Katherine M. Van Heuvelen

Department of Chemistry, Harvey Mudd College
301 Platt Blvd, Claremont, CA 91711
Phone (Office): (909) 607-9019
vanheuvelen@g.hmc.edu

ACADEMIC POSITIONS

Associate Dean of Faculty	2021 – Present
Associate Dean for Faculty Development & Diversity	2020 – 2021
Associate Professor of Chemistry, Harvey Mudd College	2018 – Present
Assistant Professor of Chemistry, Harvey Mudd College	2012 – 2018

EDUCATION

University of Minnesota 2009 – 2012
NIH NRSA Postdoctoral Fellow
Laboratory of Professor Lawrence Que, Jr.

Ph.D. in Inorganic Chemistry, University of Wisconsin-Madison 2004 – 2009
NSF Graduate Research Fellow
Research Advisor: Professor Thomas C. Brunold

B.A. in Chemistry and Religion (summa cum laude), St. Olaf College 2000 – 2004
Research Advisors: Professors Gary L. Miessler (Chemistry) & Ed Santurri (Religion)

RESEARCH AREAS

Experimental Expertise: Air-free synthesis (standard Schlenk techniques), GC-MS, HPLC, MS

Spectroscopic Expertise: UV-visible Absorption, Infrared, Nuclear Magnetic Resonance, Magnetic Circular Dichroism, Electron Paramagnetic Resonance, X-ray Absorption, X-ray Emission

Computational Expertise: Density Functional Theory (DFT), Time-Dependent DFT, QM/MM, XSEDE Supercomputing System

PUBLICATIONS (Undergraduate co-authors are underlined)

23. Emergency Remote Instruction during the COVID-19 Pandemic Reshapes Collaborative Learning in General Chemistry.
Van Heuvelen, K.M.*, Daub, G.W.; Van Ryswyk, H.
Journal of Chemical Education, **2020**, *97* (9), 2884 – 2888.
http://dx.doi.org/10.1021/acs.jchemed.0c00691

22. How do I design a reaction to do useful work? Reinvigorating general chemistry by connecting chemistry and society.
Van Heuvelen, K.M.*; Daub, G.W.; Johnson, A.R.; Hawkins, L.N.; Van Ryswyk, H.; Vosburg, D.A.
Journal of Chemical Education, **2020**, *97*, 925-933. http://dx.doi.org/10.1021/acs.jchemed.9b00281

21. Emphasizing Learning: The Impact of Student Surveys in the Reform of an Introductory Chemistry Course
Van Heuvelen, K.M.*; Palucki Blake, L; Daub, G.W.; Johnson, A.R.; Hawkins, L.N.; Van Ryswyk, H.; Vosburg, D.A.
Journal of Assessment and Institutional Effectiveness, **2019**, *9*, 1-28.
https://www.jstor.org/stable/10.5325/jasseinsteffe.9.1-2.0001

20. Crystal Structure and Spectroscopic Characterization of a Cobalt(II) Tetraazamacrocycle: Completing a Series of First-Row Transition Metal Complexes
Van Heuvelen, K.M.*; Lee, I.; Arriola, K.; Griffin, R.; Ye, C.; Takase, M.
Acta Crystallographica Section C, **2017**, *C73*, 620-624 http://dx.doi.org/10.1107/S2053229617010397

19. Mononuclear Nickel(II) and Copper(II) Coordination Complexes Supported by Bispicen Ligand Derivatives: Experimental and Computational Studies
Singh, N.; Niklas, J.; Poluektov, O.; **Van Heuvelen, K.M.***; Mukherjee, A.*
Inorganica Chimica Acta, **2017**, *455*, 221 – 230 http://dx.doi.org/10.1016/j.ica.2016.09.001

18. Cobalt Kβ Valence-to-Core X-ray Emission Spectroscopy: A Study of Low-Spin Octahedral Cobalt(III) Complexes
Schwalenstocker, K.; Paudel, J.; Kohn, A.W.; Dong, C.; **Van Heuvelen, K.M.***; Farquhar, E.R.*; Li, F.*
Dalton Transactions, **2016**, *45*, 14191-14202. http://dx.doi.org/10.1039/C6DT02413K

17. Characterization of a Heterobimetallic Nonheme Fe(III)-O-Cr(III) Species Formed by O_2 Activation
Zhou, A.; Kleespies, S.T.; **Van Heuvelen, K.M.**; Que, L.
Chemical Communications, **2015**, *51*, 14326 – 14329. http://dx.doi.org/10.1039/C5CC05931C

