CURRICULUM VITAE
PROFESSOR ROBERT H. MORRIS
CHEMISTRY DEPARTMENT, UNIVERSITY OF TORONTO

Robert.morris@utoronto.ca or **rmorris@chem.utoronto.ca**
ORCID: 0000-0002-7574-9388
The Morris Group | University of Toronto (utoronto.ca)

Table of Contents

Abstract

History: BSc (Coop.) University of Waterloo, 1975 PhD University of British Columbia, 1978. Supervisor Brian James. Rhodium and Iridium Sulfoxide Complexes in Catalysis NATO Postdoctoral work with Prof. Joe Chatt and Dr G. J. Leigh, Nitrogen Fixation Lab, U. of Sussex, 1979. NATO Postdoctoral work with

Prof. Greg Geoffroy, Pennsylvania State U., 1980. Assistant Professor, U. of Toronto, 1980-1985 Associate Professor, U. of Toronto, 1985-1989. Professor, U. Toronto, 1989- present. Acting Chair of Chemistry Department July-Dec. 2008. Interim Chair of Chemistry, July 2009 – June 2010. Chair of Chemistry, July 2010-2013. Killam Research Fellow 2015-2017.
Honours: Rutherford Medal in Chemistry from the Royal Society of Canada in 1991. Alcan Lecture Award from the Canadian Society for Chemistry, 1995. Fellow of the Chemical Institute of Canada, 1995. Canadian Society for Chemistry Award for Pure or Applied Inorganic Chemistry, 1998. Advisory boards of Can. J. Chem. (1996-1998) and J. Chem. Soc., Dalton Trans. (1997-2000), Fellow of the Royal Society of Canada, 2005. Dean's Excellence awards 2009, 2010-12. Honorary Professor, Beijing University of Chemical Technology. 2013. Killam Research Fellow 2015-2017. RSC Inorganic Mechanisms Award 2017. Canadian Green Chemistry and Engineering Network Awards (Individual) 2017. Dedicated issue of Canadian Journal of Chemistry 2021. ACS Award in Organometallic Chemistry 2025.
Research interests: organometallic and bioinorganic chemistry, homogeneous catalysis, hydride and dihydrogen complexes, green chemistry.
Research Contributions: 290 articles and 12 book chapters (H index 75 since 1977),
3 PCT, 5 US, 5 Canadian patents issued, 25 PhD degrees and 22 MSc degrees granted to students supervised, 22 Postdoctoral fellows and visiting scientists supervised, 114 Undergraduate students supervised, 206 Invited lectures, 263 Other contributions to conferences.
Research grants NSERC, PRF, NATO, CFI, ORF, Green Centre Canada and Contracts from Ontario Hydro, and a Flavours and Fragrance Company, Compute Canada.
Courses: Undergraduate courses in general chemistry, inorganic chemistry, environmental chemistry, bioinorganic chemistry and organometallic chemistry and catalysis.
Graduate courses in reactions of coordinated ligands, physical methods in inorganic chemistry, bioinorganic chemistry and topics in inorganic and organometallic chemistry and catalysis.
Some significant contributions of Robert H. Morris, Department of Chemistry, University of Toronto (references hyperlinked, use CRL click to follow)

- Demonstration of reversible hydrogen storage using a soluble iron complex. Inorg. Chem. 1983, 22, 6-9.
- Identification of sulfido bridged platinum complex that is alkylated by methylene chloride. Can. J. Chem. 1983, 61, 2490-2492.
- First demonstration of an eta-1 to eta-6-pyridine rearrangement. J. Chem. Soc., Chem. Commun. 1983, 909-910.
- The preparation of the first unbridged heterobimetallic quadruple bonded compounds. J. Am. Chem. Soc. 1984, 106, 7978-7979; Inorg. Chem. 1987, 26, 2422-2429.
- A rare sulfur-ligated molybdenum complex that reduces dinitrogen to ammonia. J. Am. Chem. Soc. 1984, 106, 3683-3684.
- First eta-2 dihydrogen complexes of iron, ruthenium and osmium and the second X-ray and neutron diffraction crystallographic studies of dihydrogen complexes. J. Am. Chem. Soc. 1985, 107, 5581-5582 (> 237 cites); J. Am. Chem. Soc. 1988, 110, 4056-4057; Inorg. Chem. 1988, 27, 1124-1126; J. Am. Chem. Soc. 1989, 111, 8823-8827 (>134 cites); J. Am. Chem. Soc. 1991, 113, 4876-4887 (> 220 cites).
- The first correct method of estimating the H-H distance in dihydrogen ligands using NMR T_1 relaxation that takes into account the motion of the H_2 ligand. J. Am. Chem. Soc. 1988, 110, 7031-7036 (>175 cites); Coord. Chem. Rev. 2008, 252, 2381-2394 (>116 cites).

- Finding the standard equation for determining H-H distances in dihydrogen ligands using hydrogen-deuterium coupling constants and demonstrating the continuum of H-H distances from dihydrogen to compressed dihydride to dihydride. J. Am. Chem. Soc. 1996, 118, 5396-5407 (>209 cites); Can. J. Chem. 1996, 74, 1907-1915 (>84 cites).
- Demonstration of systematic ligand effects on the electrochemical potentials of metal complexes and their use predicting the reactions of dinitrogen, dihydrogen and hydride ligands. Inorg. Chem. 1987, 26, 2674-2683 (>105 cites); J. Am. Chem. Soc. 2020, 142, 17607–17629.
- Demonstration of systematic ligand effects on the acidity of dihydrogen and hydride complexes and the unification of non-aqueous acid-base scales. J. Am. Chem. Soc. 1991, 113, 875-883 (>160 cites); Inorg. Chem. 1992, 31, 1471-1478; J. Am. Chem. Soc. 1994, 116, 3375-3388 (>143 cites); J. Am. Chem. Soc. 2000, 122, 9155-9171 (> 195 cites); J. Am. Chem. Soc. 2014, 136, 1948–1959 (> 78 cites); Chem. Rev. 2016, 116, 8588–8654 (> 118 cites).
- First demonstrations of the reversible heterolytic splitting of dihydrogen to coordinated thiopyridine J. Am. Chem. Soc. 1994, 116, 8356-8357 (>207 citations), cyanide Chem. Commun. 1996, 1665-1666, thiolate J. Chem. Soc., Chem. Commun. 1995, 625-626, and amide J. Am. Chem. Soc. 2002, 124, 15104-15118 (> 444 cites).
- First comprehensive review of the reactions of dihydrogen complexes: Coord. Chem. Rev. 1992, 121, 155-284 (>708 cites).
- First report of a proton-hydride hydrogen bond (aka dihydrogen bond) J. Am. Chem. Soc. 1994, 116, 8356-8357 (>207 cites).
- First demonstration that the Noyori ketone pressure hydrogenation catalysts proceeds by trans dihydride and amido intermediates and the special kinetic properties of such intermediates J. Am. Chem. Soc. 2001, 123, 7473-7474 (>261 cites); Coord. Chem. Rev. 2004, 248, 2201-2237 (> 1058 cites); J. Am. Chem. Soc. 2005, 127, 1870-1882 (> 149 cites); Inorg. Chem. 1989, 28, 4437-4438; Organometallics 2007, 26, 5987-5999 (> 80 cites); Organometallics 2007, 26, 5940-5949 (>101 cites); J. Am. Chem. Soc. 2009, 131, 11263-11269; Inorg. Chem. 2019, 18, 12467-12479.
- First well-defined iron-based catalysts for the highly enantioselective asymmetric transfer hydrogenation and early pressure hydrogenation of prochiral ketones and imines. Angew. Chem. Int. Ed. 2008, 47, 940-943 (>264 cites); J. Am. Chem. Soc 2009, 131, 1394-1395 (>234 cites) US patent 8,716,507; Chem. Soc. Rev. 2009, 38, 2282-2291 (> 591 cites); Org. Lett. 2012, 14, 4638-4641 (> 89 cites) J. Am. Chem. Soc. 2012, 134, 12266-12280 (>151 cites); Science 2013, 342, 1080-1083 (>318 cites); Acc. Chem. Res. 2015, 48, 1494–1502 (>267 cites). J. Am. Chem. Soc. 2014, 136, 1367–1380 (>201 cites); Nature Protoc. 2015, 10, 241–257 (>49 cites); Chem. Eur. J. 2017, 23, 7212-7216 (>47 cites); J. Org. Chem. 2019, 84, 12040-12049; Science 2020, 369, eabc3183 3181-3110.
- Certain asymmetric transfer hydrogenation catalysts based on iron are ligand-coated nanoparticles J. Am. Chem. Soc. 2012, 134, 5893−5899 (>177 cites). ACS

Catalysis 2013, 3, 1092–1102 (> 49 cites); Cat. Sci. Technol. 2014, 4, 3426-3438 (>55 cites).

- New phosphine-aldehyde synthons for an extremely wide range of new phosphineimine and phosphine-amine ligands. J. Organometal. Chem. 2010, 695, 1824-1830; Organometallics 2014, 33, 6452-6465 (>45 cites); Chem. Sci. 2017, 8, 6531–6541; Dalton Trans. 2019, 48, 2150–2159; Inorg. Chem. 2020, 59, 11041-11053.
- Manganese-based catalysts for the highly enantioselective hydrogenation of ketones. Catal. Sci. Technol. 2021, 11, 3153-3163.
- The first chelating amine-N-heterocyclic carbene ligands for very active catalysts for the hydrogenation and asymmetric hydrogenation of polar bonds: Chem. Commun. 2010,46, 8240-8242 (> 96 cites); ACS Catal. 2013, 3, 32–40 (>76 cites); ACS Catal. 2017, 7, 10, 6827–6842 (>19 cites)
- Discovered equations to estimate the pK_a (J. Am. Chem. Soc. 2014, 136, 1948-1959)(J. Am. Chem. Soc. 2020, 142, 17607-29) and νMH (Inorg. Chem. 2018, 57, 13809-13821) of transition metal hydride complexes
- The first stable low spin manganese(II) hydride complex predicted on the basis of this equation, isolated and characterized: Inorg. Chem. 2023
- First review of reactivity umpolung of ligands in inorganic chemistry: Reactivity umpolung (reversal) of ligands in transition metal complexes - Chemical Society Reviews (RSC Publishing)

A. BIOGRAPHICAL INFORMATION

1. PERSONAL

Home: 980 Broadview Ave. Unit 208, Toronto, Ont. M4K 3Y1.
phone: 416-465-7815
University: Chemistry Department, University of Toronto, Toronto, Ont. M5S 3H6
phone: 416-978-6962
rmorris@chem.utoronto.ca

2. DEGREES

Ph. D. (inorganic chem.)	1978	University of British Columbia "Sulfoxide complexes of rhodium and Iridium" Supervisor: Professor Brian James
B.Sc. (co-op., hon).	1975	University of Waterloo

3. EMPLOYMENT

University of Toronto, St George Campus:	
Chair, Chemistry	July 2010 – Jun 2013
Interim Chair, Chemistry	July 2009 – Jun 2010
Acting Chair, Chemistry	July-Dec 2008
Associate Chair, Graduate Studies in Chemistry	Jan-June 2008
Professor	1995-present
University of Toronto, Scarborough and St George Campuses:	
Professor of Chemistry	1989-1995
Associate Professor (tenure)	1985-1988
Assistant Professor	1980-1985

Penn. State University, NSERC Postdoctoral fellow,	1979-1980
University of Sussex, AFRC Nitrogen Fixation Laboratory, NATO Postdoctoral fellow,	1978-1979
N.R.C., Ottawa, summer student	1975
Centre de Metallurgie, St. Etienne, France, co-op student	1974
Shell Oakville Research Centre, co-op student	1972, 1973
N.R.C., Ottawa, summer student	1971

4. HONOURS

1991 Rutherford Medal in Chemistry of the Royal Society of Canada for outstanding research (preference given to a chemist under 40 years old).
1995 Alcan Lecture Award for outstanding research in inorganic chemistry in Canada from the Canadian Society for Chemistry.
1998 Pure or Applied Chemistry Award from the Canadian Society for Chemistry.
1995 Elected Fellow of the Chemical Institute of Canada.
On advisory boards of the Can. J. Chem. (1996-1998) and J. Chem. Soc., Dalton Trans. (1997-2000).
2005 Fellow of the Royal Society of Canada
2013 Honorary Professor of the Beijing University of Chemical Technology
2015 Killam Research Fellow (2015-2017). (5 awarded among scholars of all disciplines of arts and science in Canada).
2017 Royal Society of Chemistry (UK) Inorganic Mechanisms Award.
2017 Canadian Green Chemistry and Engineering Network Awards (Individual)
2021 Special issue of Canadian Journal of Chemistry in my honour.

