

ZACHARIAH M. HEIDEN
Assistant Professor of Chemistry

Washington State University
Chemistry Department
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Dr. Heiden's research focuses on *energy and catalysis*. His main goal is to develop new catalytic systems to reduce energy needs and dependence of fossil fuels throughout the world.

EDUCATION

Post-Doctoral Appointment (October 2011 – July 2013)

Pacific Northwest National Laboratory (Richland, WA).

Advisor: R. Morris Bullock

Research Project: Synthesis and Reactivity of Iron-Based Dinitrogen Complexes Containing a Pendant Amine

Post-Doctoral Appointment (October 2008 – September 2011)

University of Toronto (Toronto, ON, Canada).

Advisor: Prof. Douglas W. Stephan

Project Title: Synthesis of Metal-Free Asymmetric Hydrogenation Catalysts

Graduate Studies (2004-2008),

Ph.D. in Chemistry

University of Illinois at Urbana-Champaign (Urbana, IL)

Advisors: Prof. Thomas B. Rauchfuss

Dissertation Title: Small Molecule Activation with Transfer Hydrogenation Catalysts

Undergraduate Studies (1999-2004),

B.S. in chemical engineering with additional major in chemistry

University of Wisconsin-Madison (Madison, WI)

Advisors: Prof. Paul M. Treichel

Research Project: From the Synthesis of Trinuclear Rhenium Clusters to MALDI-MS of Lanthanide β -diketonates

PROFESSIONAL EXPERIENCE

Assistant Professor of Chemistry, Chemistry Department

Washington State University, 08/2013 - present

AWARDS

Ontario Postdoctoral Fellowship, University of Toronto (2008-2010)

Theron Standish Piper Award, University of Illinois (2008)

ACS Division of Inorganic Chemistry Student Travel Award (Spring 2007)

Robert Carr Fellowship, University of Illinois (2007-2008)

John C. Bailar Fellowship, University of Illinois (2006-2007)

Daniel L. Sherk Award for Excellence in Undergraduate Research, University of Wisconsin (2004)

Grieger-Block Award for Creativity in Unit Operations Lab, University of Wisconsin (2003)

PROFESSIONAL SOCIETIES

American Chemical Society (2002-Present)

GRANT ACTIVITY

2013

ACS-PRF – “Ligand Mediated Catalytic Dehydrogenation of Alkanes and Cycloalkanes”

Zachariah M. Heiden (PI)

Amount: \$110,000

Declined

2014

ACS-PRF – “Ligand-Mediated Catalytic Dehydrogenation of Alkanes and Cycloalkanes”

Zachariah M. Heiden (PI)

Amount: \$110,000

Declined

WSU New Faculty Seed Grant – “Photo-degradation of Plastics into Fuels”

Zachariah M. Heiden (PI)

Amount: \$30,000

Declined

NSF – “SusChEM: Photo-Mediated Hydrogen Transfer Using Non-Precious Metals”

Zachariah M. Heiden (PI)

Amount: \$473,712

Declined

2015

WSU New Faculty Seed Grant – “Photo-degradation of Plastics into Fuels”

Zachariah M. Heiden (PI)

Amount: \$25,160

Declined

NASA – “Catalytic Water Generation from Limited Resources”

Zachariah M. Heiden (PI)

Amount: \$562,523

Declined

NSF – “CAREER: SusChEM: Photoredox Promoted Catalytic Transformations Without Precious Metals”

Zachariah M. Heiden (PI)

Amount: \$768,198

Declined

NSF – “SusChEM: Fluorescent Sensors for the Investigation of Main Group-Based Ethylene Activation.”

Zachariah M. Heiden (PI)

Amount: \$474,888

Declined

DOE Early Career – “H₂/Molecular Reservoirs in the Promotion of Catalytic Chemical Transformations”
Zachariah M. Heiden (PI)
August 1, 2016 – July 31, 2021.
Amount: \$750,512
Declined

2016

WSU New Faculty Seed Grant – “Fluorescent Sensors for the Investigation of Main Group-Based Ethylene Activation”
Zachariah M. Heiden (PI)
Amount: \$25,847
Declined

DOE – “Metal Dinitrogen Complexes Containing H-atom and Proton Shuttles for the Catalytic Reduction of Dinitrogen to Ammonia”
Zachariah M. Heiden (PI)
September 1, 2016 – August 31, 2019.
Amount: \$600,000
Declined

ACS Petroleum Research Fund – “Pendant Molecular Reservoirs for Iron Promoted Carbon-Carbon Bond Formation Reactions”
Zachariah M. Heiden (PI)
Amount: \$110,000
Declined

NSF – “CAREER: SusChEM: Tunable Catalytic Reactivity of Earth-Abundant Metal-Based Catalysts”
Zachariah M. Heiden (PI)
Amount: \$775,643
Declined

Cottrell Scholar Award – “Molecular Catalysts for the Production of Water from Hydrogen and Oxygen Sources”
Zachariah M. Heiden (PI)
Amount: \$100,000
Declined

