

Elena Liles, Curriculum Vitae

PhD Student
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Education

University of British Columbia, Vancouver, Canada

2018 – Present

PhD., Chemistry
Supervisor: Prof. Jason Hein

University of Victoria, Victoria, Canada

2013 – 2017

B.Sc. Chemistry Honours
4th year project title "Investigating Hydrophosphination of Alkenes"
Project Supervisor: Prof. Lisa Rosenberg

Awards & Scholarships

- **2019: NSERC Postgraduate Scholarship-Doctoral (PGS-D)**
University of British Columbia, Vancouver, Canada.
Criteria: Research ability or potential (50%), Academic excellence (30%), communication, interpersonal, and leadership abilities(20%).
- **2018: The Four Year Doctoral Fellowship (4YF),**
University of British Columbia, Vancouver, Canada.
Criteria: Academic excellence upon the recommendation of the graduate program.
- **2018: Chemistry Graduate Fellowship**
University of British Columbia, Vancouver, Canada.
Criteria: On recommendation of the Department and the graduate program.
- **2018: Gladys Estella Laird Research Fellowship,**
University of British Columbia, Vancouver, Canada.
Criteria: Graduate students in Chemistry who hold major academic awards
- **2017: Hugh and Lilian Salmond Scholarship in Chemistry**
University of Victoria, Victoria, Canada.
Criteria: Academic excellence, contribution to health science
- **2017: NSERC Undergraduate Student Research Award (USRA)**
Queens University, Kingston, Canada.
Criteria: Academic excellence, research potential.

Research and Work Experience

September 2018 to Present – PhD Candidate, University of British Columbia. I am currently working on the development of an autonomous research platform to speed the discovery process of new energy storage materials. We are building a platform that interfaces with state-of-the-art machine learning algorithms for multi-component optimization. My work will be focussing on developing a modular robotics platform for materials discovery and reaction optimization. I will also work on the development of machine learning algorithms that will be used to efficiently explore chemical space.

September 2017 to April 2018 – Undergraduate Research Associate, University of Victoria. In the McIndoe group I was involved in the study of methylaluminoxane (MAO). Since its discovery in the 1970s MAO has been used industrially as a cocatalyst in olefin polymerization, though its structure and exact role in catalyst activation are poorly defined. Mechanistic studies of MAO have proved challenging due to its high reactivity and difficulty in obtaining suitable crystals for diffraction. The McIndoe group makes use of an anaerobic real-time mass spectrometry to study the structure and mechanism of operation of MAO. In one of my projects, I worked on monitoring the speciation of MAO prepared by various literature methods and made comparisons with samples obtained from industry.

September 2017 to Present – Teaching Assistant, University of Victoria. As a teaching assistant I was responsible for the supervision of first year undergraduates in their laboratory sections. My duties include the planning and execution of pre-lab talks as well as marking reports, invigilating exams, and providing office hours for tutoring.

May 2017 to August 2017 – Undergraduate Research Associate, Queen's University. In the Crudden group, I used *N*-heterocyclic carbenes (NHCs) to stabilize gold-based materials. In 2014, the Crudden group demonstrated that NHCs are exceptional ligands for gold surfaces. They demonstrated that NHC-on-Au films survive refluxing in organic solvents, acid, base, oxidation with hydrogen peroxide, and heating up to 600 K. The stability of these films is significantly greater than traditional sulfur-based films, which is attributed to the replacement of oxidatively sensitive sulfur-metal bonds with strong and chemically inert carbon-metal bonds. However, the effect of NHC structure on the strength of the metal-carbon bond and the performance of the film had barely been examined. I investigated the electronic and steric effects of non-classical NHCs on the properties of the resulting self-assembled monolayers on gold surface. Additionally I worked on extending NHC binding from flat surfaces to curved structures such as gold nanoparticles.

