

Molly Meng Hua Sung

Email: molly.sung@mail.utoronto.ca

Education	PhD Candidate, Chemistry (Organometallics and Catalysis)	2014-present
	<ul style="list-style-type: none">University of Toronto, Toronto, On, CanadaAdvisor: Professor Robert MorrisThesis: Experimental and Theoretical Design of M–H Catalysts for Small Molecule Activation	
	International Research Exchange Student (IRTG-2027)	2019
	<ul style="list-style-type: none">Westfälische Wilhelms-Universität MünsterAdvisor: Prof. Dr. F. Ekkehardt Hahn	
	Bachelor of Science, Chemistry	2009-2014
<ul style="list-style-type: none">University of British Columbia, Vancouver, BC, CanadaAdvisor: Professor Curtis BerlinguetteThesis: "Spectroscopic and electrochemical properties of iron(II) polypyridyl complexes through the modification of ancillary ligands"		
	International Exchange Student, Chemistry 3 Honours	2011-2012
<ul style="list-style-type: none">University of Glasgow, Glasgow, Scotland, UK		
Research Experience	Graduate Research Assistant, Morris Group, University of Toronto	2014-present
	<ul style="list-style-type: none">Synthesized and characterized new transition metal complexes for water oxidation and CO₂ reduction catalysisEstablished parameters for metal-hydride acidity using density functional theoryCarried out catalytic screenings for the hydrogenation of asymmetric ketones	
	Undergraduate Thesis Student, Berlinguette Group, University of British Columbia	2013-2014
	<ul style="list-style-type: none">Conducted research into the viability of a new iron-based dye for Grätzel-style solar cellsSynthesized and characterized a family of iron complexes using mass spectrometry and cyclic voltammetry to determine the electronic effects of ancillary ligands	
	Undergraduate Summer Student, Cullis Group, University of British Columbia	2013 and 2014
<ul style="list-style-type: none">Formulated and analyzed liposomes for use in cancer cells and in hygienic behaviour studies of honeybeesMeasured the pK_a of cationic lipids for use in siRNA delivery liposomesStudied liposome degradation pathways of liposomes through ultra-performance liquid chromatography		
	Directed Studies Student, Mehrhodavandi Group, University of British Columbia	2012-2013
<ul style="list-style-type: none">Optimized the synthesis of proligands for the study effects of hydrogen-bonding during the ring-opening polymerization of lactide		
Teaching Experience	Tutorial Teaching Assistant	
	Led tutorials of roughly 20-40 students through problem sets in a lecture-style setting.	
	<ul style="list-style-type: none">Chemistry 247 – Introductory Organic Chemistry IIChemistry 136 – Introductory Organic Chemistry I	2017 2016-Present
	Laboratory Teaching Assistant	
Demonstrated lab techniques and supervised students during the practical portion of their coursework and provided feedback on the content and scientific writing of their lab reports.		
<ul style="list-style-type: none">Chemistry 338 – Intermediate Inorganic ChemistryChemistry 238 – Introduction to Inorganic ChemistryChemistry 136 – Introductory Organic ChemistryChemistry 151 – Chemistry: The Molecular Science	2016-2017 2015-2016 2014-2016 2015	

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Research Mentorship

Provided guidance and training to undergraduate researchers in the Morris Lab

- Jacob Schneidewinde – 1st year undergraduate summer researcher (2015, currently a researcher at the Leibniz-Institut für Katalyse – Beller Group)
- Jay Kyungseop Lee – 3rd year summer researcher (2015, currently a MSc student at the University of Western Ontario – Corrigan Group)
- Albert Maotong Xu – 3rd year undergraduate summer NSERC (2015, currently a PhD student at the University of Toronto – Stephan Group)
- Vanessa Lee – 4th year undergraduate thesis student (2016-2017, currently a Medical student at McMaster University)
- Sofia Jdanova – 3rd year undergraduate summer NSERC and 4th year undergraduate thesis student (2018-2019, currently a MSc student at the University of Toronto – Taylor Group)

Peer-Reviewed Publications

Sung, M. M. H., Prokophuk, D. E., Morris, R. H.; *Phosphine-free ruthenium NCN-ligand complexes and their use in catalytic CO₂ hydrogenation*. Dalton Transactions, **2019**. Accepted.