NSF – “SusChEM: Detection and Functionalization of Small Molecules with Fluorescent Redox-Active Frustrated Lewis Pairs”
Zachariah M. Heiden (PI)
Amount: \$458,482
June 1, 2017 – May 31, 2020
Declined

2017

WSU New Faculty Seed Grant – “Using Fluorescent Dyes for the Generation of Switchable Catalysts”
Zachariah M. Heiden (PI)
Amount: \$26,677
May 16, 2016 – August 15, 2018
Funded

NSF – “CAREER: Tunable Reactivity of Catalysts Containing Fluorescent Dye Molecules”
Zachariah M. Heiden (PI)
Amount: \$798,311
May 1, 2018 – April 30, 2023
Pending

NSF – “Utilization of Fluorescent Dye Molecules to Promote Substrate Binding and Functionalization with Main Group Complexes”

Zachariah M. Heiden (PI)

Amount: \$482,916

May 1, 2018 – April 30, 2021

Pending

ACS Petroleum Research Fund – “Light-Promoted Catalytic Aerobic Oxidation of C-H Bonds with Fluorescent Pd Pincer Complexes”

Zachariah M. Heiden (PI)

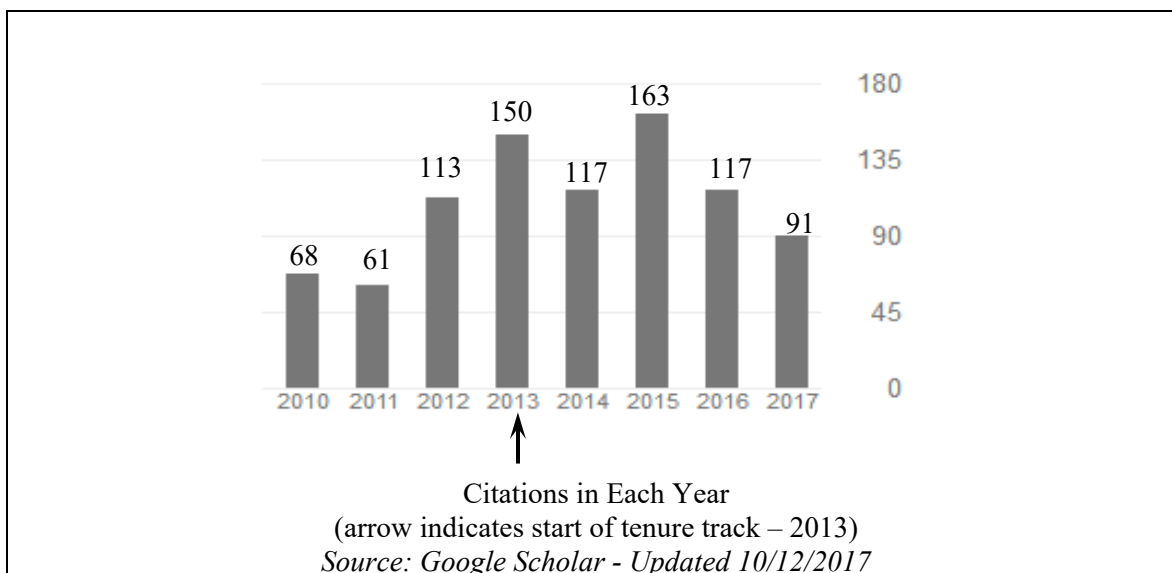
Amount: \$110,000

May 1, 2018 – August 31, 2020

Pending

PUBLICATIONS

<p>Current <i>h</i>-index = 13 Number of citations of papers published while at WSU: 638 Sum of the Times Cited: 979</p>	<p>Source: Google Scholar Updated 10/12/2017</p>
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(Research Associate[@], Graduate Student[#], Undergraduate Student^{\$}, High School Student[%]) **Bolded red numbers indicate an affiliation with WSU.**

PEER-REVIEWED JOURNAL ARTICLES

- 27.** Johnson, N. A.; Wolfe, S. R.; Kabir, H.; Andrade, G. A.; Yap, G. P. A.; **Heiden, Z. M.**; Moberly, J. G.; Roll, M. F.; Waynant, K. V. Deconvoluting the Innocent vs. Non-innocent Behavior of N,N-diethylphenylazothioformamide Ligands with Copper Sources. *Accepted November 10, 2017 in European Journal of Inorganic Chemistry (Journal impact factor 2.942)*. *Z. Heiden performed the computational work and wrote the manuscript in collaboration with Waynant. All computations were undertaken during Z. Heiden's time at WSU.*
- 26.** Treich, N. R.[#]; Wimpenny, J. D.[#]; Kieffer, I. A.[#]; **Heiden, Z. M.** Synthesis and Characterization of Chiral and Achiral Diamines Containing One or Two BODIPY Molecules. *New J. Chem., 2017, doi: 10.1039/C7NJ02670F. (Journal impact factor 3.269).*

Z. Heiden is the corresponding author; he oversaw the work performed by the three graduate students and wrote the final draft of the manuscript.

