Demyan E. Prokopchuk

CURRENT POSITION

Assistant Professor

Department of Chemistry

Determine Management

Rutgers University - Newark

73 Warren Street

Newark, NJ, 07102 demyan.prokopchuk@rutgers.edu

United States Research Group Website

EDUCATION AND EMPLOYMENT

Assistant Professor, Rutgers University, Newark, NJ

2019-

Postdoctoral Fellow, University of Calgary, AB, Canada

2017-2018

Mentor: Warren E. Piers

Electrocatalytic CO₂ reduction research as part of the Canada First Research Excellence Fund (CFREF)

Google Scholar

Web of Science

ORCID

Postdoctoral Fellow, Pacific Northwest National Laboratory, Richland, WA

2015-2017

Mentors: R. Morris Bullock, Michael Mock (now at Montana State University) N₂ reduction, H₂ oxidation in the DOE Center for Molecular Electrocatalysis EFRC

PhD, Chemistry, University of Toronto, Toronto, ON, Canada

2009-2015

Advisor: Robert H. Morris

Thesis Title: "Synthetic and Computational Studies of Metal-Ligand Cooperation with

Iron Group Complexes for Water Splitting and Ketone Hydrogenation"

BSc, Chemistry, University of Saskatchewan, Saskatoon, SK, Canada

2004-2009

Chemistry (Major, High Honors) and Computer Science (Minor)

Mentors: Stephen Foley, Heinz-Bernhard Kraatz (now at University of Toronto-Scarborough)

OTHER RESEARCH
POSITIONS

Visiting PhD Student, ETH Zürich (Hönggerberg), Switzerland

Jun-Oct 2014

Advisor: Hansjörg Grützmacher

Inorganic Chemistry Exchange (ICE) Student, Western University, London, ON

May-Aug 2008

Advisor: John Corrigan

ALL PUBLICATIONS

- 27. B. Goel, H. Neugebauer, A. VanderWeide, P. Sánchez, R. A. Lalancette, S. Grimme, A. Hansen, D. E. Prokopchuk "Mechanism of Electrocatalytic H₂ Production with Amine-rich FeCp Complexes: The Critical Roles of Coordinated Solvent and Cp Ring Activation" in preparation.
- A. VanderWeide, D. E. Prokopchuk "Cyclopentadienyl Ring Activation in Organometallic Chemistry and Catalysis" Nat. Rev. Chem., 2023, accepted.
- 25. A. Karagiannis, B. Goel, **D. E. Prokopchuk** "Putting a New Spin on Imido Chemistry with an Fe^{II} Dicarbene Complex" *Trends Chem.*, **2022**, 10.1016/j.trechm.2022.12.002 (invited contribution)
- 24. D. S. Tresp, H. Neugebauer, S. Grimme, A. Hansen, **D. E. Prokopchuk** "Electronic Effects of Aminoindenyl ligands Coordinated to Manganese: Structures and Properties of a Mn⁰ Metalloradical and Bimetallic Mn^I/Mn^{-I} Adduct" *Organometallics* **2022**, 10.1021/acs.organomet.2c00463
- 23. A. Karagiannis, A. M. Tyryshkin, R. A. Lalancette, D. M. Spasyuk, A. Washington, **D. E. Prokopchuk** "A Redox-active Mn(0) Dicarbene Metalloradical" *Chem. Commun.*, **2022**, 10.1039/D2CC04677F

