**Kate M. Waldie**

Rutgers, The State University of New Jersey
Department of Chemistry and Chemical Biology
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## EDUCATION

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|---|---|
| 2016 | Ph.D. in Chemistry, Stanford University, Stanford, CA<br>Advisor: Professor Robert M. Waymouth<br>Cumulative GPA: 4.04/4.00<br>Thesis: "Investigations of Homogeneous Ruthenium and Cobalt Complexes for Electrocatalytic Transformations." |
| 2010 | B.Sc. Chemistry, Honours with Distinction, University of Victoria, Canada<br>Cumulative GPA: 8.86/9.00<br>Honours Thesis: "Synthesis, characterization, and electrochemical studies of new bis(imino)indigo ("Nindigo") derivatives and their binuclear palladium complexes." |

## PROFESSIONAL EXPERIENCE

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|---|---|
| 2018-present | Assistant Professor, Department of Chemistry and Chemical Biology, Rutgers, The State University of New Jersey |
| 2016-2018 | Postdoctoral Scholar, Department of Chemistry and Biochemistry, University of California San Diego<br>Advisor: Professor Clifford P. Kubiak |

## AWARDS & HONORS

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|---|---|
| 2015-2016 | Center for Molecular Analysis and Design (CMAD) Fellowship, Stanford University |
| 2011-2014 | Natural Sciences and Engineering Research Council of Canada (NSERC) Postgraduate Scholarship, Doctoral Level |
| 2010-2013 | Stanford Graduate Fellowship in Science and Engineering, Gabilan Fellow |
| 2010-2011 | Natural Sciences and Engineering Research Council of Canada (NSERC) Postgraduate Scholarship, Masters Level |
| 2010 | Henry Taube Award, Stanford University |
| 2010 | ACS Division of Inorganic Chemistry Undergraduate Award in Inorganic Chemistry |
| 2010 | British Columbia Inorganic Discussion Weekend Poster Prize |

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| 2010 | Natural Sciences and Engineering Research Council of Canada (NSERC) Undergraduate Student Research Award |
| 2010 | Society of Chemical Industry Canada Section Merit Award |
| 2005-2009 | University of Victoria Excellence Award Scholarship |
| 2009 | Canadian Society for Chemistry Silver Medal Award |
| 2009 | Charles Humphrey Memorial Scholarship in Chemistry |
| 2009 | Frank and Margaret Gibbs Scholarship |
| 2009 | Hazel T. Knox Memorial Scholarship |
| 2009 | Natural Sciences and Engineering Research Council of Canada (NSERC) Undergraduate Student Research Award |
| 2009 | Undergraduate Research Scholarship in Chemistry |
| 2009 | University of Victoria Faculty Scholarship |
| 2009 | University of Victoria Science Undergraduate Research Award |
| 2008 | Charles Humphrey Memorial Scholarship in Chemistry |
| 2008 | Natural Sciences and Engineering Research Council of Canada (NSERC) Undergraduate Student Research Award |
| 2008 | Stephen A. Ryce Memorial Scholarship |
| 2008 | University of Victoria Science Undergraduate Research Award |
| 2006 | Seaspan International Ltd. Scholarship |
| 2005 | British Columbia Provincial Scholarship |
| 2005 | Oak Bay Municipal Scholarship |
| 2005 | Miller Thomson Foundation National Scholarship |
| 2005 | Royal Canadian Legion Sir Percy Lake Memorial Scholarship |
| 2005 | Soroptimist Club Violet Richardson Award for Young Women |