5. SELECTED PROFESSIONAL AFFILIATIONS AND ACTIVITIES

Member and then Fellow of the Chemical Institute of Canada (Canadian Society for Chemistry) since 1974.
Member of the American Chemical Society (since 1980).
Member of the Royal Chemical Society, UK.
Poster session organizer and chair of the 10th International Conference on Organometallic Chemistry, Toronto, 1981.
Organizer and Chairman of the 18th Inorganic Discussion Weekend Oct. 1985.
Lecturer to and examiner of the Canadian team to the Chemistry Olympiad Jan-Jun 1985, Jan-Jun 1986.
Chemical Consultant for Northern Pigment Co. 1990-1992
Organizer of “Transition Metal Hydride” symposium, CSC conference, 1993 in Sherbrooke, Quebec.
Head of the organizing committee of the 30th Inorganic Discussion Weekend, Oct. 1997 in Toronto (200 attendees).
Chemical Institute of Canada Inorganic Division symposia and program organizer for the 82nd Chemical Society of Chemistry Conference held in Toronto in 1999.
2001 Nominator and cover artist and guest editor of special issue of Can J Chem dedicated to Brian James, 2001 May-June issue.
2000-2003 Alcan Award Selection Committee for the Canadian Society for Chemistry.
2004, 2007 Pure and Applied Chemistry Award Selection Committee for the CSC.
Reviewer (30-40 journal articles each year).
Referee for several granting agencies (5-8 per year).
External reviewer of promotion files of several assistant and associate professors.
External examiner of many PhD Theses.
Regional Administrator of the Chemical Institute of Canada National Secondary Exam. 1983-1991.
Toronto District Coordinator of the Chemical Institute of Canada High School Exam. 1992-2001
Organizer and Chairman of the 40th Inorganic Discussion Weekend, Toronto, Nov. 2007.
Chairman of the Inorganic Chemistry Program of the Canadian Society for Chemistry Conference, May 2010. (programmed 11 symposia).
Conducted OCGS review of the Graduate Program of the Chemistry Department at the University of Western Ontario, May 2009.
Director of the Mathematical and Physical Sciences (MPS) Division of the Academy III of the Royal Society of Canada 2009-2012

Head of the MPS Academy III Nomination Committee of the Fellows of the Royal Society of Canada. 2009-2012
Member of the Executive Committee of Academy III of the Royal Society of Canada. 2009-2012
Member of the Henry Tory Marshall Award Committee 2011.
Member of the Academy III Working Group, New Fellow Selection 2014.
Chair of the Inorganic Chemistry Program of the Canadian Society for Chemistry Conference, May 2017.

B. ACADEMIC HISTORY

6. A. RESEARCH ENDEAVOURS

Organometallic Chemistry. The development of new, green catalytic processes. The preparation of very active catalysts for the hydrogenation of polar bonds, including the first ones based on iron. Efficient methods of homochiral ligand synthesis. The chemistry of dihydrogen and hydride complexes of transition metals including the first hydridic-protonic bonds (dihydrogen bonds) and the first dihydrogen complexes of the iron group elements. The acid-base properties of hydride and dihydrogen complexes.

Bioinorganic Chemistry. Synthesis of models of active sites of metalloproteins.

B. RESEARCH AWARDS

NSERC operating. April 1, 1981-1982 $10,343 p.a.
Connaught award July 1981-1982 $17,400
NSERC operating Apr. 1982-83 $11,000 p.a.
NSERC operating Apr. 1983-84 $19,000 p.a.
NSERC operating - April 1, 1984- Apr, 1987 $31,841 p.a.
NSERC Strategic Energy Group Grant Nov. 1984- Nov. 1985 $33,000
Petroleum Research Fund - Mar. 1986- Sept. 1988 $35,000 US p.a.
Scarborough Campus, U. of T. funds toward a glove box $12,000
Petroleum Research Fund - Sept. 1988- Aug. 1990 $40,000 US p.a.
"Transition Metal Complexes of Dihydrogen and Dinitrogen",
NSERC Operating grant, Apr. 1987-Mar. 1988, $41,200
"Dihydrogen Complexes of Ruthenium",
NSERC International Collaborative Research Grant, Sept.-Oct. 1987, $1,460.
"Hydride and Thiolate Complexes of Molybdenum and Tungsten"
NATO Collaborative Research Grant, May 1987-May 1989, $8,000, with Dr. R. L. Richards, University of Sussex.
"Loans of Platinum Metals" 1987- 2002 Johnson Matthey company (approx. $1000 each time worth of ruthenium, osmium and iridium).
"Hydride-thiolate Complexes of Molybdenum as Models of the HDS Catalyst",
Imperial Oil, 1988, $10,000.
"Transition Metal Complexes of Dihydrogen and Dinitrogen",
NSERC Operating grant, Apr. 1989-Mar. 1992, $49,539 per year
"Hydride and Thiolate Complexes of Molybdenum and Tungsten"
NATO Collaborative Research Grant with Dr. R. L. Richards, University of Sussex.Feb. 1989-May 1991, $8,000.
"Reactions of Dihydrogen Transition Metal Complexes" Petroleum Res. Fund, Sept. 1990-Aug. 1992, $40,000 US total
"Deuteropolyacetylene A synthetic metal", (contract)
Ontario Hydro Sept. 1990-Aug 1991 $30,000.
"Polydeuteroacetylene- a synthetic metal", University Research Incentive Fund. $37,000, Sept. 1991 to 1992.
"Complexes of Molybdenum and Tungsten That Model Aspects of the HDS Reaction." Imperial Oil, Mar. 1990-Mar. 1991, $8,000.
"Inert Atmosphere Glove Box" NSERC Equipment Grant. 1990, $59,600.
"Dihydrogen and dinitrogen complexes of Mo" with Dr. R. L. Richards, University of Sussex. NATO Collaborative Research Grant, July 1991-June 1993, $4,000.

"Upgrade to routine 200 MHz NMR Facility" (with several other faculty) NSERC Equipment 1991-1992, $271,923.

"Reactions of Dihydrogen and Hydride Complexes of Transition Metals" NSERC Operating, 1992-1995, $69,000 per year.

."Transition Metal Dihydrogen Complexes Containing Thiolate Ligands" Petroleum Res. Fund. $25,000 US per year, 1993-1995.

"Intramolecular and intermolecular proton-hydride interactions in transition metal complexes" Petroleum Research Fund, Sept. 1995-Aug. 1997, $25,000 US per year for 2 years.

"New Hydrogen-hydrogen Interactions in Inorganic Chemistry" NSERC Operating, 1995-1999, $70,000 per year for 4 years.

"Intramolecular and intermolecular proton-hydride interactions in transition metal complexes" Petroleum Research Fund, Sept. 1995-Aug. 1997, $25,000 US per year for 2 years.

"Inert Gas Purification System for Glovebox" NSERC equipment, 1995-1996 $31,775.44.

"Guided Tour of Metalloproteins" U. Toronto Courseware Development Fund. 1997. $5,000.

"CCD Area Detector for Regional Crystallographic Facility, D.H. Farrar, R. H. Morris and 19 others, NSERC Major Equipment, 1997. $283,689.

"High Throughput NMR Spectrometer" Ian Manners, R.H.Morris and 5 others. NSERC Major Equipment, 1999. $314,637.

"Transition Metal Hydride and Bioinorganic Chemistry" NSERC Operating, 1999-2003, $85,680 per year for 4 years.

Travel grant from the Royal Society of Chemistry, Author's Program, November 1999, £800.

"Transition Metal Hydride Symposium, 82nd CSC Conference" Feb. 1999. $1,000 US from the Petroleum Research Fund, type SE grant.

"Organometallics in Catalysis Symposium, 82nd CSC Conference" Feb 1999, $1,000 US from the Petroleum Research Fund, type SE grant.

"Transition Metal Hydride and Bioinorganic Chemistry" NSERC Operating, 1999-2003, $85,680 per year for 4 years.

Travel grant from the Royal Society of Chemistry, Author's Program, November 1999, £800.

"Transition Metal Hydride Symposium, 82nd CSC Conference" Feb. 1999. $1,000 US from the Petroleum Research Fund, type SE grant.

"Organometallics in Catalysis Symposium, 82nd CSC Conference" Feb 1999, $1,000 US from the Petroleum Research Fund, type SE grant.

"Very Active Catalysts Containing the Proton-Hydride Motif." Petroleum Research Fund, type AC, $US 30,000 each year for 2 years, $US 60,000 total, 2000-2002.

"UV-VIS Spectrophotometer to study reactions of hydrides." NSERC equipment 2000. $22,706.

"Extremely active ruthenium catalysts for the asymmetric hydrogenation of ketimines to chiral amines." ESTAC, $30,000, 2001-2002 ($30,000 matching NSERC CRD available but ESTAC program cancelled in May 2001).

"Extremely active ruthenium catalysts for the asymmetric hydrogenation of ketones to chiral alcohols." Flavours and Fragrance Company. May 2001-Aug 2003. $219,300 total.

"Electrochemistry Equipment" 2001, $30,000, NSERC Equipment, Ian Manners, R.H.Morris.

"Analytical/semi-preparative HPLC system" NSERC Equipment, with M. Lautens (P.I.), R.Batey $87,583 (2002-2003).

"Late Transition Metal Amido Chemistry" PRF, Am. Chem. Soc. $US 40,000 per year, $US80,000 total 2002-2004.

"Transition Metal Hydride Chemistry." NSERC Discovery Grant, 2003-2008, $100,000 per year for five years, $500,000 total.

"Pressure reactor for the study of the mechanism of hydrogenation catalysts," NSERC Research Tools Grant, 2005-2006, $ 24,243 total.

"Polar Bond Hydrogenation Catalyzed by Iron Complexes" Petroleum Research Fund. , Am. Chem. Soc. $US45,000 per year, $US90,000 total 2007-2009.

"Transition Metal Chemistry" NSERC Discovery Grant, 2008-2013, $100,000 per year for five years, $500,000 total.

"Inert Atmosphere Glove Box" NSERC Research Tools, 2008-2010, $43,459.

"Departmental X-ray Diffractometer" NSERC Research Tools, 2011-2012, $150,000 (Morris PI with 7 co-applicants)

"React-IR" NSERC Research Tools, 2011-2012, $100,000 (Taylor PI with 4 co-applicants).
"Iron hydrogenation catalysts" POP Grant, Green Centre of Canada, 2012, $50,00.
"Transition Metal Chemistry and Catalysis" NSERC Discovery Grant, 2013-2018, $124,000 per year for five years, total $620,000
"Developing catalysts based on iron" Killam Research Fellowship, Canada Council for the Arts, July 1,2015 to June 30, 2017 $70,000 pa
"Synthesis of iron catalyst for the Strem Chemical Catalog", Contract, Strem Chemical Company, July 1, 2015 to June, 2016, $2000 plus chemicals
"Sustainable iron catalysts for the hydrogenation of esters and carbon dioxide.", Connaught Innovation Award, Connaught Fund, Jan. 1, 2016 to Dec. 1, 2016, $89580
" Catalytic Synthesis of Specialty Chemicals from Sustainable Resources" NSERC Strategic Partnership Grants for Projects. Jan 1, 2017 to Dec 31, 2020. $372,000. Chin, Cathy (PI) with Perovic, D. My part $41,333 per year.
" Synthesizing renewable fuels using enzyme-derived catalysts." ORF Research Excellence 8. Sept. 2017- Aug. 2022. Edward Sargent (PI) with 6 co-applicants. Total funding $2M. My part: $20,000 per year.
"Computational resources for iron catalyst development." Resources for Research Groups, Compute Canada. Apr. 15, 2017 to April 1, 2018. $9,442. Renewed May 2018-April 2019.
"Abundant Transition Metals in Catalysis" NSERC Discovery grant. Apr. 2018 – Mar. 2024. $105,000 per year for 6 years.
"Developing catalysts based on earth abundant transition metals" 2020 Resource Allocation Competition. Apr 2020-Apr 2021. $6067.
"Sustainable catalysis using hydride complexes of abundant metals" NSERC Discovery grant. Apr. 2024-Mar. 2029. $78,000 per year for 5 years.