16. Spectroscopic Identification of an Fe^{III} Center, not Fe^{IV}, in the Crystalline Sc-O-Fe Adduct Derived from $[Fe^{IV}(O)(TMC)]^{2+}$
Prakash, J.; Rohde, G.T.; Meier, K.K.; Jasniewski, A.J.; **Van Heuvelen, K.M.**; Münck, E.; Que, L.
J. Am. Chem. Soc. **2015**, *137*, 3478 – 3481. http://dx.doi.org/10.1021/jacs.5b00535

15. An Ultra-Stable Oxoiron(IV) complex and its Blue Conjugate Base
England, J.; Bigelow, J.O.; **Van Heuvelen, K.M.**; Farquhar, E.R.; Martinho, M.; Meier, K.K.; Frisch, J.R.; Münck, E.; Que, L.
Chem. Sci. **2014**, *5*, 1204 – 1215. http://dx.doi.org/10.1039/C3SC52755G

14. Sc^{3+} can trigger the formation of an oxoiron(IV) complex from O_2 and its nonheme iron(II) precursor via a Sc^{3+}-peroxo-Fe^{3+} intermediate
Li, F.; **Van Heuvelen, K.M.**; Meier, K.M.; England, J.; Münck, E.; Que, L.
J. Am. Chem. Soc. **2013**, *135*, 10198 – 10201. http://dx.doi.org/10.1021/ja402645y

13. Isolation and Characterization of a Thiolato-Iron(III)-Peroxy Anion Complex
McDonald, A.R.; **Van Heuvelen, K.M.**; Guo, Y.; Münck, E.; Que, L.
Angew. Chem. Int. Ed. **2012**, *51*, 9132 – 9136. http://dx.doi.org/10.1002/anie.201203602

12. One-Electron Oxidation of an Oxoiron(IV) Complex to Form an $[O=Fe^{V}=NR]^{+}$ Center
Van Heuvelen, K.M.; Fieder, A.T.; Shan, X.; DeHont, R.; Meier, K.K.; Münck, E.; Que, L. *Proc. Nat. Acad. Sci.* **2012***, 109*, 11933 – 11938. http://dx.doi.org/10.1073/pnas.1206457109

11. A More Reactive Trigonal-Bipyramidal High-Spin Oxoiron(IV) Complex with a cis-Labile Site
England, J.; Guo, Y.; **Van Heuvelen, K.M.**; Cranswick, M.A.; Rohde, G.T.; Bominaar, E.L. Münck, E.; Que, L.
J. Am. Chem. Soc. **2011**, *133*, 11880 – 11883. http://dx.doi.org/10.1021/ja2040909

10. Characterization of a High-Spin Non-Heme Fe^{III}-OOH Intermediate and Its Quantitative Conversion to an Fe^{IV}=O Complex
Li, F; Meier, K.K.; Cranswick, M.A.; Chakrabrti, M.; **Van Heuvelen, K.M**.; Münck, E.; Que, L.
J. Am. Chem. Soc. **2011**, *133*, 7256 – 7259. http://dx.doi.org/10.1021/ja111742z

9. Spectroscopic and Computational Studies on High-Spin Ni(II) Thiolate Compounds
Van Heuvelen, K. M.; Cho, J.; Dingee, T.; Riordan, C. G.; Brunold, T. C.

Inorg. Chem. **2010**, *49*, 6535 – 6544. http://dx.doi.org/10.1021/ic100362q

8. Spectroscopic and Computational Studies of the μ–η²:η²–Disulfido–Bridged Dinickel(II) Species $[(PhTt^{tBu})_2Ni_2(\mu–\eta^2:\eta^2–S_2)]$
Van Heuvelen, K. M.; Cho, J.; Riordan, C. G.; Brunold, T. C.
Inorg. Chem. **2010**, *49*, 3113 – 3120. http://dx.doi.org/10.1021/ic901731b

7. Spectroscopic and Computational Studies of the Trans-μ-1,2-Disulfido-Bridged Dinickel(II) Species $[Ni_2(tmc)_2(S_2)](OTf)_2$: Comparison of End-on Disulfido and Peroxo Bonding in Ni(II) and Cu(II) Species
Van Heuvelen, K. M.; Kieber-Emmons, M. T.; Riordan, C. G.; Brunold, T. C.
Inorg. Chem. **2010**, *49*, 3104 – 3112. http://dx.doi.org/10.1021/ic901733h