Schnieders, D., Tsui, B. T. H., **Sung, M. M. H.**, Bortolus, R., Schrobilgen, G. J., Neugebauer, J., Morris, R. H.; *Metal Hydride Vibrations: The Trans Effect of the Hydride*. Inorganic Chemistry, **2019**. Accepted.

Sung, M. M. H., Jdanova, S., Morris, R. H.; Ligand acidity constants as calculated by density functional theory for PF₃ and N-Heterocyclic carbene ligands in hydride complexes of Iron(II). Journal of Organometallic Chemistry, **2019**, 880, 15-21.

Wan, K. Y., **Sung, M. M. H.**, Lough, A. J., Morris, R. H.; *Half-Sandwich Ruthenium Catalyst Bearing an Enantiopure Primary Amine Tethered to an N-Heterocyclic Carbene for Ketone Hydrogenation*. ACS Catalysis, **2017**, 7, 6827-6842.

Sung, M. M. H., Morris, R. H.; *DFT Calculations Support the Additive Nature of Ligand Contributions to the pK_a of Iron Hydride Phosphine Carbonyl Complexes*. Inorganic Chemistry, **2016**, 55, 9596-9601.

Chen, S; Tam, Y. Y. C.; Lin, P. J.; **Sung, M. M.**; Tam, Y. K.; *Influence of Particle Size on the In Vivo Potency of Lipid Nanoparticle Formulations of siRNA*. Journal of Controlled Release, **2016**, 235, 236-244.

Other Publications

Sung, V. and **Sung, M.** *Do we have enough scientists in Parliament?* iPolitics, November, 2019.

Sung, M. *Verifying the virtues of volunteering*. Canadian Chemical News, September, 2019.

Qaiser, F. and **Sung, M.** *A beginner's guide to forming a student science policy group*. Science Borealis, June 24, 2017.

Gruosso, T., Qaiser, F., **Sung, M.**, and Franquin, M. *Budget 2019 promises support for the next generation of scientists, but Ottawa must go farther still*. ReSearch Money, April 27, 2019

Kolluru, V.; Pao, C.; **Sung, M.** *STEM education means social priorities*. Canadian Chemical News, March, 2019.

Sung, M. *Veggie (Scrap) Tales – Are plant-based polymers the answer to our plastic conundrum?*. The Green Chemistry Initiative Blog, March 7, 2018.

Sung, M. *Science advocacy can save Canadian science (and the next generation of Canadian scientists)*. Science Borealis, September 13, 2017.

Presentations

Sung, M. M. H., Jdanova, S., Prokopchuk, D. E., Morris, R. H. *Ligand design by additive ligand acidity constants*. 52nd Inorganic Discussion Weekend, Oshawa, Canada, November 8-10th, 2019.

Sung, M. M. H.; Morris, R. H. *Catalyst design by additive ligand acidity constants*. 8th Annual Symposium of IRTG 2027, Münster, Germany, April 11-12, 2019

Jdanova, S.; **Sung, M. M. H.**; Morris, R. H. *Ligand acidity constants of PF₃ and N-Heterocyclic Carbene ligands calculated by density functional theory in Iron(II) Hydride complexes*. 51st Inorganic Discussion Weekend, Waterloo, Canada, November 9-11, 2018.

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Sung, M. M. H.; Unsleber, J. P.; Neugebauer, J.; Morris, R. H. *Predicting the pKa of transition metal hydrides: using density functional theory to access the acidity constants of a large library of ligands*. 101st Canadian Chemistry Conference and Exhibition, Edmonton, Canada, May 27-31, 2018.