6.C. PATENTS Graduate students in bold)

127. V. Rautenstrauch, R. Challand, R. Churlaud, R.H. Morris, K. Abdur-Rashid, E. Brasic, H. Mimoun "Catalytic Hydrogenation Processes" WO 02/22526 A2. Filed Sept. 2000, published, Feb. 2002. Replaced by EP 1366004 (Europe), / CA 2,422,029 (Canada)/ US 2004/0063966 (USA)/ IL 154822 (Israel)/ JP 2002-526727 / JP2004509087T (Japan) Filed Sep, 2001. US patent number 7,317,131 (2008).
131. V. Rautenstrauch, R. Challand, R. Churlaud, R.H. Morris, K. Abdur-Rashid. "Process for hydrogenation of carbonyl and iminocarbonyl compounds using ruthenium catalysts comprising tetradentate diimino-diphosphine ligands." WO 02/40155 A1. Filed Nov. 2000, published Apr. 2002. Replaced by EP 1337334 (Europe)/ CA 2,428,824 (Canada)/ US 2004/0015017 (USA) issued as US 6,878,852 (Apr 2005)/ IL 155869 (Israel), JP 2002-542516 / JP2004513929T (Japan).
132. Abdur-Rashid, K.; Morris, R. H. "Hydrogenation of Unactivated Imines Using Ruthenium Complexes as Catalysts." US provisional patent. filed May 2002. Published Nov 2003.
140. Abdur-Rashid, K.; Morris, R. H. Process for hydrogenating or asymmetrically hydrogenating unactivated imines into amines using ruthenium complexes as catalysts *PCT Int. Appl.* WO03/097571 A1 2003, 31 pp. US Patent 7,256,311 Issued 2007.
166. **A. A. Mikhailine**, C. Sui-Seng, N. Meyer, **F. Freutel**, R. H. Morris "IRON(II) CATALYSTS CONTAINING DIIMINO-DIPHOSPHINE TETRADENTATE LIGANDS AND THEIR SYNTHESIS."*US Provisional Patent Application* **2008**, Filed Nov. 1, 2008. *Can. Patent Application* **2008**, Filed Nov. 1, 2008.. Full patent applications filed Nov. 2009. Can. Pat. Appl. (2010), CA 2642563 A1 20100430. US Patent Application 12/609955. U.S. Pat. Appl. Publ. (2010), US 20100145087 A1 20100610. "Iron(II) catalysts containing diimino-diphosphine tetradentate ligands and their synthesis" Can. Pat. Appl. (2011), CA 2684197 A1 20110430. US Patent issued as number 8,716,507 in 2014.
207. **A. Mikhailine, P. Lagaditis, Weiwei Zuo** and R. H. Morris,"Iron Diphosphine Complexes" *US Provisional Patent Application* **2012. US Application 20150151289 A1** *PCT Patent Application*, **PCT/CA2013/050405.** "Preparation of iron complex catalysts with unsymmetrical pnn'p ligands" PCT Int. Appl. (2013), WO 2013173930 A1 20131128. Country filings 2015: AL AT BE BG CH CY CZ DE DK EE ES Fl FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR. US patent issued as number US 9,597,673.

211 **P. O. Lagaditis, J. F. Sonnenberg** and R. H. Morris, "Iron catalysts containing tridentate PNP ligands, their synthesis and use thereof" *US Provisional Patent Application*, **2014**. Then PCT Patent Application, **2015. 20160326202-A1/ PCT/CA2015/050008. US patent number** 10,385,084.

6.D. INVENTION DISCLOSURES
Nine in total: 127, 131.1, 132.1, 140, 166.1, 166.2, 166.3, 176, 211

C. SCHOLARLY AND PROFESSIONAL WORK.

7. Refereed publications

H index 74 with 22602 citations (Google Scholar) for 343 documents since 1977.
H Index 71 with 18986 citations (ISI) for 286 documents since 1977.
H index 72 with 17092 citations (Scopus) for 248 documents

A. Articles (Graduate students in bold)

1 Willis, C.; Back, R. A.; Morris, R. H. "Radiation Chemistry of Acetylene at High Intensity: the Initial Product Distribution." *Can. J. Chem.* 1977, *55,* 3288-3295.

2 James, B. R.; Morris, R. H.; Reimer, K. J. "Cationic rhodium(I) sulfoxide complexes. Synthesis and spectroscopic properties" *Can. J. Chem.* 1977, *55,* 2353-9.

3 James, B. R.; McMillan, R. S.; Morris, R. H.; Wang, D. K. W. "Ruthenium and rhodium hydrides containing chiral phosphine or chiral sulfoxide ligands, and catalytic asymmetric hydrogenation" *Adv. Chem. Ser.* 1977, *167*, 122-132.

4 James, B. R.; Morris, R. H. "Solvent transfer hydrogenation of .alpha..beta.-unsaturated aldehydes to the unsaturated alcohols catalyzed by hydridoiridium sulfoxide complexes" *J. Chem. Soc., Chem. Commun.* 1978, 929-30.

5 James, B. R.; Morris, R. H. "Vibrational analysis of oxygen-bonded sulfoxide complexes" *Spectrochim. Acta, Part A, 34a* 1978, 577-582.

7 James, B. R.; Morris, R. H. "Sulfur-bonded sulfoxide complexes of rhodium(III) and rhodium(I)" *Can. J. Chem.* 1980, *58,* 399-408.

8 James, B. R.; Morris, R. H.; Einsten, F. W. B.; Willis, A. "Protonated dimethyl sulfoxide, $[Me_2SO...H...OSMe_2]^+$; a novel hydrogen-bridged structure: x-ray crystal structure of trans-$[H(Me_2SO)_2][RhCl_4(Me_2SO)_2]$" *J. Chem. Soc., Chem. Commun.* 1980, 31-2.

9 Leigh, G. J.; Morris, R. H.; Pickett, C. J.; Stanley, D. R.; Chatt, J. "Redox potential-structure relationships in metal complexes. Part 4. Electron-poor dinitrogen complexes of rhenium(I)" *J. Chem. Soc., Dalton Trans* 1981, 800-4.

10 Foley, H. C.; Morris, R. H.; Targos, T. S.; Geoffroy, G. L. "Photo-induced elimination of H_2 from $[Pt_2H_3(dppm)_2]PF_6$ and $[Pt_2H_2Cl(dppm)_2]PF_6$" *J. Am. Chem. Soc.* 1981, *103,* 7337-7339.

11 Azizian, H.; **Luck, R.**; Morris, R. H.; Wong, H. "Dinitrogen versus .eta.^{6}-arene coordination in methyldiphenylphosphine complexes of molybdenum(0)" *J. Organomet. Chem.* 1982, *238,* C24-C26.

12 Morris, R. H.; Ressner, J. M. "Formation of .eta.6-pyridine complexes of molybdenum(0) by a σ to π rearrangement in $Mo(N_2)_2(NC_5H_4\text{-}4\text{-}R)(PMePh_2)_3$, R = H, Me" *J. Chem. Soc., Chem. Commun.* 1983, 909-10.

13 Gukathasan, R. R.; Morris, R. H.; Walker, A. "Reactions of elemental sulfur with tetrakis(triphenylphosphine)platinum(0). Formation of a complex containing very nucleophilic bridging sulfido ligands" *Can. J. Chem.* 1983, *61,* 2490-2.

14 Azizian, H.; Morris, R. H. "Photochemical synthesis and reactions of $FeH(C_6H_4PPhCH_2CH_2PPh_2)(PPh_2PCH_2CH_2PPh_2)$" *Inorg. Chem.* 1983, *22,* 6-9.

15 **Luck, R.**; Morris, R. H. "Synthesis of molybdenum-rhodium bimetallic complexes using, as ligands, electron-rich molybdenum(0) complexes containing an η^6-methyldiphenylphosphine ligand" *J. Organomet. Chem.* 1983, *255,* 221-30.

16 **Luck, R. L**.; Morris, R. H. "Use of η^6-arylphosphine complexes of molybdenum(0) for the synthesis of complexes containing molybdenum-molybdenum and molybdenum-tungsten quadruple bonds" *J. Am. Chem. Soc.* 1984, *106,* 7978-9.

17 **Luck, R. L**.; Morris, R. H.; Sawyer, J. F. "Synthesis and substitution reactions of Mo(η^6-PhPMePh)(PMePh$_2$)$_3$. The crystal and molecular structure of Mo(η^6-PhPMePh)(CNCMe$_3$)(PMePh$_2$)$_2$" *Organometallics* 1984, *3,* 247-55.

18 **Luck, R**.; Morris, R. H. "Reversible binding of dinitrogen and dihydrogen by (η^6-phenylmethylphenylphosphine)tris(methyldiphenylphosphine)moly bdenum (Mo(η^6-PhPMePh)(PMePh$_2$)$_3$): use of [9-BBN]$_2$ as a phosphine sponge reagent" *Inorg. Chem.* 1984, *23,* 1489-91.

19 **Luck, R**.; Morris, R. H.; Sawyer, J. F. "Complexes [Mo(N$_2$)(PPh$_3$)$_2$]$_2$ and [Mo(CNR)(PPh$_3$)$_2$]$_2$ (R = n-butyl and tert-butyl) containing bridging η^1,η^6-triphenylphosphine ligands. The molecular structure of [Mo(μ-η^1,η^6-PPh$_3$)(PPh$_3$)(CN(CH$_2$)$_3$Me)]$_2$" *Organometallics* 1984, *3,* 1009-14.

20 Morris, R. H.; Ressner, J. M.; Sawyer, J. F.; Shiralian, M. "A sulfur-ligated molybdenum complex that reduces dinitrogen to ammonia. The crystal and molecular structure of the dinitrogen-molybdenum complex trans-Mo(N$_2$)$_2$(PMePh$_2$)$_2$(PPh$_2$CH$_2$CH$_2$SMe)" *J. Am. Chem. Soc.* 1984, *106,* 3683-4.

21 Morris, R. H.; Shiralian, M. "Benzene carbon-hydrogen bond activation using Ru(C$_6$Me$_6$)[PH(C$_6$H$_{11}$)$_2$]H$_2$" *J. Organomet. Chem.* 1984, *260,* C47-C51.

22 Morris, R. H.; Sawyer, J. F.; Shiralian, M.; Zubkowski, J. "Two molecular hydrogen complexes: trans-[M(η^2-H$_2$)(H)(PPh$_2$CH$_2$CH$_2$PPh$_2$)$_2$]BF$_4$ (M = Fe, Ru). The crystal structure determination of the iron complex" *J. Am. Chem. Soc.* 1985, *107,* 5581-2.

23 Morris, R. H.; Ressner, J. M.; Sawyer, J. F. "Trans-Bis(dinitrogen)tetrakis(methyldiphenylphosphine)molybdenum(0) benzene solvate, [Mo(N$_2$)$_2${P(CH$_3$)(C$_6$H$_5$)$_2$}$_4$].1.5(C$_6$H$_6$)" *Acta Crystallogr., Sect. C: Cryst. Struct. Commun.* 1985, *C41,* 1017-1019.

24 Frizzell, J. J.; **Luck, R. L.**; Morris, R. H.; Peng, S. H. "The influence of the steric properties of the ligands PR$_2$Ph and L on the formation and properties of the complexes Mo(η^6-PhPR$_2$)(L)(PPh$_2$CH$_2$CH$_2$PPh$_2$), R = Et, L = PPhEt$_2$ and R = Ph, L = PPh$_3$, PR'$_3$, CO, CNR, N$_2$, H$_2$" *J. Organomet. Chem.* 1985, *284,* 243-55.

25 Gamage, S. N.; Morris, R. H.; Rettig, S. J.; James, B. R. "Formation of an η^1-ylidic enamine complex of rhodium(III) during use of triethylamine for a base-promoted reaction" *J. Organomet. Chem.* 1986, *309,* C59-C62.

26 **Lazarowych, N. J**.; Morris, R. H.; Ressner, J. M. "Spectroscopic and chemical properties of nitrogen-15-enriched molybdenum dinitrogen complexes trans,mer-Mo(N$_2$)$_2$(L)(PMePh$_2$)$_3$" *Inorg. Chem.* 1986, *25,* 3926-32.

27 James, B. R.; Morris, R. H.; Kvintorics, P. "Hydridoiridium(III) sulfoxide complexes and their reactivity toward dioxygen" *Can. J. Chem.* 1986, *64,* 897-903.

28 Bancroft, G. M.; Bice, J. A.; Morris, R. H.; **Luck, R. L**. "The photoelectron spectrum of tetrachlorotetrakis(trimethylphosphine)molybdenumtungsten: the position of the valence .sigma.-ionization in quadruply bonded compounds" *J. Chem. Soc., Chem. Commun.* 1986, 898-9.

29 Morris, R. H.; **Earl, K. A.**; **Luck, R. L.**; **Lazarowych, N. J**.; **Sella, A.** "Dihydrogen vs. dihydride. Correlations between electrochemical or UV PES data and force constants for carbonyl or dinitrogen ligands in octahedral, d^6 complexes and their use in explaining the behavior of the dihydrogen ligand" *Inorg. Chem.* 1987, *26,* 2674-83.

30 **Lazarowych, N. J.**; Morris, R. H. "Molybdenum complexes containing hydride and sulfur donor ligands. Synthesis and properties of Mo(H)$_2$(S$_2$C$_6$H$_3$R)(PMePh$_2$)$_3$ (R = H, Me)" *J. Chem. Soc., Chem. Commun.* 1987, 1865-6.