6. Synthesis and Spectroscopic Characterization of a μ-1,2-Disulfidodinickel Complex
Kieber-Emmons, M. T.; **Van Heuvelen, K. M.**; Brunold, T. C.; Riordan, C. G.
J. Am. Chem. Soc., **2009**, *131*, 440 – 441. http://dx.doi.org/10.1021/ja807735a

5. Computational Studies of Bioorganometallic Enzymes and Cofactors
Liptak, M. D.; **Van Heuvelen, K. M.**; Brunold, T. C.
In *Metal Ions in Life Sciences Vol 6: Metal-Carbon Bonds in Enzymes and Cofactors*. Eds. Sigel, A.; Sigel, H.; Sigel, R. K. O. Cambridge: Royal Society of Chemistry, 2009.

4. New Synthetic Routes to a Disulfido Dinickel(II) Complex: Characterization and Reactivity of a $Ni_2(\mu\text{-}\eta^2:\eta^2\text{-}S_2)$ Core
Cho, J**.; Van Heuvelen, K. M.**; Yap, G. P. A.; Brunold, T. C.; Riordan, C. G.
Inorg. Chem. **2008**, *47*, 3931 – 3933. http://dx.doi.org/10.1021/ic800321x

3. Ferromagnetic Semiconducting EuO Nanorods
Bierman, M. J.; **Van Heuvelen, K. M.**; Schmeiβer, D.; Brunold, T. C.; Jin, S.
Adv. Mater. **2007**, *19*, 2677 – 2681. http://dx.doi.org/10.1002/adma.200602612

2. Identification of an "End-On" Nickel-Superoxo Adduct, $Ni(tmc)(O_2)^+$
Kieber-Emmons, M. T.; Annaraj, J.; Seo, M. S.; **Van Heuvelen, K. M.**; Tosha, T.; Kitagawa, T.; Brunold, T. C.; Nam, W.; Riordan, C. G.
J. Am. Chem. Soc. **2006**, *128*, 14230 – 14231. http://dx.doi.org/10.1021/ja0644879

1. Spectroscopic and Computational Studies of Reduction of the Metal versus the Tetrapyrrole Ring of Coenzyme F-430 from Methyl-Coenzyme M Reductase
Dey, M.; Kunz, R. C.; **Van Heuvelen, K. M.**; Craft, J. L.; Horng, Y. C.; Tang, Q.; Bocian, D. F.; George, S. J.; Brunold, T. C.; Ragsdale, S. W.
Biochemistry **2006**, *45*, 11915 – 11933. http://dx.doi.org/10.1021/bi0613269

PRESENTATIONS

Nickel(II) borohydride converts perchloroethylene to trichloroethylene
Van Heuvelen, K.M.
American Chemical Society National Meeting, Virtual, April 2021
DIV: Inorg

Magnetic Circular Dichroism
Invited speaker for the Penn State Bioinorganic Workshop
May 29 – June 5, 2020; cancelled due to COVID-19 pandemic

How do I design a chemical reaction to do useful work, and how does my reaction impact society? A case study in reimaging general chemistry
Van Heuvelen, K.M.

American Chemical Society National Meeting, San Diego, CA, August 2019

Assessing Introductory Courses: Creating Conversations about Learning through Student Surveys
Van Heuvelen, K.M. and Palucki Blake, L
HEDS conference, Spokane, WA, June 2018

Bio-inspired dehalogenation: Developing first-row transition metal complexes to treat priority pollutants perchloroethylene and trichloroethylene
American Chemical Society National Meeting, New Orleans, LA, March 2018
Invited speaker, "Women in Inorganic Chemistry: Synthetic Chemistry Addressing Challenges in Energy and the Environment" symposium

Designing Bio-Inspired Nickel and Cobalt Complexes to Treat Priority Pollutants – Invited Talk
Van Heuvelen, K.M.
University of Wisconsin-Madison, Madison, WI, November 2017

Crafting Your Career – Invited Talk
Van Heuvelen, K.M.
University of Wisconsin-Madison, Madison, WI, November 2017

Designing Bio-Inspired Nickel and Cobalt Complexes to Treat Priority Pollutants – Invited Talk
Van Heuvelen, K.M.
University of La Verne, La Verne, CA, November 2017