## PUBLICATIONS

1. Zou, M.; Emge, T. J.; Waldie, K. M.* Two-Electron Redox Tuning of Cyclopentadienyl Cobalt Complexes Enabled by the Phenylenediamide Ligand. *ChemRxiv*. DOI: 10.26434/chemrxiv-2023-I58hm
2. Katipamula, S.; White, N. M.; Waldie, K. M.* Controlled-Potential Electrolysis for Evaluating Molecular Electrocatalysts. *Chem Catalysis* **2023**, *3*, 100561. DOI: 10.1016/j.checat.2023.100561. **Invited article as part of the Women in Catalysis Special Issue.**
3. Mancini, J. A.; Pike, D. H.; Poudel, S.; Timm, J.; Tyryshkin, A. M.; Siess, J.; Molinaro, P.; McCann, J. J.; Waldie, K. M.; Koder, R. L.; Falkowski, P. G.; Nanda, V.* Design of a

Minimal di-Nickel Hydrogenase Peptide. *Sci. Adv.* **2023**, *9*, eabq1990. DOI: 10.1126/sciadv.abq1990

4. Waldie, K. M.*, Katipamula, S. Recent Progress in the Development of Molecular Electrocatalysts for Formate Oxidation. *Catalysis Research*, **2022**, *2*, 15. DOI: 10.21926/cr.2201006

5. Cook, A. W.; Emge, T. J.; Waldie, K. M.* Insights into Formate Oxidation by a Series of Cobalt Piano-Stool Complexes Supported by Bis(phosphino)amine Ligands. *Inorg. Chem.*, **2021**, *60*, 7372-7380. DOI: 10.1021/acs.inorgchem.1c00563

6. Barrett, J. A.; Brunner, F. M.; Cheung, P. L.; Kubiak, C. P.; Lee, G. L.; Miller, C. J.; Waldie, K. M.; Zhanaidarova, A. Approaches to Controlling Homongeneous Electrochemical Reduction of Carbon Dioxide. In *Carbon Dioxide Electrochemistry: Homogeneous and Heterogeneous Catalysis*; Robert, M.; Costentin, C.; Daasbjerg, K., Eds.; Energy and Environment Series No. 28; Royal Society of Chemistry, 2021; pp 1-66. DOI: 10.1039/9781788015844-00001

7. Cook, A. W.; Waldie, K. M.* Molecular Electrocatalysts for Alcohol Oxidation: Insights and Challenges for Catalyst Design. *ACS Appl. Energy Mater.*, **2020**, *3*, 38-46. DOI: 10.1021/acsaem.9b01820. **Invited article as part of the Young Investigator Forum.**

8. Ostericher, A. L.; Waldie, K. M.; Kubiak, C. P.* Utilization of Thermodynamic Scaling Relationships in Hydricity to Develop Nickel Hydrogen Evolution Reaction Electrocatalysts with Weak Acids and Low Overpotentials. *ACS Catal.*, **2018**, *8*, 9596-9603. DOI: 10.1021/acscatal.8b02922

9. McLoughlin, E.†; Waldie, K. M.†; Ramakrishnan, S.; Waymouth, R. M.* Protonation of a Cobalt Phenylazopyridine Complex at the Ligand Yields a Proton, Hydride, and Hydrogen Atom Transfer Reagent. *J. Am. Chem. Soc.*, **2018**, *140*, 13233-13241. DOI: 10.1021/jacs.8b06156

10. Waldie, K. M.; Brunner, F. M.; Kubiak, C. P.* Transition Metal Hydride Catalysts for Sustainable Interconversion of $CO_2$ and Formate: Thermodynamic and Mechanistic Considerations. *ACS Sustainable Chem. Eng.*, **2018**, *6*, 6841-6848. DOI: 10.1021/acssuschemeng.8b00628

**11.** Waldie, K. M.†; Ostericher, A. L.†; Reineke, M. H.; Sasayama, A. F.; Kubiak, C. P.* Hydricity of Transition Metal Hydrides: Thermodynamic Considerations for $CO_2$ Reduction. *ACS Catal.*, **2018**, *8*, 1313-1324. DOI: 10.1021/acscatal.7b03396. **Selected for ACS Editor's Choice.**

12. Waldie, K. M.; Kim, S.-K.; Ingram, A. J.; Waymouth, R. M.* Cyclopentadienyl Cobalt Complexes as Precatalysts for Electrocatalytic Hydrogen Evolution. *Eur. J. Inorg. Chem.*, **2017**, 2755-2761. DOI: 10.1002/ejic.201700188