31 **Luck, R. L.**; Morris, R. H.; Sawyer, J. F. "Complexes containing unbridged homonuclear or heteronuclear quadruple bonds. Crystal and molecular structures of $MoWCl_4(PMePh_2)_4$, $MoWCl_4(PMe_3)_4$, and $Cl_2(PMe_3)_2MoWCl_2(PMePh_2)_2$" *Inorg. Chem.* 1987, *26,* 2422-9.

32 **Bautista, M.**; **Earl, K. A.**; Morris, R. H.; **Sella, A.** "NMR properties of the complexes trans-$[M(\eta^6\text{-}H_2)(H)(PEt_2CH_2CH_2PEt_2)_2]^+$ (M = Fe, Ru, Os). Intramolecular exchange of atoms between η^6-dihydrogen and hydride ligands" *J. Am. Chem. Soc.* 1987, *109,* 3780-2.

33 Morris, R. H. "The synthesis and properties of complexes containing heteronuclear quadruple bonds" *Polyhedron* 1987, *6,* 793-801.

34 Gamage, S. N.; Morris, R. H.; Rettig, S. J.; Thackray, D. C.; Thorburn, I. S.; James, B. R. "Formation of a trimethyldihydroperimidinium cation from proton sponge [1,8-bis(dimethylamino)naphthalene] during base-promoted reactions of rhodium and ruthenium complexes" *J. Chem. Soc., Chem. Commun.* 1987, 894-5.

35 Arliguie, T.; Chaudret, B.; Morris, R. H. "$RuH_2[(PC_6H_5)_2(p\text{-}C_6H_4CH_3)]_3$: An Unexpectedly Stable and Unreactive Sixteen-electron Ruthenium Dihydride." *Polyhedron* 1988, *7,* 2031-2033.

36 **Bautista, M. T.**; **Earl, K. A.**; **Maltby, P. A.**; Morris, R. H. "Stereochemical control of the exchange of hydrogen atoms between hydride and dihydrogen ligands in the complexes $[M(\eta^2\text{-}H_2)(H)$(meso- or rac-tetraphos-1)$]^+$, M = Fe, Os" *J. Am. Chem. Soc.* 1988, *110,* 4056-7.

37 Arliguie, T.; Chaudret, B.; Morris, R. H.; **Sella, A.** "Monomeric and dimeric ruthenium(II) η^2-dihydrogen complexes with tricyclohexylphosphine co-ligands" *Inorg. Chem.* 1988, *27,* 598-9.

38 **Bautista, M. T**.; **Earl, K. A.**; Morris, R. H. "NMR studies of the complexes trans-$[M(\eta^2\text{-}H_2)(H)(Ph_2PCH_2CH_2PEt_2)_2]X$ (M = Fe, X = BPh_4; M = Os, X = BF_4): evidence for unexpected shortening of the hydrogen-hydrogen bond" *Inorg. Chem.* 1988, *27,* 1124-1126.

39 **Luck, R. L.**; Morris, R. H. "Use Of Electron-Rich η^6-Arylphosphine Complexes Of Molybdenum(0) As Ligands In Group 6 Metal Carbonyl Complexes" *J. Organometal. Chem.* 1988, *347,* 349-364.

40 **Bautista, M. T**.; **Earl, K. A**.; **Maltby, P. A.**; Morris, R. H.; Schweitzer, C. T.; Sella, A. "Estimation of the H–H Distances of η^2–Dihydrogen Ligands in the Complexes Trans-$[M(\eta^2\text{–}H_2)(H)(PR_2CH_2CH_2PR_2)_2]^+$, M = Fe, Ru, R = Ph and M = Os, R = Et by Solution NMR Methods" *J. Am. Chem. Soc.* 1988, *110,* 7031-7036.

41 Antiñolo, A.; Chaudret, B.; Commenges, G.; Fajardo, M.; Jalon, F.; Otero, A.; Morris, R. H.; **Schweitzer, C. T.** "Bonding Interactions Between Three Adjacent Hydrogen Ligands. Preparation and Spectroscopic Properties of the Complexes $Ta(H)_3\{C_5H_{5-n}R_n\}_2$, R = $SiMe_3$, n = 1, 2 and $Nb(H_3)\{C_5H_{5-n}R_n\}_2$, n = 1, R = Me, $SiMe_3$, n = 2, R = $SiMe_3$" *J. Chem. Soc., Chem. Commun.* 1988, 1209-1212.

42 Morris, R. H.; Sawyer, J. F.; **Sella, A.** "Monoclinic and triclinic forms of [1,2-bis(diphenylphosphino)propane](.eta.6-methyldiphenylphosphine)(m ethyldiphenylphosphine)molybdenum(0) benzene solvate" *Acta Crystallogr., Sect. C: Cryst. Struct. Commun., C44* 1988,

43. **K. A. Earl**, R. H. Morris and J. F Sawyer. "Bis(1,2-bis(diethylphosphino)ethane)(η^2-dihydrogen)hydridoosmium(II) tetraphenylborate" Acta Cryst. Section C Structure Commun., C45, 1137-1139 (1990).

45. F. A. Cotton, **R. L. Luck** and R. H. Morris. "High Yield Synthesis of $Mo(\eta^6\text{-}PhPMe_2)(PMe_2Ph)_3$ and its Dimerization to Form $\{Mo(\mu\text{-}\eta^1,\eta^6\text{-}PMe_2Ph)((PMe_2Ph)_2\}_2$, a Complex Characterized by X-ray Crystallography" Organometallics, 8, 1282-1287 (1989).

46. **T. E. Burrow**, **N. J. Lazarowych**, R. H. Morris, J. Lane and R. L. Richards. "Hydride Complexes Of Molybdenum and Tungsten in a Sulfur Environment" Polyhedron,8, 1701-1704 (1989).

47. R. H. Morris, J. F. Sawyer, **C. T. Schweitzer** and **A. Sella**. "Conversion of η^6–Arylphosphine to η^6-Benzene Complexes of Molybdenum by Use of Strong Acids. The Crystal and Molecular Structure of $[Mo(H)(\eta^6\text{-}C_6H_6)(PPh_2CH_2CH_2PPh_2)(PPh_2F)]BF_4$" Organometallics 8, 2099-2106 (1989),

48. J. S. Ricci, T. F. Koetzle, **M. T. Bautista**, T. M. Hofstede, R. H. Morris and J. F. Sawyer. "Single Crystal X-Ray and Neutron Diffraction Studies of an η^2-Dihydrogen Transition Metal Complex: trans-$[Fe(\eta^2\text{-}H_2)(H)(PPh_2CH_2CH_2PPh_2)_2]BPh_4$" J. Am Chem. Soc. 111 8823-8827 (1989).
49. **E. P. Cappellani**, **P. A. Maltby**, R. H. Morris, **C. T. Schweitzer** and M. R. Steele "From cis-Dichloride Complexes to Dihydride Complexes of the Iron Group Metals via Two Successive η^2-Dihydrogen Intermediates" Inorg. Chem. , 28, 4437-4438 (1989).
50. J. Eckert, H. Blank, **M. T. Bautista** and R. H. Morris "Dynamics of Molecular Hydrogen in the Complex trans-$[Fe(\eta^2\text{-}H_2)(H)(PPh_2CH_2CH_2PPh_2)_2]BF_4$ in the Solid State as Revealed by Neutron-Scattering Experiments" Inorg. Chem. 29, 747-750 (1990).
51. G. Jia and R. H. Morris "Comparing the Acidity of Hydride and η^2-Dihydrogen Complexes of Transition Metals" Inorg. Chem.29, 581-582 (1990).
52. **N. J. Lazarowych** and R. H. Morris "Synthesis and Substitution Chemistry of Some Bis(dithiolate) Complexes of Molybdenum, $Mo(PMePh_2)_2(S_2C_6H_3R)_2$, R = H, Me" Can. J. Chem.68, 558-564 (1990).
54. G. Jia and R. H. Morris "Wide Range of pK_a Values of Coordinated Dihydrogen. Synthesis and Properties of Some η^2-Dihydrogen and Dihydride Complexes of Ruthenium(II)" J. Am. Chem. Soc. 113, 875-883 (1991).
55. **T. E. Burrow**, A. Hills, D. L. Hughes, **N. J. Lazarowych**, M. Maguire, R. H. Morris and R. L. Richards "Cleavage of an Aryl Carbon-Sulphur Bond in Hydride-Thiolate Complexes of Molybdenum(IV); X-ray Crystal Structure of $[\{Mo(SC_6H_2Pr^i_3\text{-}2,4,6)(OMe)(PMePh_2)\}_2(\mu\text{-}S)_2]$" J. Chem. Soc., Chem. Commun , 1757-1759 (1991).
56. G. Jia, R. H. Morris and **C. T. Schweitzer** "Acidic Dihydrogen Complex Protonates Coordinated Dinitrogen" Inorg. Chem. 30, 593-594 (1991).
57. **T. E. Burrow**, A. Hills, D. L. Hughes, J. Lane, R. H. Morris and R. L. Richards "Monohydride Complexes of Mo(IV) and W(IV) Containing Bulky Thiolate Ligands: X-ray Crystal Structure Determinations of $[MH(SC_6H_2Pr^i_3\text{-}2,4,6)_3(PMe_2Ph)_2]$, M = Mo or W" J. Chem. Soc, Dalton Trans. , 1813-1820 (1991).
58. **K. A. Earl**, G. Jia, **P. A. Maltby** and R. H. Morris "η^2-Dihydrogen On the Brink of Homolytic Cleavage: *Trans*-$[Os(H\cdot\cdot H)H(PEt_2CH_2CH_2PEt_2)_2]^+$ Has Spectroscopic and Chemical Properties Between Those of the Isoelectronic Complexes *trans*-$[OsH(PPh_2CH_2CH_2PPh_2)_2(\eta^2\text{-}H_2)]^+$ and $ReH_3(PPh_2CH_2CH_2PPh_2)_2$" J. Am. Chem. Soc. , 113, 3027-3039 (1991).
59. D. H.Farrar, **P. A. Maltby** and R. H. Morris. "Trans-Bis[1,2-bis(diphenylphosphino)ethane]-(η^2-dihydrogen)hydridoosmium(II) Tetrafluoroborate." Acta Crystallogr., Sect. C , 48, 28-31 (1992).
60. **M. T. Bautista**, **E. P. Cappellani**, **S. D. Drouin**, R. H. Morris, C. T. Schweitzer, A. Sella and J. Zubkowski "Preparation and Spectroscopic Properties of the η^2-Dihydrogen Complexes $[M(\eta^2\text{-}H_2)(H)(PR_2CH_2CH_2PR_2)]^+$ M = Fe, Ru, R = Ph, Et" and Trends in Properties Down the Iron Group Triad" J. Am. Chem. Soc. , 113, 4876-4887 (1991).
61. **T. E. Burrow**, A. J. Lough, R. H. Morris, A. Hills, D. L. Hughes, J. D. Lane and R. L. Richards Richards "The Reactions of Hydride-Thiolate Complexes $[MH(SC_6H_2Pr^i_3\text{-}2,4,6)_3(PMe_2Ph)_2]$, (M = Mo or W, R = Me or Pr^i: X-ray Crystal Structures of $[M(SC_6H_2Pr^i_3\text{-}2,4,6)_2(CO)_2(PMe_2Ph)_2]$, (M = Mo or W)" J. Chem. Soc, Dalton Trans. , 2519-2526 (1991).
62. G. Jia, A. J. Lough and R. H. Morris "Synthesis and Kinetic and Thermodynamic Acidity Properties of η^2-Dihydrogen and Dihydride Complexes of the Type $[Ru(C_5Me_5)H_2L_2]^+$. Crystal Structure of the Complex $[Ru(C_5Me_5)(\eta^2\text{-}H_2)(PPh_2CH_2PPh_2)]BF_4$" Organometallics 11, 161-171 (1992).
63. R. H. Morris "Ligand Additivity Effects and Periodic Trends in the Stability and Acidity of Octahedral η^2-Dihydrogen Complexes of d^6 Transition Metal Ions", Inorg. Chem. 31, 1471-1478 (1992).