Sung, M. M. H.; Wan, K. Y.; Morris, R. H. *Density Functional Theory Calculations: Predicting the pKa of Metal Hydride Complexes and Mechanistic Investigation of Hydrogenation Catalysis*. High Performance Computing Symposium 2017, Kingston, Canada, June 6-9, 2017

Sung, M. M. H.; Morris, R. H. *DFT Calculations toward Development of the Ligand-Acidity Constant Method of Predicting pKa Values of Metal-Hydrides*. 100th Canadian Chemistry Conference and Exhibition, Toronto, Canada, May 28-June 1, 2017

Wan, K. Y.; **Sung, M. M. H.;** Rebmann, H.; Santana, S. S.; Bergen, E.; Tsui, B. T. H.; Morris, R. H.; Rofles, F.; Tan, T. T. Y.; Hahn, F. E. *Transition Metal Complexes with Enantiomerically Pure Bidentate Amide Tether N-Heterocyclic Carbenes: Synthesis, Coordination and Catalysis*. 100th Canadian Chemistry Conference and Exhibition, Toronto, Canada, May 28-June 1, 2017

Wentzell, J.S.; **Sung, M.;** Morris, R.; Miller, R. J. D. *Structural Dynamics of Photocatalytic Water Oxidation*. 100th Canadian Chemistry Conference and Exhibition, Toronto, Canada, May 28-June 1, 2017

Sung, M. M. H.; Morris, R. H. *DFT calculations toward the development of the ligand-acidity constant method of predicting pKa values of metal-hydrides*. 49th Inorganic Discussion Weekend, Hamilton, Canada, November 11-13th, 2016.

Sung, M. M. H., Morris, R. H. *The reactivity of a ruthenium-NHC complex toward the production of renewable fuels*, 99th Canadian Chemistry Conference and Exhibition, Halifax, Canada, June 5-9, 2016

Prokopchuk, D. E.; **Sung, M. M.-H.;** Morris, R. H. *Ruthenium complexes for chemical and solar energy applications*. Institute for Sustainable Energy - University of Toronto Connaught Global Challenge Symposium, Toronto, Canada, Oct 8, 2014.

McAfee, A.; Chen, S.; **Sung, M. M.-H.;** Cullis, P. R.; Foster, L. J. *RNA interference methods to study hygienic behaviour in honey bees (Apis mellifera L.)*. Centre for High-Throughput Biology Research Day, Vancouver, Canada, Oct 2, 2014.

Sung, M. M.-H. *Iron-centred complexes in dye-sensitized solar cells*. UBC Chemistry Undergraduate Research Conference, Vancouver, Canada, March 27, 2014.

Osten, K. M.; Duffy, I. R.; Lagaditis, P. O.; **Sung, M.;** Yu, J. C-C.; Yuan, L.; Yu, I.; Aluthge, D. C.; Patrick, B. O.; Mehrkhodavandi, P. *Effects of Ligand Tuning on Dinuclear Indium Catalysts for the Polymerization of Lactide*. 96th Canadian Chemistry Conference and Exhibition, Quebec City, Canada, May 25-20, 2013.

Awards & Grants

Special Opportunity Travel Fellowship	University of Toronto – Department of Chemistry	2019
ChemClub Education Award	University of Toronto – Department of Chemistry	2018
Chemical Education Fund	Chemical Institute of Canada (Toronto) – Grant awarded for Professional Development program	2017
Chemical Education Fund	Chemical Institute of Canada (Toronto) – Grant awarded for public outreach initiatives	2016
Chemical Institute of Canada Student Chapter Merit Award	University of British Columbia – Undergraduate Chemistry Society	2014
UBC Dean of Science Undergraduate Research Award	University of British Columbia	2013
UBC President's Entrance Scholarship	University of British Columbia	2009

Leadership and Volunteer Experience

University of Toronto Green Chemistry Initiative (GCI) Seminar Series Coordinator (2010-2020)		2016-Present
<ul style="list-style-type: none">Created budget proposal for green chemistry speaker series		