Bio-Inspired Dehalogenation: Developing First-Row Transition Metal Complexes to Treat Priority Pollutants – Invited Talk
Van Heuvelen, K.M.
University of La Verne, La Verne, CA April 2017

Development of Bio-Inspired Catalysts for Dechlorination Reactions
Poster presented at the Gordon Research Conference: Metals in Biology
January 2015, Ventura, CA

Investigation of the Electronic Structure of Cobaloximes
Van Heuvelen, K. M.
Poster presented at the Gordon Research Conference: Metals in Biology,
January 26 – 31, 2014, Ventura, CA

One-Electron Oxidation of an Oxoiron(IV) Complex
Van Heuvelen, K. M.; Fiedler, A.T.; Meier, K.K.; DeHont, R.; Shan. X.; Münck, E.; Que, L..
Poster presented at the International Conference of Bioinorganic Chemistry
August 7-12, 2011, Vancouver, British Columbia

One-Electron Oxidation of an Oxoiron(IV) Complex
Van Heuvelen, K. M.; Fiedler, A.T.; Meier, K.K.; DeHont, R.; Shan. X.; Münck, E.; Que, L..
Poster presented at the Gordon Research Conference: Metals in Biology,
January 30 – February 3, 2011, Ventura, CA

Graduate School in Chemistry
Van Heuvelen, K. M.
Invited seminar presented at St. Olaf College
October 14, 2010, Northfield, MN

Insights into the Mechanism of Methyl-Coenzyme M Reductase: Spectroscopic and Computational Studies of Ni-C Bonding in Cofactor F430

Van Heuvelen, K. M.; Dey, M.; Kunz, R.; Ragsdale, S. W.; Brunold, T. C.
Talk presented at the Gordon Research Seminar: Bioinorganic Chemistry,
January 29 – February 1, 2009, Ventura, CA

Spectroscopic and Computational Studies of Ni–Alkyl Bonding in the Active Site of Methyl-Coenzyme M Reductase
Van Heuvelen, K. M.; Dey, M.; Kunz, R.; Ragsdale, S. W.; Brunold, T. C.
Poster presented at the Gordon Research Seminar: Bioinorganic Chemistry,
January 29 – February 1, 2009, Ventura, CA

Spectroscopic and Computational Insights into Ni–S Bonding in Methyl–CoM Reductase and Synthetic $Ni_2(S_2)$ Complexes
Van Heuvelen, K. M.; Dey, M.; Kunz, R.; Kieber-Emmons, M. T.; Cho, J.; Riordan, C. G.; Ragsdale, S. W.; Brunold, T. C.
Poster presented at the Gordon Research Seminar: Bioinorganic Chemistry,
January 31 – February 3, 2008, Ventura, CA

So You Want to Go to Grad School
Van Heuvelen, K. M.
Invited seminar presented at St. Olaf College
September 2008, Northfield, MN

Spectroscopic and Computational Studies of Ni-Containing Enzymes: Application to Acetyl-CoA Synthase/Carbon Monoxide Dehydrogenase and Methyl-Coenzyme M Reductase
Van Heuvelen, K. M.; Dey, M.; Kunz, R.; Kieber-Emmons, M. T.; Riordan, C. G.; Ragsdale, S. W.; Brunold, T. C.
Poster presented at the International Conference of Biological Inorganic Chemistry
July 31 – August 5, 2005, Ann Arbor, MI

Modeling Enzyme Active Sites: Synthesis of Group VI Heterobimetallic Compounds
Van Heuvelen, K. M.; Miessler, G. L.
Talk presented at the St. Olaf Summer Research Symposium
August 2002/2003, Northfield, MN

Green Chemistry: Diels-Alder Reactions in Ionic Solutions
Patterson, M.; Van Heuvelen, K. M.; Spessard, G.
Poster presented at St. Olaf College
May 2003, Northfield, MN

Modeling Enzyme Active Sites: Synthesis of Group VI Heterobimetallic Compounds
Van Heuvelen, K. M.; Miessler, G. L.
Talk presented at the Pew Midstates Science and Mathematics Consortium
Fall 2003, Chicago, IL

AWARDS

Fellow, Claremont Faculty Leadership Program	2018 – 2019
National Institute of Health NRSA Postdoctoral Fellowship	2010 – 2012
Vilas Travel Grant (University of WI-Madison)	2008
McElvain Travel Grant (University of WI-Madison)	2008
National Science Foundation Graduate Research Fellowship	2005 – 2008
McElvain Fellowship (University of WI-Madison)	2004
Distinction in Chemistry (St. Olaf College)	2004
Distinction in Religion (St. Olaf College)	2004
Courtland and Ellen Agre Award in Chemistry (St. Olaf College)	2004
Junia Award in Religion (St. Olaf College)	2004