13. Waldie, K. M.†; Ramakrishnan, S.†; Kim, S.-K.; Maclaren, J. K.; Chidsey, C. E. D.; Waymouth, R. M.* Multielectron Transfer at Cobalt: Influence of the Phenylazopyridine Ligand. *J. Am. Chem. Soc.*, **2017**, *139*, 4540-4550. DOI: 10.1021/jacs.7b01047

14. Waldie, K. M.; Flajslik, K. R.; McLoughlin, E.; Chidsey, C. E. D.; Waymouth, R. M.* Electrocatalytic Alcohol Oxidation with Ruthenium Transfer Hydrogenation Catalysts. *J. Am. Chem. Soc.*, **2017**, *139*, 738-748. DOI: 10.1021/jacs.6b09705

15. Ramakrishnan, S.†; Waldie, K. M.†; Warnke, I.; De Crisci, A. G.; Batista, V. S.;* Waymouth, R. M.;* Chidsey, C. E. D.* Experimental and Theoretical Study of $CO_2$ Insertion into Ruthenium Hydride Complexes. *Inorg. Chem.*, **2016**, *55*, 1623-1632. DOI: 10.1021/acs.inorgchem.5b02556
16. Nawn, G.; Waldie, K. M.; Oakley, S. R.; Peters, B. D.; Mandel, D.; Patrick, B. O.; McDonald, R.; Hicks, R. G.* Redox-Active Bridging Ligands based on Indigo Diimine ("Nindigo") Derivatives. *Inorg. Chem.*, **2011**, *50*, 9826-9837. DOI: 10.1021/ic200388y
17. Oakley, S. R.; Nawn, G.; Waldie, K. M.; MacInnis, T. D.; Patrick, B. O.; Hicks, R. G.* "Nindigo": Synthesis, Coordination Chemistry, and Properties of Indigo Diimines as a new class of Functional Bridging Ligands. *Chem. Comm.*, **2010**, *46*, 6753-6755. DOI: 10.1039/C0CC01736A

† These authors contributed equally.
* Corresponding author.

## PRESENTATIONS (2016-present)

1. ACS National Meeting & Exposition Fall 2023 – Advances in Photo- and Electrochemical Reduction of Carbon Dioxide: Symposium Honoring Etsuko Fujita, San Francisco, CA. August 2023. "*Electrochemical Oxidation Reactions at First-Row Transition Metal Complexes*." (upcoming invited talk)
2. ACS National Meeting & Exposition Fall 2023 – Catalysis Goes to Eleven Symposium, San Francisco, CA. August 2023. "*Multielectron Redox Transformations Enabled by a Redox-Active Ligand*." (upcoming invited talk)
3. University of Virginia, Department of Chemistry, Charlottesville, VA. March 31, 2023. "*Enabling Electrocatalytic Transformations through Ligand Tuning at Transition Metal Complexes*." (invited talk)
4. Rutgers, The State University of New Jersey, Laboratory for Biomaterials Research, New Brunswick, NJ. February 10, 2023. "*My Experiences in Chemistry and Aiming to Improve the Experiences of Others.*" (invited talk)
5. Philadelphia Inorganic Colloquium, Villanova University, Villanova, PA. October 29, 2022. "*Exploring the Electrocatalytic Activity and Electronic Structures of Piano Stool Complexes*." (invited talk)
6. ACS National Meeting & Exposition Fall 2022 – Emerging Areas in Inorganic Chemistry Symposium, Chicago, IL. August 21, 2022. "*Insights into Electrocatalytic Oxidation Reactions using First-Row Transition Metal Complexes*." (invited talk, symposium co-organizer)
7. ACS Middle Atlantic Regional Meeting – Carbon Dioxide Reduction Chemistry: Electrochemical and Photochemical Pathways Symposium, Trenton, NJ. June 4, 2022. "*Thermodynamic Hydricity: Tipping the Scale between Carbon Dioxide Reduction and Formate Oxidation*." (invited talk)

