

## Laura K.G. Ackerman

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### Professional Experience

Assistant Professor      **Arizona State University**-Tempe, AZ      January 2020  
*Organic and Organometallic Chemistry*

### Education

Ph.D.      **University of Rochester**-Rochester, NY      March 2016  
M.S.      **University of Rochester**-Rochester, NY      May 2012  
B.A.      **Claremont McKenna College**-Claremont, CA      May 2009  
*Dual Major in Chemistry and Religious Studies*  
*Study Abroad*      **University of Sussex**-Brighton, England      June-August 2008  
*Study Abroad*      **International Christian University**-Tokyo, Japan      July-December 2007  
Diploma      **Punahou School**-Honolulu, HI      June 2005

### Research Experience

**Postdoctoral Research with Professor Abigail G. Doyle**      Spring 2016-Fall 2019  
*Princeton University*

- Studied dual metal and photoredox systems for application to fluorination and amination methods
- Explored the utility of bulky phosphine ligands, *N*-heterocyclic carbenes, and  $\beta$ -diketones for application to nickel and photoredox catalysis
- Identified and developed optimal conditions for a practical functionalization of C(sp<sub>3</sub>)-H bonds to generate ketones and esters, with particular emphasis placed on understanding the influence of light (wavelength and intensity), temperature, and additive effects
- Investigated the role of chlorine radical in C(sp<sub>3</sub>)-H activation by construction of linear free energy relationships and comparing the rates of functionalization of ethyl benzene derivatives
- Calculated bond dissociation energies and bond dissociation free energies for reference in comparing metal and C(sp<sub>3</sub>)-H bonds using Gaussian (B3LYP or CBS-QB3)
- Examined the theoretical excited states leading to bond weakening of Ni-X bonds from various Ni(II) and Ni(III) complexes using Gaussian (B3LYP or B3LYP TZVP)
- Explored the use of abundant metal catalysts for defunctionalization protocols

**Ph.D. Research with Professor Daniel J. Weix**      Fall 2010-Spring 2016  
*University of Rochester*

- Synthesized ruthenium, iridium, palladium, and nickel complexes for the study of aryl transmetalation
- Studied the reactivity of C-H activation and C-C coupling catalysts towards electrophiles using gas chromatography/mass spectrometry and <sup>1</sup>H, <sup>13</sup>C, <sup>31</sup>P, <sup>19</sup>F NMR spectroscopy for application to the design of multimetallic catalyzed reactions
- Discovered and developed a nickel and palladium catalyzed method for the coupling of aryl and vinyl halides with aryl and vinyl pseudohalides to access unsymmetrical biaryls and dienes
- Developed the nickel and cobalt co-catalyzed synthesis of diarylmethanes from benzyl mesylates and aryl halides, optimizing reaction conditions and expanding the substrate scope to include aryl bromides, heterocycles, and secondary benzyl substrates

- Identified conditions for the successful coupling of *N*-hydroxyphthalimide esters with aryl and alkyl derivatives
- Explored benchtop procedures and alternative reducing agents, solvents, and additives for adaptation of nickel catalyzed cross electrophile couplings for industrial application

**Post-Baccalaureate Research with Professor David A. Vivic** Fall 2009-Spring 2010  
*University of Hawai'i at Manoa*

- Studied the reaction of decarboxylative trifluoromethylation of aryl iodides and bromides using well-defined copper-acetate derivatives
- Synthesized precursors for asymmetric *N*-heterocyclic carbenes for application to cross coupling reactions

**Undergraduate Research with Professor Anna G. Wenzel** Spring 2008-Spring 2009  
*Joint Science Department of the Claremont Colleges*

- Synthesized an effective chiral Brønsted acid catalyst for the asymmetric Friedel-Crafts alkylation of indole
- Initiated a project for the development of a copper-catalyzed enantioselective Claisen rearrangement

**Undergraduate Research with Professor Andrew W. Zanella** January-May 2006  
*Joint Science Department of the Claremont Colleges*

- Investigated the hydration of cobalt nitrile complexes using UV-vis and IR spectroscopy as analytical techniques