- 25.** Rinne, B. L. #; Lathem, A. P. #; **Heiden, Z. M.** Influence of Intramolecular vs. Intermolecular Phosphonium-Borohydrides in Catalytic Hydrogen, Hydride, and Proton Transfer Reactions. *Dalton Trans.*, **2017**, 46, 9382 - 9393. (Journal impact factor 4.029)
Z. Heiden is the corresponding author; he oversaw the work performed by the graduate students and wrote the final draft of the manuscript.
- 24.** Lathem, A. P. #; Rinne, B. L. #; Maldonado, M. A. \$; **Heiden, Z. M.** Comparison of Intramolecular and Intermolecular Ammonium and Phosphonium Borohydrides in Hydrogen-, Proton-, and Hydride-Transfer Reactions. *Eur. J. Inorg. Chem.*, **2017**, 2017, 2032-2039. (Journal impact factor 2.942)
Z. Heiden is the corresponding author; he oversaw the work performed by the graduate students and undergraduate student. He also wrote the final draft of the manuscript.
- 23.** Lathem, A. P. #; **Heiden, Z. M.** Quantification of Lewis acid induced Brønsted acidity of protogenic Lewis bases. *Dalton Trans.*, **2017**, 46, 5976-5985. (Journal impact factor 4.029)
Z. Heiden is the corresponding author; he oversaw the work performed by the graduate student and wrote the final draft of the manuscript.
- 22.** Bhattacharya, P.; **Heiden, Z. M.**; Wiedner, E. S.; Raugei, S.; Piro, N. A.; Kassel, W. S.; Bullock, R. M.; Mock, M. T. Ammonia Oxidation by Abstraction of Three Hydrogen Atoms from a Mo-NH₃ Complex. *J. Am. Chem. Soc.*, **2017**, 139, 2916-2919. (Journal impact factor 13.038)
Z. Heiden performed the computational work and wrote the manuscript in collaboration with Mock. All computations were undertaken during Z. Heiden's time at WSU.
- 21.** Carter, T. J.; **Heiden, Z. M.**; Szymczak, N. K. Discovery of Low Energy Pathways to B=N Bond Reduction via η^6 -Coordination Guided by Computation and Experiment. *Chem. Sci.* **2015**, 6, 7258-7266. (Journal impact factor 9.144)
Z. Heiden is one of the two corresponding authors. Z. Heiden provided the computational analysis, data interpretation, and helped in writing of the manuscript.
- 20.** Labios, L. A.; **Heiden, Z. M.**; Mock, M. T. Electronic and Steric Influences of Pendant Amine Groups on the Protonation of Molybdenum bis(Dinitrogen) Complexes. *Inorg. Chem.* **2015**, 54, 4409-4422. (Journal impact factor 4.820)
Z. Heiden performed the computational work and wrote the manuscript in collaboration with Mock. All computations were undertaken during Z. Heiden's time at WSU.
- 19.** **Heiden, Z. M.**; Lathem, A. P. # Establishing Hydride Donor Abilities of Main Group Hydrides. *Organometallics* **2015**, 34, 1818-1827. (Journal impact factor 4.126) (Second most accessed manuscript in the months of May and June 2015, and 12th most accessed article for 2015)
Z. Heiden is the corresponding author; he oversaw the work performed by the graduate student and wrote the final draft of the manuscript.
- 18.** Lathem, A. P. #; Treich, N. R. #; **Heiden, Z. M.** Establishing the Steric Bulk of Main Group Hydrides in Reduction Reactions. *Isr. J. Chem.* **2015**, 55, 226-234. Invited article for special issue on Frustrated Lewis Pairs. (Journal impact factor 2.425)
Z. Heiden is the corresponding author; he oversaw the work performed by the graduate students and wrote the final draft of the manuscript.
- 17.** **Heiden, Z. M.**; Chen, S.; Labios, L. A.; Bullock, R. M.; Walter, E. D.; Tyson, E. L.; Mock, M. T. Proton and Electron Additions to Iron(II) Dinitrogen Complexes Containing Pendant Amines. *Organometallics* **2014**, 33, 1333-1336. (Journal impact factor 4.126)
Z. Heiden performed the experimental work and wrote the manuscript under supervision of Mock and Bullock.
- 16.** **Heiden, Z. M.**; Chen, S.; Mock, M. T.; Dougherty, W. G.; Kassel, S.; Rousseau, R. Bullock, R. M. Protonation of Ferrous Dinitrogen Complexes Containing a Diphosphine Ligand with a Pendant Amine. *Inorg. Chem.* **2013**, 52, 4026-4039. (Journal impact factor 4.820)
Z. Heiden performed the experimental work and wrote the manuscript under supervision of Mock and Bullock.