Selected as a 2022 ChemComm HOT Article

- 22. L. Lin, D. Spasyuk, R. A. Lalancette, **D. E. Prokopchuk** "Coordination-Induced Weakening of a C(*sp*³)-H Bond: Homolytic and Heterolytic Bond Strength of a CH—Ni Agostic Interaction" *J. Am. Chem. Soc.*, **2022**, *144*, 12632. 10.1021/jacs.2c05667
- P. Sánchez, B. Goel, H. Neugebauer, Roger A. Lalancette, A. Hansen, S. Grimme, D. E. Prokopchuk
 "Ligand Protonation at Carbon, not Nitrogen, during H₂ Production with Amine-Rich Iron Electrocatalysts" *Inorg. Chem.* 2021, 60, 17407. 10.1021/acs.inorgchem.1c03142
- M. M. H. Sung, D. E. Prokopchuk, R. H. Morris "Phosphine-free ruthenium NCN-ligand complexes and their use in catalytic CO₂ hydrogenation" *Dalton Trans.* 2019, 48, 16569. (invited contribution) 10.1039/C9DT03143J
- Z. Dubrawski, J. Heidebrecht, B. M. P. Lombardi, A. S. Hyla, J. Willkomm, C. L. Radford, J.-B Lin, G. C. Welch, S. Ponnurangam, R. Roesler, D. E. Prokopchuk, W. E. Piers "Ligand-Centered Electrochemical Processes Enable CO₂ Reduction with a Nickel Bis(triazapentadienyl) Complex" Sustainable Energy Fuels 2019, 3, 1172. 10.1039/C8SE00623G
 - Selected as a 2019 Sustainable Energy and Fuels HOT Article
- 18. **D. E. Prokopchuk**, Geoffrey M. Chambers, E. D. Walter, M. T. Mock, R. M. Bullock "H₂ Binding, Splitting, and Net Hydrogen Atom Transfer at a Paramagnetic Iron Complex" *J. Am. Chem. Soc.* **2019**, *141*, 1871. 10.1021/jacs.8b12823
 - News article at Phys.org, February 19, 2019: "Mechanism of iron-based hydrogen bond cleavage revealed"
- D. E. Prokopchuk, E. S. Wiedner, E. D. Walter, N. A. Piro, W. S. Kassel, C. V. Popescu, R. M. Bullock, M. T. Mock "Catalytic N₂ Reduction into Silylamines and Thermodynamics of N₂ Binding at Square Planar Fe", J. Am. Chem. Soc. 2017, 139, 9291. 10.1021/jacs.7b04552
- P. Bhattacharya, D. E. Prokopchuk, M. T. Mock "Exploring the Role of Pendant Amines in Transition Metal Complexes for the Reduction of N₂ to Hydrazine and Ammonia", Coord. Chem. Rev., 2017, 334, 67. 10.1016/j.ccr.2016.07.005
- S. A. M. Smith, D. E. Prokopchuk, R. H. Morris "Asymmetric transfer Hydrogenation of Ketones Using New Iron(II) (P-NH-N-P') Catalysts: Changing the Steric and Electronic Properties at Phosphorus P'", Isr. J. Chem. 2017 57, 1204. (invited contribution) 10.1002/ijch.201700019
- 14. D. E. Prokopchuk, S. A. M. Smith, R. H. Morris "Ligands for iron-based homogeneous catalysts for the asymmetric hydrogenation of ketones and imines" in *Ligand Design in Metal Chemistry: Reactivity* and Catalysis, First Edition. Edited by Mark Stradiotto and Rylan Lundgren. John Wiley and Sons, Ltd., 2016 (invited contribution) 10.1002/9781118839621.ch8
- D. E. Prokopchuk, A. J. Lough, R. E. Rodriguez-Lugo, R. H. Morris, H. Grützmacher "Insights into metal-ligand hydrogen transfer: a square-planar ruthenate complex supported by a tetradentate aminoamido-diolefin ligand", *Chem. Commun.*, 2016, 52, 6138. 10.1039/C6CC00041J
- 12. W. Zuo, **D. E. Prokopchuk**, A. J. Lough, R. H. Morris "Details of the Mechanism of the Asymmetric Transfer Hydrogenation of Acetophenone Using the Amine(imine)diphosphine Iron Precatalyst: The Base Effect and The Enantiodetermining Step", *ACS Catalysis*, **2016**, *6*, 301. 10.1021/acscatal.5b01979
- 11. C. Lichtenberg, **D. E. Prokopchuk**, M. Adelhardt, J. Sutter, L Viciu, K. Meyer, H. Grützmacher "Reactivity of an All-Ferrous Iron–Nitrogen Heterocubane under Reductive and Oxidative Conditions", *Chem. Eur. J.*, **2015**, *21*, 15797. 10.1002/chem.201502530
- 10. **D. E. Prokopchuk**, B. T. H. Tsui, A. J. Lough, R. H. Morris "Intramolecular C–H/O–H Bond Cleavage with Water and Alcohol Using a Phosphine-Free Ruthenium Carbene NCN Pincer Complex", *Chem. Eur. J.*, **2014**, *20*, 16960, 10,1002/chem.201404819
 - News article in ChemViews magazine, October 12, 2014: "Phosphine-Free Ruthenium Complex for Water Splitting"

9. W. Zuo, S. Tauer, **D. E. Prokopchuk**, R. H. Morris "Iron Catalysts Containing Amine(imine)diphosphine P-NH-N-P Ligands Catalyze both Asymmetric Hydrogenation and Asymmetric Transfer Hydrogenation of Ketones" *Organometallics*, **2014**, *33*, 5791. (invited contribution) 10.1021/om500479q

One of the most read articles between 2011-2016 (over 13000 times).