## Publications

9. Huang, L.; **Ackerman, L. K. G.**; Olivares, A. M.; Weix, D. J. LiCl Accelerated Multimetallic Cross-Coupling of Aryl Chlorides with Aryl Triflates. *J. Am. Chem. Soc.* **2019**, *141*, 10978-10983.
8. **Ackerman, L. K. G.**; Martinez Alvarado, J. I.; Doyle, A. G. Direct C–C Bond Formation from Alkanes Using Ni and Photoredox Catalysis. *J. Am. Chem. Soc.* **2018**, *140*, 14059-14063.
7. Anka-Lufford, L. L.; Huihui, K. M. M.; Gower, N. J.; **Ackerman, L. K. G.**; Weix, D. J. Nickel-Catalyzed Cross-Electrophile Coupling with Organic Reductants in Non-Amide Solvents. *Chem. –Eur. J.* **2016**, *22*, 11564-11567.
6. Huihui, K. M. M.; Caputo, J. A.; Melchor, Z.; Olivares, A. M.; Spiewak, A. M.; Johnson, K. A.; DiBenedetto, T. A.; Kim, S.; **Ackerman, L. K. G.**; Weix, D. J. Decarboxylative Cross-Electrophile Coupling of *N*-Hydroxyphthalimide Esters with Aryl Iodides. *J. Am. Chem. Soc.* **2016**, *138*, 5016-5019.
5. **Ackerman, L. K. G.**; Lovell, M. M.; Weix, D. J. Multimetallic Catalysed Cross-Coupling of Aryl Bromides with Aryl Triflates. *Nature* **2015**, *524*, 454-457.
4. **Ackerman, L. K. G.**; Anka-Lufford, L. L.; Naodovic, M.; Weix, D. J. Cobalt Co-Catalysis for Cross-Electrophile Coupling: Diarylmethanes from Benzyl Mesylates and Aryl Halides. *Chem. Sci.* **2015**, *6*, 1115-1119.
3. Keleman, R. E.; **Ackerman, L. K. G.**; Weix, D. J. Tandem Catalysis, In AccessScience, McGraw-Hill Education, **2014**, Invited contribution <<http://www.accessscience.com/content/tandem-catalysis/YB140343>>.
2. McReynolds, K. A.; Lewis, R. S.; **Ackerman, L. K. G.**; Dubinina, G. G; Brennessel, W. W.; Vivic, D. A. Decarboxylative Trifluoromethylation of Aryl Halides using Well-defined Copper-trifluoroacetate and -chlorodifluoroacetate Precursors. *J. Fluorine Chem.* **2010**, *131*, 1108-1112.

1. Gutierrez, E. G.; Moorhead, E. J.; Smith, E. H.; Lin, V.; **Ackerman, L. K. G.**; Knezevic, C. E.; Sun, V.; Grant, S.; Wenzel, A. G. Electron-Withdrawing, Biphenyl-2,2'-diol-Based Compounds for Asymmetric Catalysis. *Eur. J. Org. Chem.* **2010**, 16, 3027-3031.

## Awards and Honors

National Institute of Health Kirschstein National Research Service Award (NIH Kirschstein NRSA) Postdoctoral Research Fellowship	Spring 2017-Fall 2019
Reaxys PhD Prize Finalist	September 2016
Elon Huntington Hooker Fellowship <i>University of Rochester Fellowship for Students in the Chemical Sciences</i>	Spring 2014-Spring 2015
National Science Foundation Graduate Research Fellowship (NSF GRF)	Spring 2011-Spring 2014
W.D. Walters Teaching Award <i>University of Rochester Chemistry Department</i>	September 2012
Senior Religious Studies Department Award <i>Claremont Mckenna College Religious Studies Department</i>	May 2009

## Presentations

6. **Ackerman, L. K. G.** Harvard Future Faculty Symposium, *Accepted talk*, Harvard University, Cambridge, MA, United States, August 24, **2018**.
5. **Ackerman, L. K. G.**; Martinez Alvarado, J. I.; Doyle, A. G. Direct Transformation of C(sp<sub>3</sub>)-H bonds to Ketones and Esters via Nickel and Photoredox Catalysis, *Chosen talk from poster abstracts*, Stereochemistry Gordon Research Conference, Newport, United States, July 22-27, **2018**.
4. **Ackerman, L. K. G.** Synergistic Catalysis for the Construction of Molecules and Careers. Louisiana State University Seminar, Baton Rouge, United States, March 10, **2017**.
3. **Ackerman, L. K. G.**; Lovell, M. M.; Weix, D. J. Multimetallic Catalysed Cross Ullmann Reaction, Reaxys PhD Prize Symposium, London, United Kingdom, September 22-23, **2016**.
2. **Ackerman, L. K. G.** Quest for Selectivity: Multimetallic Catalysis for the Cross Coupling of Aryl Electrophiles. 248<sup>th</sup> ACS National Meeting, San Francisco, United States, August 8-14, **2014**.
1. Gutierrez, E. G.; **Ackerman, L. K. G.** Synthesis of a Biphenyl-based Phosphoric Acid for Chiral Brønsted-acid Catalysis. 237<sup>th</sup> ACS National Meeting, Salt Lake City, United States, March 22-26, **2009**.