64. R. H. Morris "Unexpected Chemistry of Hydrogen Gas"*Transactions of the Royal Society of Canada.* Series VI, II, 263-270 (1991).
65. **S. D. Drouin**, G. Jia, P. Jessop, A. J. Lough and R. H. Morris "Use of the New Ligand $P(CH_2CH_2PCy_2)_3$ in the Synthesis of Dihydrogen Complexes of Iron(II) and Ruthenium(II)", Organometallics, 12, 161-171 (1993).
66. P. Jessop and R. H. Morris. "Reactions of Transition Metal Complexes of Dihydrogen" Coord. Chem. Rev. (a large review with 330 references) 121, 155-284 (1992).
67. P. J. Jessop, R. H. Morris, and H. Azizian. " The Effect of Perdeuteration on the Properties of Polyacetylene and Polystyrene" Polymer, *35*, 1952-1956 (1994).
68. **T.E. Burrow**, R. H. Morris, D.L. Hughes and R.L. Richards. "Structure of Dimethylphenylphosphonium Tris(1,2-dithiobenzene)". Acta Cryst. C., 49, 1591-1594 (1993).
69. G. Jia, A. J. Lough and R. H. Morris "Some Rhenium Hydride Complexes with Tetradentate Phosphine Co-ligands: The Crystal Structure of $Re(H_2BEt_2)$(racemic-tetraphos)" J. Organomet. Chem. , 461, 147-156 (1993).
70. P. G. Jessop and R. H. Morris "H/D Exchange Reactions of an Iridium Dithiol Complex" Inorg. Chem. , 32, 2236-2237 (1993).
71. **M. Schlaf,** A. J. Lough and R. H. Morris "$[Os(\eta^2\text{-}H_2)(CO)(pyS)(PPh_3)_2]BF_4$ - a Stable But Highly Acidic Dihydrogen Complex" Organometallics, 12, 3808-3809 (1993).
72. **M. T. Bautista**, **K. A. Earl**, **P. A. Maltby**, R. H. Morris and **C. T. Schweitzer** "New Dihydrogen Complexes: the Synthesis and Spectroscopic Properties of Iron(II), Ruthenium(II) and Osmium(II) Complexes Containing the Meso-tetraphos-1 Ligand" Can. J. Chem. , 72, 547-560 (1994).
73. **E. P. Cappellani**, **S. D. Drouin**, G. Jia, **P. A. Maltby**, R. H. Morris and **C. T. Schweitzer** "Effect of the Ligand and Metal on the pK_a Values of the Dihydrogen Ligand in the Series of Complexes $[M(H_2)H(L)_2]^+$, M = Fe, Ru, Os Containing Isosteric Ditertiaryphosphine Ligands, L" J. Am. Chem. Soc. , 116, 3375-3388 (1994).
74. R. H. Morris and **M. Schlaf** "Pi Bonding of the Dihydrogen Ligand Probed by Mössbauer Spectroscopy" Inorg. Chem. , 33, 1725-1726 (1994).
75. A. J. Lough, **S. Park,** R. Ramachandran and R. H. Morris "Switching On and Off a New Intramolecular Hydrogen-hydrogen Interaction and the Heterolytic Splitting of Dihydrogen. Crystal and Molecular Structure of $[Ir\{H(SC_5H_4NH)\}_2(PCy_3)_2](BF_4)\cdot 2.7CH_2Cl_2$" J. Am. Chem. Soc. , 116, 8356-8357 (1994).
76. A. J. Lough, **S. Park**, R. Ramachandran and R. H. Morris "A New Type of Intramolecular H···H···H Interaction Involving N-H···H(Ir)···H-N Atoms. Crystal and Molecular Structure of $[IrH(\eta^1\text{-}SC_4H_4NH)_2(\eta^2\text{-}SC_4H_4N)(PCy_3)]BF_4\cdot 0.72\ CH_2Cl_2$" J. Chem. Soc., Chem. Commun. , 2201 (1994).
77. W. T. Klooster, T. F. Koetzle, G. Jia, **T. P. Fong**, R. H. Morris and A. Albinati "Single Crystal Neutron Diffraction Study of the Complex $[Ru(H\cdots H)(C_5Me_5)(dppm)]BF_4$ Which Contains an Elongated Dihydrogen Ligand" J. Am. Chem. Soc. , 116, 7677-7681 (1994).
78. **C. E. Forde,** R. H. Morris and R. Ramachandran "Neutral Four-coordinate Selenolato Iron(II) Complexes: Syntheses and Structures of $Fe(Se\text{-}2,6\text{-}i\text{-}Pr_2C_6H_3)_2(PMePh_2)_2$ and $Fe(Se\text{-}2,6\text{-}i\text{-}Pr_2C_6H_3)_2(Et_2PCH_2CH_2PEt_2)$" Inorg. Chem. , *33,* 5647-5653 (1994).
79. B. Chin, A. J. Lough, R. H. Morris, **C. T. Schweitzer** and C. D'Agostino "Influence of Chloride Versus Hydride on H-H Bonding and Acidity of the Trans Dihydrogen Ligand in the Complexes trans-$[Ru(H_2)X(PR_2CH_2CH_2PR_2)_2]^+$, X = Cl, H, R = Ph, Et. The Crystal Structure Determinations of $[RuCl(dppe)_2]PF_6$ and trans-$[Ru(H_2)Cl(dppe)_2]PF_6$" Inorg. Chem. , *33*, 6278-6288 (1994).
80. D. L. Hughes, **N. J. Lazarowych**, M. J. Maguire, R. H. Morris and R. L. Richards "Preparation of the 5-Coordinate Complexes $[MoH(SC_6H_2R_3\text{-}2,4,6)_3(PR^1Ph_2)]$ (R=Me or ^{i}Pr, R^1=Me, Et, Bu) and Their Reactions with Nitrogen-donor Ligands. X-ray Crystal Structures of $[MoH(SC_6H_2Pr^i_3\text{-}2,4,6)_3(NC_5H_5)(PMe_2Ph)]$, $[MoH(NC_5H_4\text{-}2\text{-}S)_2(SC_6H_2Pr^i_3\text{-}2,4,6)(PEtPh_2)]$ and $[PPh_4][MoO(SC_6H_2Pr^i_3\text{-}2,4,6)_4]$" J. Chem. Soc., Dalton Trans. , 5-15 (1995).
81. **T. E. Burrow**, D. L. Hughes, A. J. Lough, M. J. Maguire, R. H. Morris and R. L. Richards "Distortions in Six Coordinate Complexes of Molybdenum(II) and Tungsten(II). Crystal Structures of Distorted Octahedral *mer*-$[Mo(SC_6H_2Pr^i_32,4,6)_2(CO)_3(PMePh_2)]$ and *cis,cis,cis*$[W(SC_6H_2Me_3\text{-}$

2,4,6)$_2$(CO)$_2$(PMe$_2$Ph)$_2$] and of Distorted Trigonal Prismatic [W(SeC$_6$H$_3$Pr$^i_2$-2,6)$_2$(CO)$_2$(PMe$_2$Ph)$_2$]" J. Chem. Soc., Dalton Trans. , 1315-1323 (1995).

82. **T. E. Burrow**, A. J. Lough, R. H. Morris, M. Maguire and R. L. Richards "Elucidation of Structures of Some Hydridothiolato Complexes of Molybdenum and Tungsten by NMR and X-Ray Techniques", Can. J. Chem. 73, 1092-1101 (1995).
83. **M. Schlaf** and R. H. Morris "A dihydrogen complex, [Os(η^2-H$_2$)(CO)(quS)(PPh$_3$)$_2$]$^+$, in equilibrium with its coordinated thiol tautomer (quS=quinoline-8-thiolate)" J. Chem. Soc., Chem. Commun. , 625-626 (1995).
84. **T. E. Burrow**, D. L. Hughes, A. J. Lough, M. J. Maguire, R. H. Morris and R. L. Richards "Cleavage of an Aryl Carbon-Sulfur Bond in Hydride-Thiolate Complexes of Molybdenum and Tungsten. X-ray Crystal Structures of [{Mo(SC$_6$H$_2$Pr$^i_3$-2,4,6)(OMe)(PMePh$_2$)}$_2$(μ-S)$_2$] and [{Mo(SC$_6$H$_2$Pr$^i_3$-2,4,6)(OEt)(PEtPh$_2$)}$_2$(μ-S)$_2$]" J. Chem. Soc., Dalton Trans. , 2583-2589 (1995).
85. W. Xu, A. J. Lough and R. H. Morris "Competition Between NH...HIr Intramolecular Proton-Hydride Interactions and NH...FBF$_3^-$ or NH...O Intermolecular Hydrogen Bonds Involving [IrH(2-thiazolidinethione)$_4$(PCy$_3$)](BF$_4$)$_2$ and Related Complexes" Inorg. Chem. , 35, 1549-1555 (1996).
86. A. J. Lough, R. H. Morris and **M. Schlaf** "Crystal Structure of trans-dibromo-bis(bis(diphenylphosphino)ethane)osmium(II), OsBr$_2$(((C$_6$H$_5$)$_2$P)$_2$C$_2$H$_4$)$_2$" Z. für Kristallographie , 210, 973-974 (1995).
87. **S. Park**, A. J. Lough and R. H. Morris "Iridium(III) Complex Containing a Unique Bifurcated Hydrogen Bond Interaction Involving Ir-H$\cdots$H(N)$\cdots$F-B atoms. Crystal and Molecular Structure of [IrH(η^1-SC$_5$H$_4$NH)(η^2-SC$_5$H$_4$N)(PPh$_3$)$_2$](BF$_4$)$\cdot$0.22C$_6$H$_{14}$" Inorg. Chem. , 35, 3001-3006 (1996).
88. **C. Forde**, A. J. Lough, R. H. Morris and R. Ramachandran "Neutral Four-Coordinate Thiolato and Selenolato Iron(II) Complexes: Synthesis and Characterization of Fe(E-2,6-*i*-Pr$_2$C$_6$H$_3$)$_2$(1-MeIm)$_2$ (E = S, Se; 1-MeIm = 1-methyl-imidazole). Potential Models for a Biological, Mononuclear N$_2$S$_2$ Binding Site for Iron?" Inorg. Chem. , 35, 2747-2751 (1996).
89. **P. A. Maltby**, **M. Schlaf**, M. Steinbeck, A. J. Lough, R. H. Morris, W. T. Klooster, T. F. Koetzle and R. C. Srivastava "Dihydrogen with Frequency of Motion Near to the ^{1}H Larmor Frequency. Solid State Structures and Solution NMR Spectroscopy of Osmium Complexes trans-[Os(H$\cdots$H)X(PR$_2$CH$_2$CH$_2$PR$_2$)]$^+$, X = Cl, Br" J. Am. Chem. Soc. , 118, 5396-5407 (1996).
90. **M. Schlaf**, A. J. Lough, **P. A. Maltby** and R. H. Morris "Synthesis, Structure and Properties of a Stable and Highly Acidic Dihydrogen Complex trans-[Os(η^2–H$_2$)(CH$_3$CN)(dppe)$_2$][BF$_4$]$_2$. Perspectives on the Heterolytic Activation of Dihydrogen on Metal Centers" Organometallics , 15, 2270-2278 (1996).
91. P. I. Amrhein, A. J. Lough and R. H. Morris "Synthesis and Structure of Fe(TIM)(CNBPh$_3$)$_2$; TIM = 2, 3, 9, 10 tetramethyl 1, 4, 8, 11 tetraazacyclotetradeca 1, 3, 8, 10 tetraene" Inorg. Chem. , 35, 4523-4525 (1996).
92. A. J. Lough, R. H. Morris and **M. Schlaf** "Chlorobis[1,2-(diphenylphosphino)ethane]osmium(II) Hexafluorophosphate Dichloromethane Solvate" Acta Cryst. C. , C52, 2193-2196 (1996).
93. P. I. Amrhein, **S. D. Drouin, C. E. Forde**, A. J. Lough and R. H. Morris "Ancillary Ligand Control of Reactivity. Protonation at Hydride versus Cyanide in *trans*-[FeH(CN)(R$_2$PCH$_2$CH$_2$PR$_2$)$_2$] (R = Et, Ph and *p*-tolyl) and X-ray Crystal Structure Determination of *trans*-[FeH(CNH)(R$_2$PCH$_2$CH$_2$PR$_2$)$_2$](BF$_4$) R = *p*-tolyl." J. Chem. Soc., Chem. Commun. , 1665-1666 (1996).
94. R. H. Morris "Intermediates in the Homolytic and Heterolytic Splitting of Dihydrogen" Can. J. Chem. , 74, 1907-1915 (1996).
95. **M. Schlaf**, A. J. Lough and R. H. Morris "Dihydrogen Thiolate vs. Hydride Thiol: Reactivity of the series of complexes MH(CO)(L)(PPh$_3$)$_2$, M = Ru, Os, L = pyridine-2-thiolate, quinoline-8-thiolate with acid. X-ray Structure Determination of [Os(CO)(μ^2-Spy)(pySH)(PPh$_3$)]$_2${BF$_4$}$_2$" Organometallics , 15, 4423-4436 (1996).
96. R. H. Morris and R. Wittebort "Effect of Libration or Hopping of the Dihydrogen Ligand on Its Spin-lattice Relaxation Time" Mag. Res. Chem. , 35, 243-250 (1997).