15. **Heiden, Z. M.**; IRIDIUM, DICHLORODI- μ -HYDROBIS[(1,2,3,4,5- η)-1,2,3,4,5-PENTAMETHYL-2,4-CYCLOPENTADIEN-1-YL]DI-. *Electronic Encyclopedia of Reagents for Organic Synthesis*. **2013**.
Z. Heiden is the corresponding author and wrote the final draft of the manuscript.
14. Madhi, T. M.; **Heiden, Z. M.**; Grimme, S.; Stephan, D. W. Metal-Free Aromatic Hydrogenation: Aniline to Cyclohexyl-amine Derivatives. *J. Am. Chem. Soc.*, **2012**, *134*, 4088-4091. (Journal impact factor 13.038)
Z. Heiden performed the experimental work and wrote the manuscript under supervision of Stephan.
13. Farrell, J. M.; **Heiden, Z. M.**; Stephan, D. W. Racemization of Amines and Transfer Hydrogenation with Frustrated Lewis Pairs. *Organometallics*, **2011**, *30*, 4497-4500. (Journal impact factor 4.126)
Z. Heiden performed the experimental work and wrote the manuscript under supervision of Stephan.
12. Stephan, D. W.; Greenberg, S.; Graham, T. W.; Chase, P.; Hastie, J. J.; Geier, S. J.; Farrell, J. M.; Brown, C. C.; **Heiden, Z. M.**; Welch, G. C.; Ullrich, M. Metal-Free Catalytic Hydrogenation of Polar Substrates by Frustrated Lewis Pairs. *Inorg. Chem.*, **2011**, *50*, 12338-12348. (Journal impact factor 4.820)
Z. Heiden performed the experimental work and wrote the manuscript under supervision of Stephan.
11. **Heiden, Z. M.**; Stephan, D. W. Metal-Free Diastereoselective Catalytic Hydrogenations of Imines Using B(C₆F₅)₃. *Chem. Commun.*, **2011**, 5729-5731. (Journal impact factor 6.567)
Z. Heiden performed the experimental work and wrote the manuscript under supervision of Stephan.
10. Letko, C. S.; **Heiden, Z. M.**; Rauchfuss, T. B. Coordination Chemistry of the Soft Chiral Lewis Acid [Cp*Ir(TsDPEN)]⁺. *Inorg. Chem.*, **2011**, *50*, 5558-5566. (Journal impact factor 4.820)
Z. Heiden performed the experimental work and wrote the manuscript under supervision of Rauchfuss.
9. **Heiden, Z. M.**; Schedler, M.; Stephan, D. W. Synthesis and Reactivity of o-Benzylphosphino- and α -Methylbenzyl(N,N-dimethyl)amine-Boranes. *Inorg. Chem.* **2011**, *50*, 1470-1479. (Journal impact factor 4.820)
Z. Heiden performed the experimental work and wrote the manuscript under supervision of Stephan.
8. Letko, C. S.; **Heiden, Z. M.**; Rauchfuss, T. B. Activation and Deactivation of Cp*Ir(TsDPEN) Hydrogenation Catalysts in Water. *Eur. J. Inorg. Chem.* **2009**, 4927-4930. (Journal impact factor 2.942)
Z. Heiden performed the experimental work and wrote the manuscript under supervision of Rauchfuss.
7. **Heiden, Z. M.**; Rauchfuss, T. B. Proton-Assisted Activation of Dihydrogen: Mechanistic Aspects of Proton-Catalyzed Addition of H₂ to Ru and Ir Amido Complexes. *J. Am. Chem. Soc.* **2009**, *131*, 3593-3600. (Journal impact factor 13.038)
Z. Heiden performed the experimental work and wrote the manuscript under supervision of Rauchfuss.
6. **Heiden, Z. M.**; Zampella, G.; De Gioia, L.; Rauchfuss, T. B. [FeFe]-Hydrogenase Models and Hydrogen: Oxidative Addition of Dihydrogen and Silanes. *Angew. Chem. Int. Ed. Engl.* **2008**, *47*, 9756-9759. (highlighted: Nature Chemistry 21 November 2008) (Journal impact factor 11.709)
Z. Heiden performed the experimental work and wrote the manuscript under supervision of Rauchfuss.
5. **Heiden, Z. M.**; Gorecki, B. J.; Rauchfuss, T. B. Lewis Base Adducts Derived from Transfer Hydrogenation Catalysts: Scope and Selectivity. *Organometallics*, **2008**, *27*, 1542-1549. (Journal impact factor 4.126)

- Z. Heiden performed the experimental work and wrote the manuscript under supervision of Rauchfuss.*
4. Ringenberg, M. R.; Kokatam, S. L.; **Heiden, Z. M.**; Rauchfuss, T. B. Redox-Switched Oxidation of Dihydrogen Using a Non-Innocent Ligand. *J. Am. Chem. Soc.*, **2008**, *130*, 788-789. (Journal impact factor 13.038)
Z. Heiden performed the experimental work and wrote the manuscript under supervision of Rauchfuss.
 3. Stanley, J. L.; **Heiden, Z. M.**; Rauchfuss, T. B.; Wilson, S. R.; De Gioia, L.; Zampella, G. Desymmetrized Diiron Azadithiolato Carbonyls: A Step Toward Modeling the Fe-only Hydrogenases. *Organometallics*, **2008**, *27*, 119-125. (Journal impact factor 4.126)
Z. Heiden performed the experimental work and wrote the manuscript under supervision of Rauchfuss.
 2. **Heiden, Z. M.**; Rauchfuss, T. B. Homogeneous Catalytic Reduction of Dioxygen Using Transfer Hydrogenation Catalysts. *J. Am. Chem. Soc.*, **2007**, *129*, 14303-14310. (Journal impact factor 13.038)
Z. Heiden performed the experimental work and wrote the manuscript under supervision of Rauchfuss.
 1. **Heiden, Z. M.**; Rauchfuss, T. B. Proton-Induced Lewis Acidity of Unsaturated Iridium Amides, *J. Am. Chem. Soc.* **2006**, *128*, 13048-13049. (Journal impact factor 13.038)
Z. Heiden performed the experimental work and wrote the manuscript under supervision of Rauchfuss.