## Teaching Experience

- Lecturer for Graduate Organometallics Class** May 2, 2018  
*University of Princeton Course Instructed by Professor Abigail G. Doyle*
- Introduced first year graduate students and advanced undergraduate students to reductive cross coupling reactions
- Graduate Seminar Student Leader** August-December 2011, 2012, 2013  
*University of Rochester Course Instructed by Professor Alison J. Frontier*
- Introduced first year graduate students to the intricacies of graduate school by leading weekly discussions on motivation, research productivity, teaching pedagogy, and advisor selection
- Advanced Laboratory Techniques Teaching Assistant, CHM234** January-April 2011, 2012  
*University of Rochester Course Instructed by Professor Daniel J. Weix*

- Taught students how to use the glovebox and Schlenk line, how to purify compounds using chromatography, and how to use UV-vis spectroscopy, NMR spectroscopy, differential scanning calorimetry, and thermal gravimetric analysis

**Organic Chemistry Laboratory Teaching Assistant, CHM207** August-December 2010  
*University of Rochester Course with Dr. Bruce Toder*

- Served as a primary instructor for supervising laboratory experiments

**High School Civics Teacher** June-August 2010  
*Punahou School*

- Served as a primary instructor for the Department of Education accredited Sophomore Civics course, "Participation in Democracy" in Hawaii

**Organic Chemistry Laboratory Teaching Assistant** September 2008-May 2009  
*Joint Science Department of the Claremont Colleges*

- Served as a secondary instructor for supervising laboratory experiments

**Middle School Teaching Assistant and Tutor** June-August 2005, 2006  
*Punahou School's PUEO Program*

- Served as a secondary instructor for the courses, "Marine Biology" and "Up, Up, and Away" (aeronautics) and small group tutor as a part of a summer learning program that assists in supporting students with socio-economic need (<https://www.punahou.edu/summer/pueo-program>)

## Service Activities

**Mentorship for Women in Science** January 2016-2018

- Organized informal meetings with female graduate students twice a month who are in organic synthesis and catalysis labs to discuss chemistry, communication skills, and career options to bolster their preparation and confidence in pursuing a job in chemistry

**Judge for American Chemical Society's Chemagination** June 9, 2018  
*Princeton University* <<http://chemists.princeton.edu/pacs/outreach-activities/chemagination/>>

**Volunteer for Princeton Graduate Student Orientation Week** August 2016, 2017  
*Princeton University*

- Served on panel to answer questions about advisor/research group selection
- Reached out to students who needed advice relating to beginning graduate school

**Volunteer for Horizons Program, Warner School of Education** July-August 2012, 2013, 2014  
*University of Rochester* <[http://www.youtube.com/watch?v=ohqx8c\\_KjM](http://www.youtube.com/watch?v=ohqx8c_KjM)>

- Co-established a partnership between the chemistry department and the Horizons summer enrichment program, teaching Rochester city students in grades 3-8 about basic chemistry
- Performed chemistry demonstrations and provided opportunities for students to meet and interact with experienced graduate students and faculty members

**Founder of Chemistry Mentor Program** September 2008-May 2009  
*Joint Science Department of the Claremont Colleges*

- Created an organization that would increase student retention in the sciences by assigning each incoming chemistry student an older mentor
- Recruited over one hundred students to participate in the program
- Organized social events and facilitated meetings

Co-Founder of Chemistry Club  
Claremont Colleges

March 2008-May 2009

- Built a partnership between Pomona, Claremont McKenna, Scripps, Pitzer, and Harvey Mudd Colleges to foster an active chemistry community
- Organized events, community volunteer opportunities, and chemistry demonstrations

## References

*Postdoctoral Advisor*

Professor Abigail G. Doyle  
Princeton University  
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*Graduate Committee Member*

Professor William D. Jones  
University of Rochester  
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jones@chem.rochester.edu

*Graduate Advisor*

Professor Daniel J. Weix  
University of Wisconsin-Madison  
608-262-0541  
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*Graduate Committee Member*

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