97. **M. Schlaf**, A. J. Lough and R. H. Morris "Synthesis and Structure of the Chiral Dihydrogen Complex trans-[Ru(eta-2-H_2)H(R,R'-Me-DuPHOS)$_2$]PF_6, R,R'-Me-DuPHOS = 1,2-Bis((2R,5R)-2,5-dimethylphospholano)benzene." Organometallics , 16, 1253-1259 (1997).
98. W. Xu, A. J. Lough and R. H. Morris "Weak M-H$^{\cdots}$H-C Interactions Observed in Ruthenium and Iridium Complexes Hydride, Amine and Bulky Phosphine Ligands" Can. J. Chem. , 75, 475-482 (1997).
99. **T. E. Burrow**, A. J. Lough, R. L. Richards and R. H. Morris "Monohydride Complexes of W(IV) Containing Bulky Selenolate Ligands: X-ray Crystal Structure Determination of [WH($SeC_6H_3Pr^i_2$-2,6)$_3$(PMe_2Ph)$_2$]" Inorg. Chim. Acta, 259, 125-135 (1997) (special issue on Transition Metal Hydrides).
100. A. Albinati, W. Klooster, T. F. Koetzle, J. B. Fortin, J. S. Ricci, J. Eckert, **T. P. Fong**, A. J. Lough, R. H. Morris and A. Golombek "Single Crystal X-ray and Neutron Diffraction Structure Determination and Inelastic Neutron Scattering Study of the Dihydrogen Complex trans-[Ru(H_2)H(dppe)$_2$]BPh_4" Inorg. Chim. Acta , 259, 351–357 (1997). (special issue on Transition Metal Hydrides),
101. R. M. Chin, R. H. Dubois, L. E. Helberg, M. Sabat, **T. Bartucz**, R. H. Morris and W. D. Harman "The Preparation of Re(I)-Amine Dinitrogen Complexes and the Characterization of a Stretched Dihydrogen Species" Inorg. Chem. 36, 3553-3558 (1997).
102. **C. E. Forde, S. E. Landa**u and R. H. Morris "Dicationic iron(II) complexes with dihydrogen trans to p-acid ligands: trans- [Fe(η^2-H_2)(L)(dppe)$_2$]$^{+2}$ (L = CO, CNH). Is there Fe-H_2 π-backbonding?" J. Chem. Soc., Dalton Trans. , 1663-1664 (1997).
103. S. Brinkmann, R. H. Morris, R. Ramachandran and **S. Park** "Pentahydridobis(tricyclohexylphosphine)iridium(V) and Fac-Trihydridotris(triphenylphosphine)iridium(III)" Inorg. Synthesis , 32, 303-308 (1998),
104. Bartucz, T. Y.; Golombek, A.; Lough, A. J.; **Maltby, P. A**.; Morris, R. H.; Ramachandran, R.; Schlaf, M. "Protonation Reactions of trans-M(H)(SPh)(dppe)$_2$, M = Ru, Os To Give Thiol and Dihydrogen Complexes. The X-ray Crystal Structure Determination of trans-Ru(H)(SPh)(dppe)$_2$ and trans-[Os(O_2)(H)(dppe)$_2$]O_3CF_3." Inorg. Chem. 37, 1552-1562 (1998).
105. G. Buntkowsky, H.-H. Limbach, F. Wehrmann, I. Sack, H.-M. Vieth and R. H. Morris "^{2}H NMR Theory of Transition Metal Dihydrides: Coherent and Incoherent Quantum Dynamics." J. Phys. Chem. , 101, 4679–4689 (1997). Secondary, Y refeered.
106. A. J. Lough, R. H. Morris, L. Ricciuto and T. Schleis "Solution and Crystal Structure of the Dihydrogen Complex [Ru(H_2)H(PMe_2Ph)$_4$]PF_6, an Active Alkyne Hydrogenation Catalyst" Inorg. Chim. Acta, 270, 238-246 (1998) (special issue dedicated to Jack Halpern)
108. **T. P. Fong**, A. J. Lough, R. H. Morris, A. Mezzetti, E. Rocchini and P. Rigo "Turning dihydrogen gas into a strong acid. Formation and reactions of the very acidic ruthenium dihydrogen complexes *trans*-[Ru(H_2)(CNH)($PPh_2(CH_2)_nPPh_2$)$_2$](O_3SCF_3)$_2$, n=2, 3", J. Chem. Soc., Dalton Trans., 2111-2114 (1998).
109. D. G. Gusev, A. J. Lough and R. H. Morris "New Polyhydride Anions and Proton-Hydride Hydrogen Bonding in Their Ion Pairs" , J. Am. Chem. Soc., 120, 13138-13147 (1998).
110. K. Abdur-Rashid, D. G. Gusev, **S. E. Landau**, A. J. Lough and R. H. Morris "Organizing Chain Structures by Use of Proton-hydride Bonding. The Single Crystal X-ray Diffraction Structures of [K(Q)][Os(H)$_5$(P^iPr_3)$_2$] and [K(Q)][Ir(H)$_4$(P^iPr_3)$_2$], Q= 18-crown-6 and 1,10-diaza-18-crown-6" , J. Am Chem. Soc. 120, 11826-11827 (1998).
111. A. C. Ontko, J. F. Houlis, D. M. Roddick, **T. P. Fong**, A. J. Lough and R. H. Morris "Protonation and H_2 Heterolysis Studies of Electrophilic (η^5-C_5R_5)Ru(dfepe)(X) (R = H, Me; X = H or OTf) Complexes" , Organometallics, 17, 5467-5476 (1998)
112. G.A. Facey, **T.P. Fong**, D.G. Gusev, P.M. MacDonald, R.H. Morris, **M. Schlaf** and W. Xu "Probing the Motion of the η^2-Dideuterium Ligand by Solution and Solid State ^{2}H NMR Spectroscopy." Can. J. Chem. 77, (1999). 1899-1910, special issue dedicated to Ted Schaefer.
113. G. Buntkowsky, F. Wehrmann, **T.P. Fong**, R. H. Morris and H.-H. Limbach " Coherent and Incoherent Deuterium Dynamics in a Solid Non-classical RuD_2 Complex studied by

^{2}H Solid State NMR Spectroscopy: Evidence for D_2 Tunneling" Phys. Chem. and Chem. Phys 1, (1999) 4033-4041.

114. **S.E. Landau**, R.H. Morris and A.J. Lough " Acidic dicationic iron(II) dihydrogen complexes and compounds related by H_2 substitution" Inorg. Chem. 38, 6060-6068 (1999).
115. **T.P. Fong, C.E. Forde**, A.J. Lough, R.H. Morris, P. Rigo, E. Rocchini and T. Stephan "Synthesis of the acidic dihydrogen complexes *trans*-$[M(H_2)(CN)L_2]^+$ and *trans*-$[M(H_2)(CNH)L_2]^{2+}$ where M = Fe, Ru, Os and L = dppm, dppe, dppp, depe, and dihydrogen substitution by the trifluoromethylsulfonate anion to give *trans*-$[Ru(OTf)(CN)L_2]$ or *trans*-$[Ru(OTf)(CNH)L_2]OTf$"" J. Chem. Soc., Dalton Trans. 4475-4486 (1999).
116. K. Abdur-Rashid, D. Gusev, A.J. Lough and R.H. Morris "Intermolecular Proton-Hydride Bonding in Ion Pairs: Synthesis and Structural Properties of $[K(Q)][MH_5(PiPr_3)_2]$ (M = Os, Ru; Q = 18-crown-6, 1-aza-18-crown-6, 1,10-diaza-18-crown-6)" Organometallics 19 (2000). 834-843
117. G. Facey, D. Gusev, S. Macholl, R.H. Morris and G. Buntkowsky "^{2}H MAS NMR of strongly dipolar coupled deuterium pairs in transition metal dihydrides: Extracting dipolar coupling and quadrupolar tensor orientations from the line shape of spinning side bands" Phys. Chem. Chem. Phys. 2 (2000) 935-941.
118. K. Abdur-Rashid, D. Gusev, A.J. Lough and R.H. Morris "Synthesis and Characterization of $Ru(H_2)_2(H)_2(P^iPr_3)_2$. Evidence for a Bis-dihydrogen Structure and Related Chemistry." Organometallics 19 (2000) 1652-1660.
119. **S.H. Park**, A.J. Lough, G.P.A. Yap and R.H. Morris "The Effect of Ancillary Ligands on Intramolecular Proton-hydride (NH...HIr) Bonding in Complexes of Iridium(III)" J. Organometal. Chem. 609, 110 (2000) (Special issue on Transition Metal Hydrides).
120. K. Abdur-Rashid, A.J. Lough and R.H. Morris "Ruthenium dihydride $RuH_2(PPh_3)_2$(R,R-Cyclohexyldiamine) and Ruthenium Monohydride RuHCl $(PPh_3)_2$(R,R-Cyclohexyldiamine): Active Catalyst and Catalyst Precursor for the Hydrogenation of Ketones and Imines" Organometallics 19 (2000) 2655-2657.
121. K. Abdur-Rashid, **T.P. Fong**, B. Greaves, D.G. Gusev, **J. G. Hinman**, **S.E. Landau** and R.H. Morris "An Acidity Scale for Phosphorus-containing Compounds Including Metal Hydrides and Dihydrogen Complexes in THF: Toward the Unification of Acidity scales " J. Am. Chem. Soc. 122 (2000) 9155-9171.
122. E. Rocchini, P. Rigo, A. Mezzetti, T. Stephan, R.H. Morris, A.J. Lough, **C.E. Forde, T.P. Fong** and **S. D. Drouin** "Synthesis and Properties of Iron-group Hydrido-Cyano Complexes *trans*-$[MH(CN)(L)_2]$, M = Fe, Ru, Os, L = depe, dppm, dppe, dppp, dtpe and Their Hydrogen-, Trifluoroboron- and Triphenylboron-isocyanide Derivatives of the type *trans*-$[MH(CNH)(L)_2]OTf$, *trans*-$[MH(CNBX_3)(L)_2]$, X = F or Ph and *trans*-$[M(H_2)(CNBF_3)(dppp)_2]BF_4$" J. Chem. Soc., Dalton Trans. (2000) 3591-3602.
124. K. Abdur-Rashid, A.J. Lough and R.H. Morris "Intra- and Inter- Molecular Ion-Pair-Assisted Protonic-Hydridic Bonding in Polyhydridobis(phosphine)rhenates" Can. J. Chem. 79, 964-976 (2001) (Special Issue for Brian James).
126. K. Abdur-Rashid, A.J. Lough and R.H. Morris "RuHCl(diphosphine)(diamine): Catalyst Precursors for the Stereoselective Hydrogenation of Ketones and Imines" Organometallics 20, 1047-1049 (2001).
128. **J.G. Hinman**, K. Abdur-Rashid, A.J. Lough and R.H. Morris "$[\{ReH_2(PMePh_2)_2\}_2(\mu\text{-}H)_3]^-$: The first member of a new class of anionic polyhydride dimers" Inorg. Chem. 40, 2480-2481 (2001).
129. K. Abdur-Rashid, M. Faatz, A.J. Lough and R.H. Morris "Catalytic Cycle for the Asymmetric Hydrogenation of Prochiral Ketones to Chiral Alcohols: Direct Hydride and Proton Transfer from Chiral Catalysts trans-$Ru(H)_2$(diphosphine)(diamine) to Ketones and Direct Addition of Dihydrogen to the Resulting Hydridoamido Complexes" J. Am. Chem. Soc. 123, 7473-7474 (2001).
130. **Shaun E. Landau**, Kai E. Groh, Alan J. Lough and Robert H. Morris "Large effects of ion pairing and protonic-hydridic bonding on the stereochemistry and basicity of crown-, azacrown- and cryptand-

222-potassium salts of anionic tetrahydride complexes of iridium(III)" Inorg. Chem. 41; 2995-3007 (2001).