MANUSCRIPTS IN PREPARATION

2. Kieffer, I. A.#; Allen, R. J.%; Wimpenny, J. D.#; Deobald, J.\$; Fernandez, J. L.\$; **Heiden, Z. M.** Utilization of a Fluorescent Dye Molecule as a Proton and Electron Reservoir in H-atom Transfer Reactions. *Anticipated submission in November 2017.*
Z. Heiden is the corresponding author; he is overseeing the work performed by the two graduate, two undergraduate, and one high school students and is writing the final draft of the manuscript.
1. Kieffer, I. A.#; Treich, N. R.#; Fernandez, J. L.\$; **Heiden, Z. M.** Influence of Lewis Acid Strength on Hydride Transfer to Unsaturated Substrates. *Anticipated submission in November 2017.*
Z. Heiden is the corresponding author; he is overseeing the work performed by the two graduate students and one undergraduate student and is writing the final draft of the manuscript.

PRESENTATIONS

Presentations containing numbers marked in bold and in red were presented while Z. M. Heiden was affiliated with WSU.

INVITED PRESENTATIONS

1. **Heiden, Z. M.** The Academic Job Application. Washington State University, WSU GPSA Professional Development Initiative. November 2, 2017.
2. **Heiden, Z. M.** Safety Discussion at WSU. Washington State University, Pullman, WA. October 2, 2017.
3. **Heiden, Z. M.** PCET Reactions Promoted by Fluorescent Dye Molecules. Telluride Science Research Conference on Proton-Coupled Electron Transfer, Telluride, CO. August 8, 2017.
4. **Heiden, Z. M.** Fluorescent Frustrated Lewis Pairs for Activating and Sensing Small Molecules. 100th Canadian Chemistry Conference, Toronto, ON. May 31, 2017.
5. **Heiden, Z. M.** Applying for Academia. Washington State University, WSU GPSA Professional Development Initiative. February 23, 2017.
6. **Heiden, Z. M.** Controlling Homogeneous Catalyst Reactivity with Redox Centers. Washington State University, Department of Chemical Engineering. Dec. 5, 2016.

7. **Heiden, Z. M.** Safety Discussion at WSU. Washington State University, Pullman, WA. November 14, 2016.
8. **Heiden, Z. M.** Solving Problems in Energy and the Environment in the Heiden Lab at WSU. University of Idaho. Feb. 9, 2016.
9. **Heiden, Z. M.** Solving Problems in Energy and the Environment in the Heiden Lab at WSU. Eastern Washington University. Nov. 5, 2015.
10. **Heiden, Z. M.** Chemistry of Biological Systems, Materials, Energy, and the Environment at WSU. Pacific Lutheran University. Nov. 11, 2013.
11. **Heiden, Z. M.** Bioinspired Catalytic Homogeneous Hydrogenation of Dioxygen. National Institutes of Health. Nov. 7–8, 2012.
12. **Heiden, Z. M.;** Stephan, D. W.. 2009. Development of a Metal-free Asymmetric Hydrogenation Catalyst. Selected Poster Talk. 2009 Inorganic Gordon Conference.
13. **Heiden, Z. M.;** Rauchfuss, T. B. 2008. Catalytic Reduction of Molecular Oxygen Using Transfer Hydrogenation Catalysts. Selected Poster Talk. 2008 Organometallic Gordon Conference.