8. ACS Middle Atlantic Regional Meeting – Advances in Electrochemical Symposium, Trenton, NJ. June 4, 2022. "*Multi-Electron Redox Behavior in Molecular Cobalt Complexes Revealed by Electrochemistry*." (invited talk)
9. International Solar Fuels Conference, Virtual Meeting. July 28, 2021. "*Insights into Metal-Hydride Formation for Electrocatalytic Oxidation Reactions*." (selected for talk)
10. ACS Middle Atlantic Regional Meeting – Inorganic and Organometallic Young Investigator Symposium, Virtual Meeting. June 10, 2021. "*Photoswitchable Extended Network Materials*." (invited talk)
11. ACS Middle Atlantic Regional Meeting – Energy Catalysis Symposium, Virtual Meeting. June 10, 2021. "*Insights into Electrocatalytic Oxidation Reactions using First-Row Transition Metal Complexes*." (invited talk)
12. ACS National Meeting & Exposition Spring 2021, Virtual Meeting. April 14, 2021. "*First-Row Transition Metal Complexes for Electrocatalytic Oxidation of Fuels.*" (talk)
13. ACS National Meeting & Exposition Spring 2020 – Emerging Areas in Inorganic Chemistry Symposium, Philadelphia, PA. March 24, 2020. "*First-row transition metal complexes for the electrocatalytic oxidation of liquid fuels*." (invited talk, symposium co-organizer) *Cancelled due to Covid-19*
14. Rutgers, The State University of New Jersey, Department of Materials Science and Engineering, New Brunswick, NJ. December 10, 2019. "*Photoswitchable Metal Organic Frameworks (MOFs).*" (invited talk)
15. ACS National Meeting & Exposition Fall 2019, San Diego, CA. August 28, 2019. "*Development of Molecular Catalysts for Energy-Related Transformations.*" (talk)
16. Muhlenberg College, Department of Chemistry, Allentown, PA. October 26, 2018. "*Using Thermodynamic Hydricity as a Guide for Electrocatalyst Design.*" (invited talk)
17. ACS National Meeting & Exposition Spring 2018, New Orleans, LA. March 20, 2018. *"Electrocatalytic Formate Oxidation with an Iridium Hydride Complex."* (talk)
18. ACS National Meeting & Exposition Spring 2018, New Orleans, LA. March 18, 2018. *"Hydricity and Other Thermodynamic Considerations for $CO_2$ Reduction."* (poster)
19. Rutgers, The State University of New Jersey, Department of Chemistry and Chemical Biology, New Brunswick, NJ. February 8, 2018. "*Chemical and Electrochemical Approaches to Moving Protons and Electrons with Metal Hydride Complexes.*" (invited talk)
20. ETH Zürich, Laboratorium für Anorganische Chemie, Zürich, Switzerland. November 14, 2017. "*Chemical and Electrochemical Approaches to Moving Protons and Electrons with Metal Hydride Complexes.*" (invited talk)
21. Southern California Inorganic Photochemistry Conference, University of Southern California Wrigley Institute, CA. September 16, 2017. *"Electrochemical Reduction of Imidazolium Carboxylates."* (talk)

22. ACS National Meeting & Exposition Spring 2017, San Francisco, CA. April 2, 2017. *"N-Heterocyclic Carbenes as Promoters for the Heterogeneous Reduction of $CO_2$ at Metal Electrodes."* (talk)
23. Southern California Inorganic Photochemistry Conference, University of Southern California Wrigley Institute, CA. September 17, 2016. *"NHC Promoters for the Heterogeneous Reduction of $CO_2$ at Metal Electrodes."* (talk)

## RESEARCH PROGRAM

Current Support

NSF Division of Chemistry, Chemical Catalysis Program CHE-2247645
Kate M. Waldie (PI) 07/01/2023-06/30/2026 $530,387
*Electrochemical Ionic Hydrogenation: Promoting Carbonyl and Imine Reduction through Electrocatalysis*