133. K. Abdur-Rashid, **S.E. Clapham, A. Hadzovic**, J.N. Harvey, A.J. Lough and R.H. Morris "Mechanism of the Hydrogenation of Ketones Catalyzed by trans-Dihydrido(diamine)ruthenium(II) Complexes" J. Am. Chem. Soc. 124, 15104-15118 (2002).
134. V. Rautenstrauch, X. Hoang-Cong, R. Churlaud, K. Abdur-Rashid and R.H. Morris "Hydrogenation versus Transfer Hydrogenation of Ketones: Two Established Ruthenium Systems Catalyze Both" Chem. Eur. J. 9, 4954-4967 (2003).
135. K. Abdur-Rashid, **T. Fedorkiw**, A.J. Lough and R.H. Morris "Coordinatively Unsaturated Hydridoruthenium(II) Complexes of N-Heterocyclic Carbenes." Organometallics, 23, 86-94 (2003).
136. **S. Clapham**, **A. Hadzovic** and R.H. Morris "Mechanisms of the H2-Hydrogenation and Transfer Hydrogenation of Polar Bonds Catalyzed by Ruthenium Hydride Complexes" Coord. Chem. Rev. 248 (2004) 2201–2237. (invited review).
137. D. Song; R. H. Morris, "Cyclometallated Amine and Amido Ligands in Pt(II) and Pd(II) Complexes and A Novel Potassium Alkoxide Aggregate." Organometallics, 23, 4406-4413 (2004)
138. R. Guo, A.J. Lough, R.H. Morris and D. Song "Asymmetric Hydrogenation of Ketones Catalyzed by Ruthenium Hydride Complexes of a Beta-aminophosphine Ligand Derived from Norephedrine" Organometallics 23 (2004) 5524-5529.
139. **T. Li**, R. Churlaud, A. J. Lough, K. Abdur-Rashid and R. H. Morris, "Dihydridoamine and Hydridoamido Complexes of Ruthenium(II) With a Tetradentate P-N-N-P Donor Ligand" Organometallics 23 (2004) 6239 – 6247.
141. Abbel, R.; Abdur-Rashid, K.; **Hadzovic, A**.; Lough, A. J.; Morris, R. H.; Harvey, J. A Succession of Dihydride Isomers of Ruthenium. Which One is the Ketone Hydrogenation Catalyst? J. Am. Chem. Soc. 127 (2005) 1870-1882.
142. K. Abdur-Rashid, R. Guo, A. J. Lough, R. H. Morris and D. Song, "Synthesis of ruthenium hydride complexes containing beta-aminophosphine ligands derived from amino acids and their use in the H2-hydrogenation of ketones and imines" Adv. Syn. Catal. 347 (2005) 571 –579.
143. R. Guo, R. H. Morris and D. Song, "Enantioselective Tandem Michael Addition/H_2-Hydrogenation Catalyzed by Ruthenium Hydride Borohydride Complexes Containing Beta-aminophosphine Ligands" J. Am. Chem. Soc. 127 (2005) 516 – 517.
144. **S. E. Clapham** and R. H. Morris, "Reactions of the amido hydrido complex of osmium, $OsH(NHCMe_2CMe_2NH_2)(PPh_3)_2$: HX addition, HX transfer and ketone H_2-hydrogenation" Organometallics 24 (2005) 479-481.
145. K. Abdur-Rashid, R. Abbel, **A. Hadzovic**, A. J. Lough and R. H. Morris, "Chemistry of Ruthenium(II) Monohydride and Dihydride Complexes Containing Pyridyl Donor Ligands" Inorg. Chem. 44 (2005) 2483- 2492.
146. R. Guo, C. Elpelt, X. Chen, D. Song and R. H. Morris, "Applications of Ruthenium Hydride Borohydride Complexes Containing Phosphinite and Diamine Ligands to Asymmetric Catalytic Reactions" Org. Lett. 7 (2005) 1757 – 1759.
148. R. Guo, C. Elpelt, X. Chen, D. Song and R. H. Morris, "A Modular Design of Ruthenium Catalysts with Diamine and Binol-derived Phosphinite Ligands that are Enantiomerically-Matched for the Effective Asymmetric Transfer Hydrogenation of Simple Ketones" Chem. Commun. (2005) 3050–3052.
152. **T. Li**, A. J. Lough, C. Zuccaccia, A. Macchioni and R. H. Morris. "An Acidity Scale of Phosphorus-Containing Compounds Including Phosphonium Salts and Ruthenium Dihydrogen Complexes in Dichloromethane." Can. J. Chem. **2006**, *84*, 164-175 (special issue in honour of Arthur Carty).
153. **A. Hadzovic**, A. J. Lough, R. H. Morris, P. G. Pringle, D. E. Zambrano-Williams "Ketone H_2-hydrogenation catalysts: ruthenium complexes with the headphone-like ligand bis(phosphaadamantyl)propane" *Inorg. Chim. Acta* **2006**, 359, 2864–2869 (special issue in honour of Brian James).
154. **S. E. Clapham**, R. Guo, M. **Zimmer-De Iuliis**, N. Rasool, A. J. Lough, R. H. Morris, "Probing the Effect of the Ligand X on the Properties and Catalytic Activity of the Complexes $RuHX(diamine)(PPh_3)_2$ (X = OPh, 4-$SC_6H_4OCH_3$, $OPPh_2$, $OP(OEt)_2$, CCPh, NCCHCN, $CH(COOMe)_2$; diamine = 2,3-diamino-2,3-dimethylbutane or (R,R)-1,2-diaminocyclohexane)."*Organometallics* **2006** 25, 5477-5486.

155. **T. Li**, A. J. Lough, R. H. Morris, "An Acidity Scale of Tetrafluoroborate Salts of Phosphonium and Iron Hydride Compounds in Dichloromethane-d_2." *Chem. Eur. J.* **2007**, 13, 3796-3803.
156. **J. G. Hinman**, A. J. Lough, R. H. Morris, "Properties of the Polyhydride Anions $[WH_5(PMe_2Ph)_3]^-$ and $[ReH_4(PMePh_2)_3]^-$ and Periodic Trends in the Acidity of Polyhydride Complexes." Inorg. Chem. **2007**, 46, 4392 - 4401 (featured on cover).
157. C. Sui-seng, A. **Hadzovic, A. J.** Lough, R. H. Morris, "Novel Hydrido-Ruthenium(II) Complexes of Histidine Derivatives and Their Application in the Hydrogenation of Ketones." *Dalton Transactions* **2007**, 2536 - 2541 (featured on cover).
158. **A. J. Hadzovic**, C. M. MacLaughlin, D. Song, R. H. Morris "A Mechanism Displaying Autocatalysis: the Hydrogenation of Acetophenone Catalyzed by RuH(S binap)(app) Where app is the Amido Ligand Derived from 2-Amino-2-(2-pyridyl)-propane" *Organometallics*, **2007**, *26*, 5987 – 5999 plus 20 pages of procedures and a cif crystallographic file
159. **T. Li**, I. Bergner, F. N. Haque, **M. Zimmer-De Iuliis**, D. Song, R. H. Morris "The hydrogenation of benzonitrile to benzylamine catalyzed by ruthenium hydride complexes with P-NH-NH-P ligands" *Organometallics*,. **2007**, *26*, 5940 – 5949 plus 28 pages of procedures and 2 cif files as supporting material.
160. C. Sui-Seng, F. Freutel, A. J. Lough, R. H. Morris. "Highly Efficient Catalyst Systems Using Iron Complexes with a Tetradentate PNNP Ligand for the Asymmetric Hydrogenation of Polar Bonds." *Angew. Chem. Int. Ed. Engl.* **2008**, *47*, 940-943 plus 4 pages of procedures and a crystal structure cif file as supporting material. ((Synfacts article written about this paper).
161. X. Zhao, N. Ivanova, **A. Hadzovic**, **M. Zimmer-De Iuliis**, A. Lough, R. H. Morris "Use of an Iodide-modified Merrifield Resin in the Synthesis of Coordinately Unsaturated Ruthenium Complexes. The Structure of RuHI((R,R)-binap)(PPh_3)." *Organometallics* **2008**, *27*, 503 – 508 plus a crystal structure cif file as supporting material.
162. R. H. Morris. "Dihydrogen, dihydride and in-between: NMR and Structural Properties of Iron Group Complexes." *Coord. Chem. Rev.* **2008**,*252*, 2381-2394.
163. F. N. Haque, A. J. Lough, R. H. Morris. "Ruthenium Hydrogenation Catalysts With P-N-N-P Ligands Derived from 1,3-Diaminopropane and the Formation of a b-Diiminate Complex by a Base-induced Isomerization." *Inorg. Chim. Acta* **2008**, *361,* 3149–3158, (invited for special issue dedicated to R. Angelici) plus a crystal structure cif file as supporting material.
165. **A. A. Mikhailine**, E. Kim, C. Dingels, A. J. Lough, R. H. Morris "Template Syntheses of Iron(II) Complexes Containing Chiral P-N-N-P and P-N-N Ligands for Use as Asymmetric Catalysts." Inorg. Chem. **2008**, *.47*, 6587-6589 plus supporting material.
167. **M. Zimmer-De Iuliis**, **I. D. G. Watson**, A. K. Yudin, R. H. Morris "A DFT Investigation into the Origin of Regioselectivity in Palladium-catalyzed Allylic Amination." Can. J. Chem. **2009**, *87*, 54-62 (invited for special issue dedicated to R. Puddephatt).
168. **A. A. Mikhailine**, A. J. Lough, R. H. Morris "Efficient Asymmetric Transfer Hydrogenation of Ketones Catalyzed by an Iron Complex Containing a P-N-N-P Tetradentate Ligand Formed by Template Synthesis." *J. Am. Chem. Soc* **2009**, *131*, 1394-1395 plus supporting material. (Synfacts, 2009, 4, 415 article written by M. Lautens and P. Thansandote about this paper).
169. C. Sui-Seng, F. N. Haque, **A. Hadzovic**, A.-M. Pütz, V. Reuss, N. Meyer, A. J. Lough, **M. Zimmer-De Iuliis**, R. H. Morris "Synthesis and Characterization of Iron(II) Complexes with Tetradentate Diiminodiphosphine or Diaminodiphosphine Ligands as Precatalysts for the Hydrogenation of Acetophenone."*Inorg. Chem.* **2009**, *48*, 735-743.
170. **W. W. N. O**, A. J. Lough, R. H. Morris "Synthesis and Characterization of Nitrile-Functionalized N-Heterocyclic Carbenes and Their Complexes of Silver(I) and Rhodium(I)."*Organometallics* **2009**, *28*, 853–862.
171. N. Meyer, A. J. Lough, R. H. Morris "Iron(II) Complexes for the Efficient Catalytic Asymmetric Transfer Hydrogenation of Ketones."*Chem. Eur. J.* **2009**,*15*, 5605-5610.
173. R. H. Morris, "Asymmetric hydrogenation, transfer hydrogenation and hydrosilylation of ketones catalyzed by iron complexes." *Chem. Soc. Rev.* **2009**,, *38*, 2282-2291 (invited tutorial review).
174. **M. Zimmer-De Iuliis** and R. H. Morris, "Kinetic Hydrogen/Deuterium Effects in the Direct Hydrogenation of Ketones Catalyzed by a Well-Defined Ruthenium Diphosphine Diamine Complex" *J. Am. Chem. Soc.* **2009**, *131*, 11263-11269.
175. **W. W. N. O**; A. J. Lough; R. H. Morris "Transmetalation of a Primary Amino-Functionalized N-Heterocyclic Carbene Ligand from an Axially Chiral Square-Planar Nickel(II) Complex to a

Ruthenium(II) Precatalyst for the Transfer Hydrogenation of Ketones" Organometallics, **2009,** 28, 6755–6761.