OTHER PRESENTATIONS

1. **Heiden, Z. M.;** Kieffer, I. A.; Allen, R. J. 2017. Utilization of Fluorescent Dye Molecules to Introduce Redox Chemistry into Main Group Complexes. Oral. Fall 2017 ACS National Meeting, Washington D.C.
2. **Heiden, Z. M.;** Treich, N. R. 2017. Synthesis and Reactivity of Fluorescent Metal Complexes. Oral. Fall 2017 ACS National Meeting, Washington D.C.
3. **Heiden, Z. M.;** Kieffer, I. A.; Allen, R. J. 2017. Fluorescent Frustrated Lewis Pairs for the Coordination and Functionalization of Small Molecules. Oral. Spring 2017 ACS National Meeting, San Francisco.
4. **Heiden, Z. M.;** Treich, N. R. 2017. Influence of Fluorescent Dye Containing Ligand Scaffolds on Metal Complex Reactivity. Oral. Spring 2017 ACS National Meeting, San Francisco.
5. **Heiden, Z. M.;** Kieffer, I. A.; Fernandez, J. L. 2016. Fluorescent Frustrated Lewis Pairs for Sensing Small Molecules. Oral. Fall 2016 ACS National Meeting, Philadelphia.
6. **Heiden, Z. M.;** Treich, N. R. 2016. Thermally Controlled Iridium-Catalyzed Transfer Hydrogenations. Oral. Fall 2016 ACS National Meeting, Philadelphia.
7. **Heiden, Z. M.;** Lathem, A. P.; Kieffer, I. A. 2016. Influence of Lewis Acid Strength on Molecular Properties of Lewis Acid-Base Adducts. Oral. Fall 2016 ACS National Meeting, Philadelphia.
8. **Heiden, Z. M.** 2016. Insights into Reduction Catalyst Design, Lessons from Main Group Complexes. Poster. 2016 Inorganic Gordon Conference.
9. **Heiden, Z. M.** 2014. Probing the Limits of Hydrogen Activation and Transfer with Frustrated Lewis Pairs. Oral. Fall 2014 ACS National Meeting, San Francisco.
10. **Heiden, Z. M.** 2014. Hydrogen Transfer Catalyst Design Inspired by Thermodynamics. Poster. Spring 2014 ACS National Meeting, Dallas.
11. **Heiden, Z. M.;** Mock, M. T.; Bullock, R. M.; DuBois, D. L. 2013. Protonation and Reduction Reactions of Iron Dinitrogen Complexes Containing Pendant Amines. Poster. Spring 2013 American Chemical Society National Meeting, New Orleans.
12. **Heiden, Z. M.;** Mock, M. T.; Bullock, R. M.; DuBois, D. L. 2012. Synthesis and reactivity of iron dinitrogen complexes containing pendant amines. Oral. Fall 2012 American Chemical Society National Meeting, Philadelphia.
13. **Heiden, Z. M.** 2012. Using general chemistry concepts in cutting edge catalytic transformations and energy research. Poster. Fall 2012 American Chemical Society National Meeting, Philadelphia.
14. **Heiden, Z. M.;** Stephan, D. W. 2011. Advances and Challenges in Catalytic Asymmetric Hydrogenations Using Boron. Poster. IME Boron Conference XIV, Niagara Falls, ON.
15. **Heiden, Z. M.;** Stephan, D. W. 2011. Advances and Challenges in Catalytic Asymmetric Hydrogenations Using “Frustrated Lewis Pairs.” Oral. 2011 Canadian Chemistry Conference,

- Montreal, QC.
16. **Heiden, Z. M.;** Stephan, D. W. 2011. Advances in Catalytic Asymmetric Hydrogenations Using “Frustrated Lewis Pairs.” Oral. Spring 2011 American Chemical Society National Meeting, Anaheim.
 17. **Heiden, Z. M.;** Stephan, D. W. 2010. Synthesis and Reactivity of Chiral “Frustrated Lewis Pair” Complexes. Oral. 2010 Canadian Chemistry Conference, Toronto, ON.
 18. **Heiden, Z. M.;** Stephan, D. W. 2010. Asymmetric Hydrogenations Using “Frustrated Lewis Pairs.” Poster. Spring 2010 American Chemical Society National Meeting, San Francisco.
 19. **Heiden, Z. M.;** Stephan, D. W.; Rauchfuss, T. B. 2009. Synthetic and Mechanistic Analysis of Asymmetric Small Molecule Activation with Bifunctional and “Frustrated Lewis Pair” Complexes. Poster. Fall 2009 American Chemical Society National Meeting, Washington D.C.
 20. **Heiden, Z. M.;** Stephan, D. W. 2009. Challenges and Advances in the Development of a Metal-free Asymmetric Hydrogenation Catalyst. Oral. Fall 2009 American Chemical Society National Meeting, Washington D.C.
 21. **Heiden, Z. M.;** Stephan, D. W. 2009. Development of a Metal-free Asymmetric Hydrogenation Catalyst. Poster. 2009 Inorganic Gordon Conference.
 22. **Heiden, Z. M.;** Stephan, D. W. 2009. Development of a Metal-free Asymmetric Hydrogenation Catalyst. Poster. 2009 Canadian Chemistry Conference, Hamilton, ON.
 23. **Heiden, Z. M.;** Rauchfuss, T. B. 2008. Mechanistic Analysis of the Catalytic Reduction of Molecular Oxygen Using Transfer Hydrogenation Catalysts. Poster. 2008 Organometallic Gordon Conference.
 24. **Heiden, Z. M.;** Rauchfuss, T. B. 2007. Redox Reactivity of Amine-Hydrides of Iridium. Poster. Spring 2007 American Chemical Society National Meeting, Chicago, IL.
 25. **Heiden, Z. M.;** Rauchfuss, T. B. 2007. Redox Reactivity of Amine-Hydrides of Iridium. Poster. Bio-inspired Chemistry for Energy Workshop, Washington D.C.
 26. Royer, A. M.; **Heiden, Z. M.;** Kokatam, S. L.; Rauchfuss, T. B. 2007. New Concepts in Hydrogen Processing: Modeling the Hmd Cofactor and Redox Active Ligands with Platinum Metals. Poster. Bio-inspired Chemistry for Energy Workshop, Washington D. C.
 27. **Heiden, Z. M.;** Treichel, P. M. 2004. The Search for a Bis-sulfate Tri-nuclear Rhenium Cluster and the Projects that Evolved from it. Undergraduate Poster Session (University of Wisconsin).

