

Edward D. Cross

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Professional Experience

Researcher in Green Mining Technologies | Verschuren Centre for Sustainability in Energy and the Environment

2015-Present

- Support research focusing on the development of innovative, economic, and sustainable solution mining technologies to reduce environmental challenges posed by conventional mining and smelting of metals.
- Provide expert advice on chemical analysis, methodology development, and product characterization.
- Conduct analyses to characterize products produced/required by the industry partner.
- Collect data, record accuracy, quality assurance, and present findings at meetings.
- Interface with research faculty and staff at the Verschuren Centre, and the industrial client to ensure success.
- Participate in the development of a collection of related research projects.

Research Associate | Cape Breton University (Sydney, NS) & University of Prince Edward Island (Charlottetown, PE)

7 years experience

- Independently explored novel, multifaceted research projects while setting short-term goals to achieve project objectives.
- Coordinated and advised junior laboratory members on their projects.
- Prepared reagents and mixed appropriately to synthesize target organic, organometallic and polymeric compounds according to novel or reported procedures.
- Applied critical thinking and judgment to data analysis and interpretation.
- Created standard operating procedures for new synthetic procedures or equipment to ensure proper execution.
- Maintained laboratory equipment and performed required preventative maintenance on regular intervals.
- Ensured GLPs were followed by all laboratory members.
- Summarized and communicated project results to supervisor, colleagues, the general scientific community and the public.

Laboratory Instructor | CBU (Sydney, NS) & UPEI (Charlottetown, PE)

2 years experience

Courses: CHEM221 – Introductory Organic Chemistry I (CBU), CHEM241/242 - Organic Chemistry I & II (UPEI), CHEM243 - Organic Chemistry for the Life Sciences (UPEI).

- Learned how to effectively teach large groups of students (up to 40 per instruction period, 2 sections per semester) with one teaching assistant. Educated students on WHMIS interpretation and proper lab etiquette and safety protocols.
- Corrected student laboratory reports or quizzes on a weekly basis, and returned by the next laboratory session. Evaluated student laboratory notebooks at the end of each semester.

Technical Skills

- Responsible for setting up equipment and writing notes relevant to the laboratory prior to the beginning of the laboratory period.
- Coordinated the compiling of student grades for final submission to professor.
- Received excellent instruction evaluations by students (>85% student satisfaction).
- Organometallic chemistry
- Polymer chemistry
- Wet chemistry
- Schlenk (air-sensitive) technique
- Inductively-Coupled Plasma Mass Spectrometry (**ICP-MS**)
- Powder X-ray Diffraction (**pXRD**)
- Particle Size Analysis
- Gel Permeation Chromatography (**GPC**)
- Gas chromatography flame ionization detection (**GC-FID**)
- Gas chromatography mass spectrometry (**GC-MS**)
- Nuclear Magnetic Resonance Spectroscopy (**NMR** 1D & 2D, ^1H , ^{13}C & ^{31}P , variable temperature)
- Ultra High Pressure Liquid Chromatography tandem mass spectrometry (**UPLC-MSMS**)
- Atmospheric Solid Analysis Probe mass spectrometry (**ASAP-MS**)
- Thermogravimetric Analysis (**TGA**)
- Differential Scanning Calorimetry (**DSC**)

Education

Master of Science in Molecular and Macromolecular Sciences (Chemistry) 2013

University of Prince Edward Island, Charlottetown, PE

- Concentration in polymer chemistry under the supervision of Dr. Michael Shaver.
- Thesis title: Living, immortal and co-polymerization of lactide and butyrolactone monomers with aluminum catalysts.

Bachelor of Science Honours (Chemistry) 2010

Cape Breton University, Sydney, NS

- Concentration in organometallic chemistry under the supervision of Dr. Matthias Bierenstiel
- Thesis title: Synthesis of new hemilabile tetradentate sulfur-functionalized *N*-heterocyclic carbene ligands for transition metal catalysis

Awards

- NSERC PGS-D3 (\$21,000/year for 3 years, National, 2012 – *Abrogated*).
- Dr. J. Regis Duffy Graduate Scholarship in Science (\$12,500, UPEI Institutional, 2010).
- Innovation PEI Graduate Student Fellowship (\$20,000/year for 2 years, PEI Provincial, 2010).

Refereed Manuscripts

9) **Cross, E. D.**; MacDonald, K. L.; McDonald, R.; Bierenstiel, M. *Acta Crystallographica Section C*. "A trinuclear palladium(II) complex containing *N,S*-coordinating 2-(benzylsulfanyl)anilinide and 1,3-benzothiazole-2-thiolate ligands with a central square-planar PdN_4 motif" **2014**, 70, 23.

8) Acosta-Ramirez, A.; **Cross, E. D.**; McDonald, R.; Bierenstiel, M. *Dalton Transactions*. "Binuclear ruthenium η^6 -arene complexes with tetradentate *N,S*-ligands containing the ortho-aminothiophenol motif" **2014**, 43, 3104.

7) Agatemor, C.; Arnold, A. E.; **Cross, E. D.**; Decken, A.; Shaver, M. P. *Journal of Organometallic Chemistry*. "Aluminium salophen and salen initiators in the ring-opening polymerisation of rac-lactide and rac- β -butyrolactone: Electronic effects on stereoselectivity and polymerisation rates" **2013**, 745–746, 335.

6) **Cross, E. D.**; Tennekone, G. K.; Decken, A.; Shaver, M. P. *Green Materials*. "Aluminum amine-(bis)phenolate complexes for ring-opening polymerization of rac-lactide and ϵ -caprolactone" **2013**, 1, 79.