- 8. S. E. Clapham, M. Zimmer-De Iuliis, K. Mack, **D. E. Prokopchuk**, R. H. Morris "Alcohol Assisted Base-free Hydrogenation of Acetophenone Catalyzed by OsH(NHCMe₂CMe₂NH₂)(PPh₃)₂" *Can. J. Chem.*, **2014**, *92*, 731. (invited contribution) 10.1139/cjc-2014-0060
- 7. **D. E. Prokopchuk**, A. Collado, A. J. Lough, R. H. Morris "Structural properties of *trans* hydridohydroxo M(H)(OH)(NH₂CMe₂CMe₂NH₂)(PPh₃)₂ (M = Ru, Os) complexes and their proton exchange behaviour with water in solution" *Dalton Trans.*, **2013**, *42*, 10214. 10.1039/C3DT50452B
- 6. **D. E. Prokopchuk**, R. H. Morris, "Inner-Sphere Activation, Outer-Sphere Catalysis: Theoretical Study on the Mechanism of Transfer Hydrogenation of Ketones Using Iron(II) PNNP Eneamido Complexes" *Organometallics*, **2012**, *31*, 7375. 10.1021/om300572v
- D. E. Prokopchuk, J. F. Sonnenberg, N. Meyer, M. Zimmer-De Iuliis, A. J. Lough, R. H. Morris, "Spectroscopic and DFT Study of Ferraziridine Complexes Formed in the Transfer Hydrogenation of Acetophenone Catalyzed Using trans-[Fe(CO)(NCMe)(PPh₂C₆H₄CH=NCH₂-)₂-κ⁴P,N,N,P](BF₄)₂" Organometallics, 2012, 31, 3056. 10.1021/om201170f
- 4. **D. E. Prokopchuk**, A. J. Lough, R. H. Morris "From Amine to Ruthenaziridine to Azaallyl: Unusual Transformation of Di-(2-pyridylmethyl)amine on Ruthenium" *Dalton Trans.*, **2011**, *40*, 10603. 10.1039/C1DT10626K
- 3. J. M. Chitanda, **D. E. Prokopchuk**, J. W. Quail, S. R. Foley "Synthesis of Palladacycles Employing Iminoisoindolines as Monoanionic Bidentate Ligands" *Dalton Trans.*, **2008**, 6023. 10.1039/B806544F
- 2. J. M. Chitanda, **D. E. Prokopchuk**, J. W. Quail, S. R. Foley "From Pyrroles to Isoindolines: Synthesis of a γ -Diimine Ligand for Applications in Palladium Coordination Chemistry and Catalysis" *Organometallics*, **2008**, *27*, 2337. 10.1021/om 800080e
- 1. **D. E. Prokopchuk**, G. A. Orlowski, H.-B. Kraatz "Synthesis of Amino Acid Conjugates of 1, 1'-dimethylferrocene: New Chiral Conjugates" *Inorg. Chim. Acta*, **2008**, *361*, 1327. 10.1016/j.ica.2007.08.028

RESEARCH GRANTS

American Chemical Society - Petroleum Research Fund (\$110,000)

2023-2025

"Using Adamantyl Ligands as Metal-Mediated C-H Activation Models" (Lead PI)

Rutgers Global Grants Program (\$8,000)

2022-2023

"Electrically Driven Carbon Dioxide Reduction Using Organobismuth Compounds" (Lead PI) Collaborative Project with Prof. Crispin Lichtenberg, University of Marburg

National Science Foundation (\$451,046)

2021-2024

"NSF-DFG-Echem: CAS: Synergistic Experimental and Computational Approaches to Designing Electrocatalysts with Proton-Responsive Ligand Architectures" (Lead PI)

National Science Foundation (\$273,700)

2020-2023

"MRI: Acquisition of a Single Crystal X-ray Diffractometer" (co-PI)

Rutgers Research Council (\$2,500)

2019-2020

"Bio-Inspired Molecular Catalysts for Electrochemical Energy" (Lead PI)