MENTORING

GRADUATE STUDENTS

Brena Thompson (PhD student, Start: 10/2017, Anticipated Finish: 05/2022)

Jacob D. Wimpenny (PhD student, Start: 5/2017, Anticipated Finish: 05/2021)

Publications:

Treich, N. R.; **Wimpenny, J. D.;** Kieffer, I. A.; Heiden, Z. M. Synthesis and Characterization of Chiral and Achiral Diamines Containing One or Two BODIPY Molecules. *Submitted to New J. Chem. on July 16, 2017. (Journal impact factor 3.269).*

Kieffer, I. A.; Allen, R. J.; **Wimpenny, J. D.;** Deobald, J.; Fernandez, J. L.; Heiden, Z. M. Utilization of a Fluorescent Dye Molecule as a Proton and Electron Reservoir in H-atom Transfer Reactions. *Anticipated submission in October 2017.*

Ian A. Kieffer (MS student, Graduated 05/2017, currently attending graduate school in economics at Boston University)

Publications:

Treich, N. R.; Wimpenny, J. D.; **Kieffer, I. A.**; Heiden, Z. M. Synthesis and Characterization of Chiral and Achiral Diamines Containing One or Two BODIPY Molecules. *Submitted to New J. Chem. on July 16, 2017. (Journal impact factor 3.269).*

Kieffer, I. A.; Allen, R. J.; Wimpenny, J. D.; Deobald, J.; Fernandez, J. L.; Heiden, Z. M. Utilization of a Fluorescent Dye Molecule as a Proton and Electron Reservoir in H-atom Transfer Reactions. *Anticipated submission in October 2017.*

Nicholas R. Treich (M.S. student 05/2017, currently a 9th grade science teacher at Stahl Junior High in Puyallup, WA)

Publications:

Treich, N. R.; Wimpenny, J. D.; Kieffer, I. A.; Heiden, Z. M. Synthesis and Characterization of Chiral and Achiral Diamines Containing One or Two BODIPY Molecules. *Submitted to New J. Chem. on July 16, 2017. (Journal impact factor 3.269).*

Lathem, A. P.; **Treich, N. R.**; Heiden, Z. M. Establishing the Steric Bulk of Main Group Hydrides in Reduction Reactions. *Isr. J. Chem.* **2015**, *55*, 226-234. Invited article for special issue on Frustrated Lewis Pairs. (Journal impact factor 2.425)

Presentations:

Treich, N. R.; Heiden, Z. M. Effect of Visible-Light on Transfer Hydrogenation Catalysis. Oral on June 24, 2015. 2015 ACS Northwest Regional Meeting (NORM), Pocatello, ID.

A. Paige Lathem (M.S. student 05/2016, currently in the WSU high school teaching program)

Publications:

Lathem, A. P.; Rinne, B. L.; Maldonado, M. A.; Heiden, Z. M. Comparison of Intramolecular and Intermolecular Ammonium and Phosphonium Borohydrides in Hydrogen-, Proton-, and Hydride-Transfer Reactions. *Eur. J. Inorg. Chem.*, **2017**, *2017*, 2032-2039. (Journal impact factor 2.942)

Rinne, B. L.; **Lathem, A. P.**; Heiden, Z. M. Influence of Intramolecular vs. Intermolecular Phosphonium-Borohydrides in Catalytic Hydrogen, Hydride, and Proton Transfer Reactions. *Dalton Trans.*, **2017**, *46*, 9382 - 9393. (Journal impact factor 4.029)

Lathem, A. P.; Heiden, Z. M. Quantification of Lewis acid induced Brønsted acidity of protogenic Lewis bases. *Dalton Trans.*, **2017**, *46*, 5976-5985. (Journal impact factor 4.029)

Heiden, Z. M.; **Lathem, A. P.** Establishing Hydride Donor Abilities of Main Group Hydrides. *Organometallics* **2015**, *34*, 1818-1827. Second most accessed article in the months of May and June 2015 and 12th most accessed article for 2015. (Journal impact factor 4.126)

Lathem, A. P.; Treich, N. R.; Heiden, Z. M. Establishing the Steric Bulk of Main Group Hydrides in Reduction Reactions. *Israel Journal of Chemistry* **2015**, *55*, 226-234. Invited article for special issue on Frustrated Lewis Pairs. (Journal impact factor 2.425)

Presentations:

Lathem, A. P; Heiden, Z. M. Prediction and Design of Reversible H₂ Activation with Frustrated Lewis Pairs. Oral on June 22, 2015. 2015 ACS Northwest Regional Meeting (NORM), Pocatello, ID.