ACS Petroleum Research Fund, Doctoral New Investigator Grant 65171-DNI3
Kate M. Waldie (PI) 01/01/2022-08/31/2024 $110,000
*Noble-Metal Reactivity at Cobalt: Using Redox Active Ligands to Promote Multi-Electron Transformations*

Current Graduate Students

Sewwandi Kuruppu (2023-present)
Krishani Teeluck (2022-present)
Alex Corral (2021-present)
Navar Mercer White (2020-present)
Sriram Katipamula (2018-present)
Minzhu Zou (2018-present)

Former Graduate Students

Hellan Kadukumblayil Moncy, M.S. 2023
Jennifer Guzman Pichardo, M.S. 2022
Siddhant Warrier, M.S. 2022

Undergraduate Students

Andrew Fedors, 2021-present (Aresty 2021, Rutgers B.A. 2023)
Kaitlin Cheung, 2020-present (Rutgers B.A. 2023)
Isabella Niedzwiecki, 2020-present (Aresty 2020, Rutgers B.A. 2023)
Priya Patel, 2018-2022 (Aresty 2019, Rutgers B.A. 2022)
Alexander Hidalgo, Summer 2022 (RISE 2022)
Victoria Diaz, Summer 2021 (RISE 2021)
Ronaldo Franjul, Summer 2020 (RISE 2020)
Zachary Clifford, Summer 2019 (RISE 2019)
Jingjing Jin, Fall 2018 (Rutgers B.A. 2019)

Postdoctoral Associates
Dr. Andrew Cook, Ph.D. (2019-2021)

## TEACHING

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| Chem 459/549 | Electroanalytical Chemistry (Fall 2018, Fall 2020, Fall 2022) |
| Chem 164 | Honors General Chemistry II (Spring 2020, Spring 2022) |

## SERVICE

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| Journal Reviewer | *ACS Applied Energy Materials*, *ACS Catalysis*, *Advanced Materials*, *Angewandte Chemie, ChemElectroChem*, *Chemical Communications*, *Chemical Science*, *Chemical Society Reviews*, *Chemistry – A European Journal*, *ChemSusChem*, *Inorganic Chemistry*, *Journal of the American Chemical Society*, *Journal of The Electrochemical Society*, *Microchemical Journal*, *Nature*, *Nature Communications*, *Organometallics* |
| Grant Reviewer | ACS Petroleum Research Fund (2023)<br>ACS Petroleum Research Fund (2022)<br>ACS Petroleum Research Fund (2021)<br>DOE Basic Energy Sciences (2023)<br>DOE Basic Energy Sciences (2022)<br>DOE Basic Energy Sciences (2021)<br>DOE Basic Energy Sciences (2020)<br>NSF Grant Review Panellist (2019) |
| Co-Organizer | "Emerging Areas in Inorganic Chemistry" Symposium, ACS National Meeting Fall 2022, Chicago, IL (2022)<br>"Emerging Areas in Inorganic Chemistry" Symposium, ACS National Meeting Spring 2020, *cancelled due to Covid-19* (2020)<br>International Solar Fuels Young Conference (ISF-2 Young), San Diego, CA (2017) |
| Organizer | Diversity in Chemistry Seminar Series, Rutgers University (2021-present) |
| Faculty Advisor | CCB Diversity Committee, Rutgers University (2021-present) |
| Faculty Mentor | Research Intensive Summer Experience (RISE) Program (2019-2023)<br>LSAMP Summer Practical Research Experience (2023)<br>Douglass WiSE Program, Project SUPER (2023)<br>Aresty Summer Science Program (2019-2021) |
| Member | Rutgers School of Arts & Sciences Core Requirements Committee (2021-present)<br>Rutgers Division of Mathematical and Physical Sciences Diversity, Equity, and Inclusion (DEI) chair (2023-present) |