INVITED TALKS

HONORS AND AWARDS

University of New Hampshire, Durham, NH	Aug 2023
University of Seville, Seville, Spain	Apr 2023
University of Winnipeg, Winnipeg, MB	Mar 2023
University of Manitoba, Winnipeg, MB	Mar 2023
Marquette University, Milwaukee, WI	Jan 2023
The College of New Jersey, Ewing, NJ	Oct 2022
Canadian Chemistry Conference and Exhibition, Calgary, AB	Jun 2022
ACS Spring Meeting, San Diego, CA	Mar 2022
Pacifichem, Honolulu, HI	Dec 2021
IUPAC/Canadian Chemistry Conference and Exhibition, Montreal, QC	Aug 2021
University of Akron, Akron, OH (virtual)	Apr 2021
Peking University, Beijing, China	Sep 2019
Gordon Research Seminar, Solar Fuels, Ventura, CA	Jan 2018
University of British Columbia-Okanagan, Kelowna, BC	Jan 2018
University of Cincinnati, Cincinnati, OH	Dec 2017
Gordon Research Seminar, Organometallic Chemistry, Newport, RI	Jul 2017
Outstanding Staff Award, PNNL	2017
Outstanding Staff Award, PNNL	2016
J. Warren Flanagan Ontario Graduate Scholarship, U of T	2014–2015
Chemistry Conference Travel Grant, U of T	2014
Special Opportunity Graduate Travel Fellowship, U of T	2014
NSERC-CGS-D Michael Smith Foreign Study Scholarship	2014
Chemistry Conference Travel Grant, U of T	2012
NSERC CGS-D Alexander Graham Bell Canada Graduate Scholarship	2011–2014
School of Graduate Studies Conference Travel Grant, U of T	2011
Student Travel Award, ACS Division of Inorganic Chemistry	2011

Best Poster Award, Inorganic Discussion Weekend, Windsor, ON	2010
NSERC CGS-M Alexander Graham Bell Canada Graduate Scholarship	2010–2011
Edwin Walter and Margery Warren Scholarship in Science, U of T	2009–2010
Alan C. Nixon Summer Research Award, U of S	2007
Best Poster Award, U of S Chemistry Research Awards Day	2006
Greystone Scholar Entrance Scholarship, U of S	2004
Peer reviewer for the following journals: Journal of the American Chemical Society, Angewa International Edition, ACS Catalysis, Chemical Communications, Organometallics, Inoristry, New Journal of Chemistry, Dalton Transactions, Canadian Journal of Chemistry troChem	ganic Chem-
Review Editor, Frontiers in Chemistry (Inorganic Chemistry)	2022-
Panel Reviewer, National Science Foundation	2021, 2022
Panel Reviewer, ACS Petroleum Research Fund	2022, 2023
Panel Reviewer, Oak Ridge Associated Universities (FDCRGP Program)	2022
Symposium Co-organizer , Canadian Chemistry Conference and Exhibition, Calgary, AB "Dihydrogen, Metal Hydrides, and Beyond"	2022
Symposium Co-organizer , ACS Spring Meeting, San Diego, CA "ACS Award in Organometallic Chemistry: Symposium in Honor of Morris Bullock"	2022
Session Chair, Virtual Q&A, Canadian Chemistry Conference and Exhibition, Montreal, C	QC 2021
Chair, Gordon Research Seminar, Organometallic Chemistry, Newport, RI	2019
Organizer , 21^{st} Western Canadian Undergraduate Chemistry Conference	2007
Thesis Defense Committee , Rutgers–Newark Chemistry Ian Weiss (PhD 2021, Galoppini group)	2021–
Candidacy Exam Committee, Rutgers–Newark Chemistry James McQuade (2020), Ana de Olveira Silva (2020), Oguz Kucukosmann (2022), Conor Long (2022)	2020–
Faculty Search Committee, Rutgers-Newark Chemistry	2021–2022
Advisory Committee, Rutgers-Newark McNair TRiO Scholarship Program	2021-
Graduate Admissions Committee, Rutgers-Newark Chemistry	2019–2022

SERVICE TO CHEMISTRY

SERVICE TO UNIVERSITY

TEACHING

Chem 448: Inorganic and Materials Chemistry Laboratory

Spring 2022, 2023

Capstone course for chemistry majors at Rutgers-Newark. The course presents a series of laboratory experiments on the synthesis and characterization of organic, inorganic, organometallic and polymeric compounds and materials. Introduced two new teaching modules:

1. Synthesis of Vaska's Complex for Stoichiometric and Catalytic Reactions

2. Scientific Glassblowing Fundamentals

Chem 579: Coordination Chemistry Applied to Catalysis

Spring 2019, 2020

Conceived, developed, and taught new graduate course covering classical and modern aspects of ligand design for homogeneous catalysis

Chem 413: Inorganic Chemistry 2

Fall 2019, 2020, 2021

Senior level undergraduate course covering, structure, bonding and reactivity of molecules containing transition metals and main group elements.