Dow Chemical Scholarship (St. Olaf College)	2004
Regents Scholar (50% tuition, St. Olaf College)	2000 – 2004
National Merit Scholar	2000

COURSES TAUGHT AT HARVEY MUDD COLLEGE

Core Laboratory 57: The Chemistry of Cooking
Writ 1: Introduction to Academic Writing
Chem 23A and B: Chemistry in the Modern World
Chem 23S: Chemical Structure
Chem 19S: General Chemistry Intensive
Chem 24: Chemistry Laboratory
Chem 40: Introduction to Chemical Research
Chem 104: Advanced Inorganic Chemistry
Chem 110: Advanced Inorganic Laboratory
Chem 150: Chemical Research
Chem 151 and 152: Senior Thesis Research
Chem 190: Bio-Inorganic Chemistry
Chem 197: Special Readings in Chemistry: C-H Bond Activation
Chem 199: Chemistry Seminar
ID 48: Social Justice and Equity: STEM and Beyond

TEACHING EXPERIENCE PRIOR TO HARVEY MUDD COLLEGE

University of Minnesota, Guest Lecturer, Inorganic Chemistry (one week)

University of Wisconsin-Madison; Madison, WI
Teaching Assistant (Upper-level advanced inorganic chemistry, introductory inorganic chemistry, advanced general chemistry)
Undergraduate student research mentor

St. Olaf College; Northfield, MN
Teaching Assistant (Analytical chemistry laboratory, organic chemistry laboratory), General chemistry course tutor
Great Conversation (great books learning community) course tutor

SERVICE (Harvey Mudd College)

Faculty Executive Committee
Core Review Committee, co-chair
Research Committee, chair
Assessment and Accreditation Committee
WSCUC Reaccreditation Steering Committee
Academic Affairs Committee
Chemistry department seminar coordinator

SERVICE (The Claremont Colleges Consortium)

7C DEI Working Group
7C Professional Development Networks Committee
7C Claremont Faculty Leadership Program Committee
7C Mentoring and Collaborative Research Working Group

RESEARCH STUDENTS

1. Alex Kohn ’13. Senior Thesis: A Spectroscopically Validated Computational Study of the Reduction of Haloalkanes by Cobaloximes
2. Bram Carlson ’13. Senior Thesis: Oxidation of Methane by Cofactor F430 Model Compounds
3. Philip Woods ‘17
4. Jessica Iwamoto ‘16
5. Casey Cannon ‘16
6. Jennifer Rogers ‘16
7. E. Page Allen ’14. Senior Thesis: Dechlorination by Cobaloximes
8. Isabell Lee ‘16
9. Naomi Epstein ‘16
10. Justin Lee ‘16
11. Allison Lim ‘16
12. Emma Klein ‘17
13. Danielle Marquis ’15. Senior Thesis: Dechlorination through Model Compounds of Vitamin B12
14. Sooyeol “Suzy” Kim ’16. Senior Thesis: Metallating Ligands in Catalyst Development for Carcinogens in Groundwater
15. Jacob Knego ‘18
16. Monica Mikkelsen
17. Kate Arriola ’16. Senior Thesis: Developing a Biologically Inspired Catalyst for Dechlorination Reactions
18. Rilke Griffin ‘18
19. Christopher Ye ’19. Senior Thesis: Investigating Dechlorination Mechanisms Using Biomimetic Model Compounds
20. Ellie Gund ’17. Senior Thesis: Investigation of Dechlorination using Bio-Inspired Nickel Compounds
21. Theo Hansel ‘19
22. Parnika Sharma ‘19
23. Micaela Homer ‘19
24. Brandon Wada ’20. Senior Thesis: Kinetic Study of [Ni(II)(cyclam)(BH_4)](BH_4) mediated Dehalogenation of Tetrachloroethylene
25. Ellie Kim ‘22
26. Jason Misleh ‘22
27. Thomas Fleming ‘22
28. Toty Calvo Polanco ‘21
29. Jada Thomas ‘22
30. Keo Chui ‘22
31. Mihira Sogal ‘23
32. Jacob Kelber ‘23
33. Stephen Gross ‘22