5) **Cross, E. D.**; Allan, L. E. N.; Decken, A.; Shaver, M. P. *Journal of Polymer Science Part A: Polymer Chemistry*. "Aluminum salen and salan complexes in the ring-opening polymerization of cyclic esters: Controlled immortal and copolymerization of rac- β -butyrolactone and rac-lactide" **2013**, 51, 1137.

4) Alberto Acosta-Ramirez, J.; Larade, M. C.; Lloy, S. M.; **Cross, E. D.**; McLellan, B. M.; Martell, J. M.; McDonald, R.; Bierenstiel, M. *Journal of Molecular Structure*. "DFT and experimental study of the structure and vibrational spectra of 2-(benzylthio)-N-{pyridinylmethylidene}anilines" **2013**, 1034, 29.

3) Allan, L. E. N.; **Cross, E. D.**; Francis-Pranger, T. W.; Hanhan, M. E.; Jones, M. R.; Pearson, J. K.; Perry, M. R.; Storr, T.; Shaver, M. P. *Macromolecules*. "Controlled Radical Polymerization of Vinyl Acetate Mediated by a Bis(imino)pyridine Vanadium Complex" **2011**, 44, 4072.

2) Bierenstiel, M.; **Cross, E. D.** *Coordination Chemistry Reviews*. "Sulfur-functionalized N-heterocyclic carbenes and their transition metal complexes" **2011**, 255, 574.

1) **Cross, E. D.**; Shehzad, U. A.; Lloy, S. M.; Brown, A. R. C.; Mercer, T. D.; Foster, D. R.; McLellan, B. L.; Murray, A. R.; English, M. A.; Bierenstiel, M. *Synthesis*. "Synthesis and characterization of donor-functionalized N,S-compounds containing the ortho-aminothiophenol motif" **2011**, 303.

Presentations

15) Oral Presentation, "BSc Under the Microscope", CBU, Your BSc Under the Microscope Youth Engagement Event. (05/2015).

14) Oral Presentation, "Expanding the horizon: carbonylation of epoxides to lactones and succinic anhydrides", UPEI Molecular and Macromolecular Sciences Seminar Series (09/2012).

13) Oral Presentation, "Aluminum salen and salan complexes for the living and immortal ring-opening polymerization of rac- β -butyrolactone, rac-lactide and ϵ -caprolactone", World Polymer Congress (06/2012).

12) Oral Presentation, "Aluminum salen and salan complexes for the living and immortal ring-opening polymerization of rac- β -butyrolactone, rac-lactide, and ϵ -caprolactone", UPEI Graduate Studies Research Day (05/2012, **awarded Top Oral Presentation**).

11) Oral Presentation, "Aluminum salen and salan complexes for the living and immortal ring-opening polymerization of rac- β -butyrolactone, rac-lactide, and ϵ -caprolactone", Atlantic Inorganic Discussion Weekend (03/2012, **awarded Top Graduate Oral Presentation**).

10) Poster Presentation, "Stereocontrolled polymer brushes based on biodegradable poly(lactones)", CSC Canadian Conference and Exhibition (06/ 2011).

9) Oral Presentation, "Stereocontrolled polymer brushes based on biodegradable poly(lactones)", UPEI Graduate Studies Research Day (05/2011, **awarded Top Oral Presentation**).

- 8) Oral Presentation, "Stereocontrolled polymer brushes based on biodegradable poly(lactones)", Atlantic Inorganic Discussion Weekend (03/2011).
- 7) Oral Presentation, "Synthesis of New Binuclear Palladium Complexes with N,S-based Ligand Frameworks", CBU Summer Lecture Series (06/2010).
- 6) Poster presentation, "Multidentate N,S-based pyridyl and S-functionalized N-heterocyclic carbene ligand frameworks for transition metal catalysts", CSC Canadian Conference and Exhibition (06/2010).
- 5) Oral Presentation, "Multidentate N,S,-based pyridinyl ligands for transition metal catalysts", APICS ChemCon (05/2010, **awarded the Murray Brooker Award for Best Undergraduate Oral Presentation in Chemical Education**).
- 4) Oral Presentation, "Synthesis of New Hemilabile Tetradentate Sulfur Functionalized N-Heterocyclic Carbene Ligands for Transition Metal Catalysis", CBU Student Undergraduate Research Forum (03/2010, **awarded Top Oral Presentation**).
- 3) Oral Presentation, "Multidentate N,S-based pyridyl and S-functionalized N-heterocyclic carbene ligand frameworks for transition metal catalysts", Atlantic Inorganic Discussion Weekend (03/2010, **awarded Top Undergraduate Oral Presentation**).
- 2) Oral Presentation, "New Hexadentate N,S-ligand Systems with Pendant Pyridine Motifs: Synthesis and Characterization", CBU Summer Lecture Series (06/2009).
- 1) Poster Presentation, "New Hexadentate N,S-ligand Systems with Pendant Pyridine Motifs: Synthesis and Characterization", APICS ChemCon (05/2009).

Community outreach and volunteerism

- Volunteer – CBU Mall of Science Event (2013-2015)
- Graduate Student Funding Committee Representative – UPEI Student Union (2011-2012)
- Graduate Student Representative – UPEI Chemistry Society (2010-2012)
- Student Representative – CBU Faculty of Science and Technology (2009-2010)
- Vice President - CBU Chemistry Society (2009-2010)
- Secretary – CBU Chemistry Society (2008-2009)