Rocio Rodriguez (MS student 05/2016, currently working as an associate scientist at Alcami Corporation)

Benjamin L. Rinne (MS student 12/2015, currently assisting with general chemistry at Washington State University)

Publications:

Lathem, A. P.; **Rinne, B. L.**; Maldonado, M. A.; Heiden, Z. M. Comparison of Intramolecular and Intermolecular Ammonium and Phosponium Borohydrides in Hydrogen-, Proton-, and Hydride-Transfer Reactions. *Eur. J. Inorg. Chem.*, **2017**, 2017, 2032-2039. (Journal impact factor 2.942)

Rinne, B. L.; Lathem, A. P.; Heiden, Z. M. Influence of Intramolecular vs. Intermolecular Phosponium-Borohydrides in Catalytic Hydrogen, Hydride, and Proton Transfer Reactions. *Dalton Trans.*, **2017**, 46, 9382 - 9393. (Journal impact factor 4.029)

UNDERGRADUATE STUDENTS, HIGH SCHOOL STUDENTS, AND INTERNS (RESEARCH)

Jamie Pimblett-Speck (07/2014 to 09/2014; summer intern from Imperial College, currently a technical salesman at Lucideon (<http://www.lucideon.com/>), a materials testing facility)

Jaycob W. Enzler (01/2014 to 12/2014; Chemistry Major, graduated Fall 2014, currently attending dental school at Creighton University)

Drayko Chudomelka (09/2017 - present; Chemistry Major)

Jordan L. Fernandez (10/2014 - present; Chemistry Major)

Publications:

Kieffer, I. A.; Allen, R. J.; **Fernandez, J. L.**; Heiden, Z. M. Reversible Proton-Coupled Electron Transfer with BODIPY Appended Amines. *Anticipated submission in February 2017.*

Presentations:

Fernandez, J. L.;^{\$} Rodriguez, R.[#]; Heiden, Z. M. Painting the Color Spectrum with Heavy Metals. Poster. Showcase for Undergraduate Research and Creative Activities (SURCA). March 28, 2016

Marc A. Maldonado (10/2015 – 05/2016; Chemistry Major)

Publications:

Lathem, A. P.; Rinne, B. L.; **Maldonado, M. A.**; Heiden, Z. M. Comparison of Intramolecular and Intermolecular Ammonium and Phosphonium Borohydrides in Hydrogen-, Proton-, and Hydride-Transfer Reactions. *Eur. J. Inorg. Chem.*, **2017**, 2017, 2032-2039. (Journal impact factor 2.942)

Alfredo A. Espino (10/2015 – 12/2016; Biomedical Engineering Major)

Robby Allen (06/2016 – 08/2016; High School Student, currently an undergradaute at Univeristy of California, Berkeley)

Publications:

Kieffer, I. A.; **Allen, R. J.**; Fernandez, J. L.; Heiden, Z. M. Reversible Proton-Coupled Electron Transfer with BODIPY Appended Amines. *Anticipated submission in February 2017.*

POST-DOCTORAL FELLOWS, RESEARCH SCIENTISTS, AND VISITING PROFESSORS

Kshitij Parab, Research Associate (10/2013-09/2014; currently employed as associate scientist at Sirrus Chemistry (<http://sirruschemistry.com/>), a startup company that makes polymers and wood glues)

LSAMP FACULTY RESEARCH MENTOR

Quinn Wilson (09/2016 - present; Basic Medical Sciences Major)

TEACHING EXPERIENCE

Fall 2013

CHEM 401, Modern Inorganic Chemistry, Washington State University, 17 students

Fall 2014

CHEM 401, Modern Inorganic Chemistry, Washington State University, 10 students

Spring 2015

CHEM 501, Advanced Inorganic Chemistry, Washington State University, 28 students

Fall 2015

CHEM 105, General Chemistry, Washington State University, 252 students

Spring 2016

CHEM 503, Special Topics in Inorganic Chemistry - Organometallics, Washington State University, 6 students

Fall 2016

CHEM 105, General Chemistry, Washington State University, 268 students

Fall 2017

CHEM 503, Special Topics in Inorganic Chemistry - Organometallics, Washington State University, 10 students

SERVICE

COMMITTEES

Member of the WSU Graduate Admissions Committee. (2013-present).

Member of the Inorganic Faculty Search Committee (2015-2016)

Member of Research Scholars Program Committee (2015-present)

REVIEWER

- Journals:
 - Journal of the American Chemical Society
 - Organometallics
 - Chemical Communications
 - Israel Journal of Chemistry
 - Dalton Transactions
 - Chemical Science
 - Organic and Biomolecular Chemistry
 - Inorganica Chimica Acta
 - Heteroatom Chemistry
 - Chemistry – A European Journal
- Proposals for agencies:
 - ACS-PRF
 - NSF
 - DOE

Co-organizer of 2015 WSU Early Career Workshop

COMMUNITY SERVICE

Volunteer at National Lentil Festival in 2013, 2014, & 2015

Volunteer Judge at the Imagine Tomorrow Competition in 2015 & 2016

Volunteer Judge at Showcase for Undergraduate Research and Creative Activities (SURCA) in 2016 & 2017