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- Contacted speakers and organized logistics of their visits

Secretary (2017-2018)

- Distributed bi-weekly emails to department on behalf of the GCI
- Scheduled and take minutes at monthly meetings
- Coordinated external communications on behalf of the GCI

Member-at-Large, University of Toronto Green Chemistry Initiative (2016-2017)

- Assisted with Green Chemistry Undergraduate Curriculum Evaluation to determine where Green Chemistry could be emphasized in undergraduate courses
- Participated in weekly inspections of variable fume hood sash levels in the Davenport Wing of the Chemistry Department

Toronto Science Policy Network (TSPN)

2018-2019

Co-founder

- Co-founded a new student group at the University of Toronto that provides a platform for students and post-docs to learn about and engage in science policy
- Organized planning meetings for the establishment of the TSPN student group
- Co-wrote organization constitution
- Co-led event planning for workshops and public panel discussions, over 300 attendees in inaugural year
- Led fundraising efforts, over \$5000 raised in inaugural year

Chemical Institute of Canada – Toronto Section (CIC-Toronto)

2015-2018

Chair (2017-2018)

- Organized and chair monthly executive meetings
- Oversaw the operation and organization of events held by the CIC Toronto Section
- Lead organizer: E. Gordon Young Lecture series feat. Prof. Polly Arnold (University of Edinburgh)
- Spearheaded an Industry Networking Night hosted by Innovation4D companies: Xerox Canada, GreenCentre Canada, and the Research, Innovation, Commercialization Centre.

Vice-Chair (2016-2017)

- Oversaw the organization of events held by the CIC Toronto Section
- Lead organizer for the Life After the Lab: Unconventional Careers for Scientists Symposium at the 100th Canadian Chemistry Conference and Exhibition

Government Liaison (Interim) and Volunteer (2015-2016)

- Researched and prepared a list of questions and interviewed a number of federal election candidates with a focus on the relationship between science and policy
- Organized CIC-Toronto's annual brewery tour and social mixer, student awards night and annual general meeting
- Co-founded a new science fair in conjunction with Science-Rendezvous

Women in Chemistry–Toronto/CIC-Toronto Mentorship Program

2016-2018

Co-founder and Co-coordinator (2016-2018)

- Organized the logistics of the mentorship program including recruitment of both mentors and mentees and matching of mentors to mentees
- Organized and participated in training sessions for program participants
- Co-wrote "How-to Guides" for the mentorship program

Mentor (2017)

- Met with an undergraduate student to discuss her future plans and to give advice on how to gain research experience and apply for graduate program

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| Data Co-ordinator, Jessica Bell Campaign – Ontario New Democratic Party | 2018 |
| <ul style="list-style-type: none">• Collected and processed data collected on canvasses• Helped train and debrief volunteers | |
| Organizer, Special Seminar on the Fundamental Science Review | 2017 |
| <ul style="list-style-type: none">• Invited speaker Dr. Jim Woodgett summarized the findings of Canada's Fundamental Science Review (commonly referred to as the Naylor Report)• Invited speaker Kathleen Walsh of Evidence for Democracy highlighted the importance of science advocacy and outlined how best to engage our local representatives | |
| Volunteer, Niki Ashton NDP Leadership Campaign | 2017 |
| <ul style="list-style-type: none">• Processed data collected from phone banking• Researched and compiled science policies | |
| Canvasser, Jennifer Hollett Campaign – New Democratic Party of Canada | 2015 |
| <ul style="list-style-type: none">• Informed voters about important policies and news with regards to the federal election• Helped train other volunteers• Accompanied the candidate to events and on canvasses• Acted as a liaison between the campaign and Elections Canada on election day | |
| Social Coordinator, UBC Undergraduate Chemistry Society | 2013-2014 |
| <ul style="list-style-type: none">• Organized wine and cheese meet-and-greet nights for students and professors• Coordinated public “2-bucks-a-beaker” social nights | |