MENTORSHIP AND OUTREACH

Research Advisor and Mentor

2019-

2011

PhD Candidates: Bhumika Goel, Ageliki Karagiannis, David Tresp, Lirong Lin

PhD Students: Sanju Kumari, Viani Maxwell

Undergraduates: Asmaa Washington, GS-LSAMP Scholar

Postdocs: Dr. Andrew VanderWeide

Former Postdocs: Dr. Práxedes Sánchez (2019-2021) MS Students graduated: Ageliki Karagiannis (Spring 2020)

Former Undergraduates:

Asmaa Washington (GS-LSAMP Scholar, Chemistry)

Naser Abuali (Chem 452 Project)

Meroline Bazile (McNair and GS-LSAMP Scholar, Chemistry) Christeen Shenoda (Summer Student, Chem 452 Project)

McNair Scholarship Program Mentor, Rutgers University-Newark	2019–2020
NSF-Garden State LSAMP Program Mentor, Rutgers University-Newark	2019
Juror, ACS North Jersey Section Awards Division	2021
Judge, William Paterson University Undergraduate Research Symposium, Wayne, NJ	2019
Member, US Department of Energy Early Career Network	2016–2017
Co-Founder, Chemistry Career Day, University of Toronto	2014
Chair, Chemical Institute of Canada (CIC) Toronto Section	2013–2014
Treasurer/Webmaster, Chemical Institute of Canada (CIC) Toronto Section	2012–2013
Student Activities Chair, Chemical Institute of Canada (CIC) Toronto Section	2011–2012
Organizer, International Year of Chemistry, Toronto, ON	2011

Volunteer, Science Rendezvous, University of Toronto

	Volunteer, "Ask a Nobel Laureate" Lecture Series, University of Toronto	2010, 2011
	Member At Large, Chemical Institute of Canada (CIC) Toronto Section	2010–2011
	VP Internal, Chemistry Student Society, University of Saskatchewan	2007–2008
	VP Admin, Chemistry Student Society, University of Saskatchewan	2006–2007
CONFERENCE PRESENTATIONS	Gordon Research Seminar, Organometallic Chemistry, Newport, RI	2022
	Gordon Research Seminar, Solar Fuels, Lucca, Italy	2022
	Gordon Research Seminar, Organometallic Chemistry, Newport, RI	2019
	Gordon Research Conference, Solar Fuels, Ventura, CA	2018
	Gordon Research Conference, Organometallic Chemistry, Newport, RI	2017
	DOE Meeting of Energy Frontier Research Centers, Washington, DC	2017
	100^{th} Canadian Chemistry Conference, Toronto, ON	2017
	Gordon Research Conference, Organometallic Chemistry, Newport, RI	2016
	97 th Canadian Chemistry Conference, Vancouver, BC	2014
	Inorganic Discussion Weekend. York, ON	2013
	95 th Canadian Chemistry Conference, Calgary, AB	2012
	94 th Canadian Chemistry Conference, Montreal, QC	2011
	241 st ACS National Meeting, Anaheim, CA	2011
	Inorganic Discussion Weekend, Windsor, ON	2010
	U of S Chemistry Research Awards Day, Saskatoon SK	2007
	90^{th} Canadian Chemistry Conference, Winnipeg, MB	2007
	21^{st} Western Canadian Undergraduate Chemistry Conference, Saskatoon, SK	2007
	U of S Chemistry Research Awards Day, Saskatoon SK	2006
STUDENT ACHIEVEMENTS	Bhumika Goel: Dissertation Fellowship	2023–2024
	Conducts Schools must must be a superior and a superior for a six and for at data	= = = = = = = = = = = = = = = = = = =

Graduate Schools most prestigious and comprehensive financial award for students in the last year of their doctoral programs

Viani Maxwell: NIH G-RISE Fellowship

2022-2024

Awarded to top incoming PhD students from diverse backgrounds to successfully transition into careers in biomedical research

Lirong Lin: Taylor-Torre Research Award

2022

In recognition of her outstanding accomplishments as a 3^{rd} year PhD student at Rutgers–Newark

David Tresp: Rutgers University Presidential Fellowship

2019-2024

Awarded to top incoming PhD students across all disciplines that display strong potential for success in research

Bhumika Goel: Teaching Assistant Award

2020-2021

For outstanding contributions to the General Chemistry laboratory

David Tresp: Teaching Assistant Award

2020-2021

For outstanding contributions to senior Organic and Inorganic chemistry laboratories