2016 June 26-July 1. *Selected among poster presenters for talk.*
- Gordon Research Seminar: Bioinorganic Chemistry. Ventura, CA. 2014 Jan 31-Feb 2.
- Great Lakes Regional ACS Meeting: Bioinorganic Chemistry Symposium. La Crosse, WI. 2013 June 5-8.
- Gordon Research Conference: Metals in Medicine. Andover, NH. 2012 June 24-29. *Selected among poster presenters for talk; Awarded for outstanding oral presentation.*
- Zing Conference: Coordination Chemistry. Xcaret, Mexico. 2012 Dec 9-13. Talk.
- ACS Southern California Undergraduate Research Conference. Los Angeles, CA. 2009 Apr 25. Talk.

### Conference Poster Presentations

- Gordon Research Conference: Metals in Biology. Ventura, CA. 2017 Jan 22 – 27.
- Gordon Research Conference: Metals Medicine. Andover, NH. 2016 June 26-July 1.
- Gordon Research Conference: Metals in Biology. Ventura, CA. 2014 Jan 25 – 31.
- Imaging in 2020. Jackson, WY. 2012 Sept 30-Oct 4.
- Gordon Research Conference: Metals in Medicine. Andover, NH. 2012 June 24-29. *Awarded for outstanding poster.*
- Midwest/Great Lakes Joint Regional ACS Meeting. St. Louis, MO. 2011 Oct 19-22. *Selected for Sci-Mix Poster Session.*

## Internal/Departmental Presentations

- UC President's Postdoctoral Fellowship Program Spring Academic Retreat. Lake Arrowhead, CA. 2016 April 15-17. Talk.
- Biochemistry, Biophysics, and Structural Biology Conference and Retreat UC Berkeley Divisional Retreat, Department of Molecular and Cell Biology. Pacific Grove, CA. 2016 Jan 10-12. Talk.
- Basolo-Ibers-Pearson Lecture at Northwestern University. Evanston, IL. 2011 Oct 8. Oral.
- Introduction to Graduate Education at Northwestern Days. Evanston, IL. 2013 April 11. Poster. *Outreach program to introduce faculty and selected students from minority-serving institutions to graduate research primarily in the STEM fields.*
- Basolo-Ibers-Pearson Lecture at Northwestern University. Evanston, IL. 2014 Mar 10. Talk. *Selected speaker for Prospective Student Visit Weekend.*
- Biophysics Divisional Seminar at Northwestern University. Evanston, IL. 2012 Jan 18. Talk.
- Basolo-Ibers-Pearson Lecture at Northwestern University. Evanston, IL. 2011 Oct 8. Talk.
- University of Southern California Undergraduate Research Symposium. Los Angeles, CA. 2009 Apr 15. Poster.
- John Stauffer Symposium USC Department of Chemistry. Los Angeles, CA. 2009 Apr 7. Poster.
- University of Southern California Undergraduate Research Symposium. Los Angeles, CA. 2009 Apr 9. Poster.

## SELECTED HONORS AND AWARDS

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### Fellowships

- University of California President's Postdoctoral Fellowship (2015-Present): *Awarded to 3-5% of all applicants across the ten University of California campuses*
- National Science Foundation Graduate Research Fellowship (2011-2014)
- National Institute 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

- Commendation for Excellence in Graduate Research (2015)
- Gelewitz Award: *Awarded to two senior graduate students for excellence in research and service* (2013)
- Presidential Fellowship Nominee for the Department of Chemistry (2013)
- USC Chemistry and Biochemistry Outstanding Undergraduate Research Award (2009)
- Undergraduate Research Symposium Prize Winner (2009): *1st Place Physical Sciences and Most Innovative*
- Discovery Scholar and Prize Finalist: *Awarded to 25 graduating seniors for excellence in innovation and research* (USC, 2009)
- Renaissance Scholar and Prize Winner: *Awarded to top 10 graduating seniors recognized for excellence in widely separate fields* (USC, 2009)

## TEACHING EXPERIENCE

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### Teaching Assistant

General Chemistry (June – August 2010)

Organic Chemistry September 2009 – June 2010)

### **Guest Lecturer**

Summer Fuel Program for Advanced High School Students, UC Berkeley (July 2016)  
Biochemistry, Northwestern University (February 2014)

### **Research Mentor:**

Meade Lab: 4 graduate, 3 undergraduate, 3 high school students (2009-2014)  
Chang Lab: 1 undergraduate student (2016)

### **Fellowship and Grant Workshop Leader**

NIH/NSF Fellowships, Meade Lab (2012-2014)  
NSF Graduate Research Fellowship, Department of Chemistry (2012)

## **SELECTED LEADERSHIP EXPERIENCE**

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**Alumni Advisory Board Member** Northwestern University, Department of Chemistry (2015 – Present)

**Women in Science and Engineering, Founding Board Member** Northwestern University and Evanston Township High School (2013-2014)

**Niles West STEM Mentorship Program, Board Member** Northwestern University (2013 – 2014)

**Phi Lambda Upsilon Chemistry Honor Society President** Northwestern University (2012-2013)

**Phi Lambda Upsilon Chemistry Honor Society Service Chair** Northwestern University (2011-2012)

**Chemistry Recruitment Video Planning Committee Member** Department of Chemistry (2012)

**First-Year Student Orientation Planning Committee Member** Department of Chemistry (2012): *Lead Organizer of the "Graduate Student Handbook: Answers to FAQs and Tips"*

## **SELECTED OUTREACH ACTIVITIES**

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**Panelist for the Northern California Diversity Forum in Graduate Education (2016)**

### **Niles West High School (2011-2014):**

- Research Mentor from 2011 – 2013; Student Mentee in 2011-2012 achieved gold medals in both the regional and state science fairs
- Board member from 2013 – 2014 to expand mentorship opportunities for Northwestern University graduate students beyond Niles West High School

### **Women in Science and Engineering with Evanston Township High School (2011-2014):**

- Founding board member:: coordinated and developed the program aimed at empowering young women in Evanston Township High School to continue pursuing advanced education in science and engineering

### **Kits & Cats Day at Northwestern University for Evanston Township High School (2013)**

- Volunteer for "Day in the Life" targeted at students in the academic low-middle range; intended to attract students who may be on the fence about college for economic or cultural reasons.

### **Outreach Activities with Phi Lambda Upsilon Graduate Chemistry Honor Society: President (2012-2013):**

- Established partnership with Mather High School Mentorship Program

- Initiated service grants for which members can apply to receive funding for service initiatives
- Co-hosted the regional *National You Be the Chemist Challenge* for middle school students

**PLU Service Chair (2011-2012)**

- Achievements in the *Science in the Classroom* Program
  - Assembled the *first* Spanish-speaking team to work with the ESL 3<sup>rd</sup> grade class
  - Coordinated a field trip to Northwestern University for a science show
  - Initiated partnership with MRSEC to receive funding through NSF

**Science in the Classroom (2010-2014),**

- Demonstration Leader (2012, 2014), Team Leader (2011-2012), Team Member (3<sup>rd</sup> grade 2010-2011, Bilingual 3<sup>rd</sup> grade class 2012-2014)

**Panelist for Career Day at Chicago Hope Academy (2012)**

**“Seeing is Believing” Demonstrator (2012)**

- Program in Northwestern’s Center for Molecular Imaging for high school students to educate them on the role of chemistry in diagnosis and on imaging techniques such as MRI

**Untamed Chemistry Project (2011-2012)**

- Team of scientists aiming to produce short educational videos to make chemistry accessible to high school