January 2015 to May 2017 – Undergraduate Research Associate, University of Victoria. I started with the Rosenberg group as an undergraduate volunteer researcher. One of the Rosenberg group's interests is the design of catalysts for hydrophosphination of alkenes to form tertiary phosphines. These phosphines are desirable as they are excellent ligands for metal and could be useful for asymmetric organometallic catalyst design. My work in the group began with on the preparation of ruthenium-based phosphine complexes for the catalytic hydrophosphination of unactivated alkenes by an outer-sphere mechanism. I continued with the group as an honours student where the main focus of my project was the preparation and characterization

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of new cobalt based secondary phosphine complexes as well as investigations into their use as catalysts in the inner-sphere hydrophosphination of unactivated alkenes. During this time I also contributed to the ongoing mechanistic studies on the ruthenium system by deriving rate laws and analysing the kinetic data to better understand the mechanism.

May 2015 to September 2016 – Laboratory Technologist, Suncor. At Suncor I held a technologist position in their petroleum quality control laboratory. I was responsible primarily for the safe handling and testing of various fuel including petroleum, diesel, and jet fuel. I had the opportunity to gain experience on a wide variety of instrumental analyses including HPLC; cloud, pour, and flash point; automatic distillation, and Karl Fischer titrations.

September 2014 to December 2014 – Undergraduate Research Associate, University of Victoria. I worked in the Hicks group as a volunteer undergraduate research assistant. The Hicks group is interested in the design and development of redox active ligands (RALs). The majority of research on RALs is focused on common types of ligands such as dithiolenes and dioxolenes. The Hicks group has explored the chemistry of verdazyls, an especially stable class of radical heterocyclic compounds. My project was working on the synthesis of new water-soluble verdazyls for use in industrial applications.

Presentations

(Presenting Author underlined)

1. **E. Liles**, R.G.Belli, and L. Rosenberg **2017** "Investigating hydrophosphination of alkenes" University of Victoria, Victoria, British Columbia, Canada, March 26. (Oral and poster presentation)
2. **E. Liles**, R.G.Belli, J. Yang and L. Rosenberg **2017** "Investigating the Reactions of a Cobalt Dication with Secondary Phosphines" University of Victoria, Victoria, British Columbia, Canada, May 10. *Inorganic Discussion Weekend* (Poster presentation)
3. R.G. Belli, J. Yang, **E. Liles**, and L. Rosenberg, **2017**. "Terminal Phosphido Complexes in Catalytic Hydrophosphination", *12th International Conference on Heteroatom Chemistry*, Vancouver, BC, June 11-16. (Oral presentation)
4. R.G. Belli, J. Yang, **E. Liles**, and L. Rosenberg, **2017**. "Developing Catalysts for the Hydrophosphination of Alkenes", *100th Canadian Society for Chemistry Conference and Exhibition*, Toronto, ON, May 28-June 1. (Oral presentation)
5. R.G. Belli, **E. Liles**, and L. Rosenberg, **2017**. "Analysis of Ru-Catalyzed Hydrophosphination via Simple Kinetic and Graphical Methods", *100th Canadian Society for Chemistry Conference and Exhibition*, Toronto, ON, May 28-June 1. (Oral presentation)
6. **E. Liles**, H. Zijlstra, and J.S. McIndoe. **2018**. "Methylalumoxane Synthesis", *101th Canadian Society for Chemistry Conference and Exhibition*, Edmonton, AB, May 29-May 31. (Oral presentation)
7. J. Yang, **E. Liles**, R.G. Belli, C. Zheng, R. McDonald, and L. Rosenberg. **2018**. "Developing a cobalt(III) system for catalytic alkene hydrophosphination", *101th Canadian Society for Chemistry Conference*

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and Exhibition, Edmonton, AB, May 29-May 31. (Oral presentation)

8. A. Joshi, H. Zijlstra, **E. Liles**, S. Collins, JS McIndoe. **2019**. "Synthesis of Methylalumoxanes", *102th Canadian Society for Chemistry Conference and Exhibition*, Quebec City, ON, Jun 03-Jun 07. (Oral presentation)
9. **E. Liles**, J. D. Daponte, L. E. Yunker, and J. E. Hein. **2019**. "Developing an Automated Platform for Kinetics", *102th Canadian Society for Chemistry Conference and Exhibition*, Quebec City, ON, Jun 03-Jun 07. (Poster presentation)