177. **P. O. Lagaditis**, **A. A. Mikhailine**, A. J. Lough, R. H. Morris, "Template Synthesis of Iron(II) Complexes Containing Tridentate P−N−S, P−N−P, P−N−N, and Tetradentate P−N−N−P Ligands" *Inorg. Chem.* **2010,** *49,* 1094-1102.
178. **W. W. N. O**; A. J. Lough; R. H. Morris "Palladium(II) and Platinum(II) Complexes Featuring Cyanophenyl- or Mesityl-functionalized N-heterocyclic Carbene and Chelating Olefin Ligands" Organometallics, **2010**, *29*, 570-581.
179. **A. A. Mikhailine**, **P. O. Lagaditis**, **P. E. Sues**, A. J. Lough and R. H. Morris "New cyclic phosphonium salts derived from the reaction of phosphine-aldehydes with acid" J. Organometallic Chemistry, **2010**, *695*, 1824-1830.
180. **W. W. N. O**, A. J. Lough, R. H. Morris "The Hydrogenation of Molecules with Polar Bonds Catalyzed by a Ruthenium(II) Complex Bearing a Chelating N-Heterocyclic Carbene with a Primary Amine Donor."*Chem. Commun.* **2010**, 46, 8240-8242 (Special issue on hydrogen).
181. **P. O. Lagaditis**, A. J. Lough, R. H. Morris "Iron Complexes for the Catalytic Transfer Hydrogenation of Acetophenone: Steric and Electronic Effects Imposed by Alkyl Substituents at Phosphorus."*Inorg. Chem.* **2010**, 49 10057-10066.
182. **W. W. N. O**, A. J. Lough, R. H. Morris "(eta6-Toluene)(eta5-pentamethylcyclopentadienyl)-ruthenium(II) hexafluorophosphate."*Acta Cryst. E.* **2010**, 66, M1264..
183. **A. A. Mikhailine**, R. H. Morris "The Effect of the Structure of the Diamine Backbone of the P-N-N-P ligand of Iron (II) Complexes on their Catalytic Activity in the Transfer Hydrogenation of Acetophenone."*Inorg. Chem.* **2010**, 49, 11039-11044.
184. **W. W. N. O**, A. J. Lough, R. H. Morris "Mechanistic Investigation of the Hydrogenation of Ketones Catalyzed by a Ruthenium(II) Complex Featuring a Chelating N-Heterocyclic Carbene with a Tethered Primary Amine Donor."*Organometallics* **2011**, *30*, 1236-1252.
185. **P. O. Lagaditis**, A. J. Lough and R. H. Morris, "Low-valent Ene-amido Iron Complexes for the Asymmetric Transfer Hydrogenation of Acetophenone Without Base" *J. Am. Chem. Soc.*, **2011**, *133*, 9662–9665.
186. **D. E. Prokopchuk**, A. J. Lough and R. H. Morris,"From Amine to Alkylamine to Azaallyl: Unusual Transformation of Di-(2-pyridylmethyl)amine on Ruthenium" *Dalton Transactions*, **2011**, *40*, 10603–10608.
187. **P. E. Sues**, A. J. Lough, R. H. Morris "Stereoelectronic Factors in Iron Catalysis: Synthesis and Characterization of Aryl-Substituted Iron(II) Carbonyl P-N-N-P Complexes and Their Use in the Asymmetric Transfer Hydrogenation of Ketones" *Organometallics*, **2011**, *30*, 4418-4431.
190. **W. W. N. O**, A. J. Lough and R. H. Morris, "Factors Favoring Efficient Bifunctional Catalysis. A Study of a Ruthenium(II) Hydrogenation Catalyst Containing an N-Heterocyclic Carbene with a Primary Amine Donor." *Organometallics*, **2012**, *31*, 2137–2151.
191. **W. W. N. O**, A. J. Lough and R. H. Morris, "Bifunctional Mechanism with Unconventional Intermediates for the Hydrogenation of Ketones Catalyzed by an Iridium(III) Complex Containing an N-Heterocyclic Carbene with a Primary Amine Donor." *Organometallics*, **2012**, *31*, 2152-2165.
192. **J. F. Sonnenberg,** N. Coombs, P. A. Dube and R. H. Morris, "Iron Nanoparticles Catalyzing the Asymmetric Transfer Hydrogenation of Ketone." *J. Am. Chem. Soc.*, **2012**, *134*, 5893-5899.
193. **D. E. Prokopchuk**, **J. F. Sonnenberg**, N. Meyer, **M. Zimmer-De Iuliis**, A. J. Lough and R. H. Morris, "A Spectroscopic and DFT Study of Ferraaziridine Complexes Formed in the Transfer Hydrogenation of Acetophenone Catalyzed Using *trans*-[Fe(CO)(NCMe)($PPh_2C_6H_4CH{=}NCH_2$-)$_2$-κ^4*P,N,N,P*][$(BF_4)_2$]" *Organometallics*, **2012**, *31*, 3056−3064.
194. **H. Ohara**, **W. W. N. O**, A. J. Lough and R. H. Morris,"Effect of chelating ring size in catalytic ketone hydrogenation: facile synthesis of ruthenium(II) precatalysts containing an N-heterocyclic carbene with a primary amine donor for ketone hydrogenation and a DFT study of mechanisms" *Dalton Transactions*, **2012**, *41*, 8797-8808.
195. **A. A. Mikhailine**, M. I. Maishan, A. J. Lough and R. H. Morris,"The Mechanism of Efficient Asymmetric Transfer Hydrogenation of Acetophenone Using an Iron(II) Complex Containing an (*S,S*)-$Ph_2PCH_2CH{=}NCHPhCHPhN{=}CHCH_2PPh_2$ Ligand: Partial Ligand Reduction is the Key" *J. Am. Chem. Soc.*, **2012,** *134,* 12266-12280.

196. **P. E. Sues**, A. J. Lough and R. H. Morris,"Flexible Synthesis of New Tripodal Phosphine Oxide, and Mixed Phosphine–Phosphine Oxide Ligands and Their Yttrium(III) Nitrate Complexes" *Inorg. Chem.*, **2012,** *51*, 9322-9332.
197. **A. A. Mikhailine**, **M. I. Maishan**, R. H. Morris, "Asymmetric Transfer Hydrogenation of Ketimines Using Well-Defined Iron(II)-Based Precatalysts Containing a PNNP Ligand", *Org. Lett.*, **2012, *14*,** 4638-4641.
198. **P. E. Sues**, A. J. Lough and R. H. Morris," Flexible Syntheses of Tripodal Phosphine Ligands 1,1,2-tris(diarylphosphino)ethane and their Ruthenium η^5-C_5Me_5 Complexes." *Organometallics* **2012**, *31*, 6589-6594.
199. F. Hasanayn and R. H. Morris, "Aspects of H_2 Heterolytic Splitting by Five Coordinate d6 Ru-amides and Calculations on Acetophenone Hydrogenation, Ruthenium Alkoxide Formation and Subsequent Hydrogenolysis in a Model trans-Ru$(H)_2$(diamine)(diphosphine) System." *Inorg. Chem.* **2012**, *51*, 10808-10818.
200. **D. E. Prokopchuk** and 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*, 7375-7385.
201. **W. W. N. O** and R. H. Morris, "Ester Hydrogenation Catalyzed by a Ruthenium(II) Complex Bearing an N-heterocyclic Carbene Tethered with an "NH_2" Group and a DFT Study of the Mechanism" *ACS Catalysis*, **2013**, *3*, 32–40.
202. **K. Park**, **P. Lagaditis**, A. J. Lough and R. H. Morris. "Synthesis of New Late Transition Metal P,P,-P,N- and P,O-Complexes Using Phosphonium Dimers as Convenient Ligand Precursors." *Inorg. Chem.* **2013,** *52*, 5448-5456.
203. **J. F. Sonnenberg** and R. H. Morris. "Evidence for Iron Nanoparticles Catalysing the Rapid Dehydrogenation of Ammonia-Borane" *ACS Catalysis,* **2013,** 3, 1092–1102.
204. **J. F. Sonnenberg**, D. Pichugin, N. Coombs and R. H. Morris. "Oxidative Kinetic Resolution of Aromatic Alcohols using Iron Nanoparticles." *Topics in Catalysis,* **2013**, *56*, 1199-1207. Invited, Thematic issue on nanoparticles in catalysis.
205. **D. Prokopchuk**, **A. Collado,** A. J. Lough and R. H. Morris. "Structural Properties of Trans Hydrido-Hydroxo M(H)(OH)($NH_2CMe_2CMe_2NH_2$)(PPh_3)$_2$ (M =Ru, Os) Complexes and their Proton Exchange Behaviour with Water in Solution. *Dalton Trans.* **2013**, *42*, 10214-10220.
206. R. H. Morris "Moving hydrogen using iron catalysts" *ACS Division of Energy & Fuels Preprints*. **2013**, *58*, 694-695.
208. A. M. Appel, J. E. Bercaw, A. B. Bocarsly, H. Dobbek, M. Dupuis, D. L. DuBois, J. G. Ferry, E. Fujita, R. Hille, P. J. A. Kenis, C. A. Kerfeld, R. H. Morris, C. H. F. Peden, A. R. Portis, S. W. Ragsdale, T. B. Rauchfuss, J. N. H. Reek, L. C. Seefeldt, R. K. Thauer and G. L. Waldrop. "Frontiers, Opportunities, and Challenges in Biochemical and Chemical Catalysis of CO_2" *Chem. Rev.* **2013**, *113*, 6621-6658.
209. **W. W. N. O**, A. J. Lough and R. H. Morris, "Primary Amine Functionalized N-Heterocyclic Carbene Complexes of Iridium: Synthesis, Structure and Catalysis." *Organometallics*, **2013**, *32*, 3808-3818.
210. W.W. Zuo, A. J. Lough, **Y. Li**, and R. H. Morris. "Amine(imine)diphosphines Activate Iron Catalysts in the Asymmetric Transfer Hydrogenation of Ketones and Imines" *Science*, **2013**, *342*, 1080-1083.
212 **P. O. Lagaditis**, **P. E. Sues**, **J. F. Sonnenberg**, **K. Y. Wan**, A. J. Lough and R. H. Morris, "Iron(II) Complexes Containing Unsymmetrical P-N-P′ Pincer Ligands for the Catalytic Asymmetric Hydrogenation of Ketones and Imines" *J. Am. Chem. Soc.*, **2014**, *136*, 1367–1380.
213. **P. E. Sues**, A. J. Lough and R. H. Morris, "Ligand-based Molecular Recognition and Dioxygen Splitting: An Endo Epoxide Ending" *Dalton Transactions*, **2014**, *43*, 4137 – 4145. (designated a "Hot paper")
214. **P. E. Sues**, A. J. Lough and R. H. Morris, "A Sulphur Mimic of 1,1-Bis(diphenylphosphino)methane: A New Ligand Opens Up" *Chemical Communications*, **2014**, *50*, 4707-4710. DOI:10.1039/C3CC49456J.
215. R. H. Morris, "Estimating the acidity of transition metal hydride and dihydrogen complexes by adding ligand acidity constants" *J. Am. Chem. Soc.*, **2014**, *136*, 1948–1959.
216. **P. E. Sues**, A. J. Lough and R. H. Morris, "Reactivity of Ruthenium Phosphido Species Generated Through the Deprotonation of a Tripodal Phosphine Ligand and Implications for Hydrophosphination" *J. Am. Chem. Soc.*, **2014**, *136,* 4746–4760.

217. **S.E. Clapham**, **M. Zimmer-De Iuliis**, **K. Mack** and R. H. Morris "Alcohol Assisted Base-free Hydrogenation of Acetophenone Catalyzed by $OsH(NHCMe_2CMe_2NH_2)(PPh_3)_2$" *Can J. Chem.* **2014**, *92,* 731–738. (Special issue in honour of Barry Lever).
218. **P. E. Sues**, A. J. Lough and R. H. Morris, "Bromo(N,N′-bis(2-(diphenylphosphino)ethyliedene)ethylenediamine) (para-toluenesulfonylmethyl-isocyanide)iron(II) tetraphenylborate." Acta Cryst. E., Structure Reports Online, **2014**, *70*, Pt 4, m144.
219. **P. E. Sues**, **K. Z. Demmans** and R. H. Morris, "Rational development of iron catalysts for asymmetric transfer hydrogenation" *Dalton Transactions*, **2014**, 43, 7650 – 7667. DOI:10.1039/C4DT00612G (invited Perspective article).
220. W. Zuo, **S. Tauer, D. E. Prokopchuk** and 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,* 5791-5801 (for special issue titled "Catalytic and Organometallic Chemistry of Earth-Abundant Metals").
221. **J. F. Sonnenberg** and R. H. Morris, "Perspective: Distinguishing Homogeneous from Nanoparticle Asymmetric Iron Catalysis" Catalysis Science & Technology, 2014, *4*, 3426 – 3438. (invited for themed issue on Mechanistic Studies in Catalysis).
222. **D. E. Prokopchuk, B. T. H. Tsui**, A. J. Lough and 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,* 16960–16968 (Highlighted here: http://www.chemistryviews.org/details/ezine/6803781/Phosphine_Free_Ruthenium_Complex_for_Water_Splitting.html).
223. **P. E. Sues**, K. Cai, D. F. McIntosh and R. H. Morris, "Template Effect and Ligand Substitution Methods for the Synthesis of Iron Catalysts: A Two Part Experiment for Inorganic Chemistry" *J. Chem. Ed.*, **2015** *92*, 378-381.
224. **J. F. Sonnenberg**, **Paraskevi O. Lagaditis**, A. J. Lough and R. H. Morris, "Synthesis of Iron P-N-P' and P-NH-P' Asymmetric Hydrogenation Catalysts" *Organometallics*, **2014**, *33*, 6452-6465. Correction: 10.1021/acs.organomet.6b00621.
225. W. Zuo and R. H. Morris, "Synthesis and use of an asymmetric transfer hydrogenation catalyst based on iron(II)" *Nature Protocols*, **2014**, 10, 241-257 (reviewed, invited, impact factor 13).
226. **P. O. Lagaditis**, **P. E. Sues**, A. J. Lough and R. H. Morris, "Exploring the Decomposition Pathways of Iron Asymmetric Transfer Hydrogenation Catalysts" *Dalton Trans.*, **2015**, 44, 12119 - 12127 (invited original article for themed issue on Earth Abundant Elements in Homogeneous Catalysis).
227. **S. A. M. Smith** and R. H. Morris, "Unsymmetrical iron complex for the asymmetric transfer hydrogenation of ketones' *Synthesis*, **2015**, 47, 1775-1779; (invited original article for themed issue on Iron in Organic Synthesis).
229. R. H. Morris, "Exploiting metal-ligand bifunctional reactions in the design of iron asymmetric hydrogenation catalysts" *Accounts of Chemical Research*, **2015**, 48, 1494–1502 (Special issue on Earth-Abundant Metals in Homogeneous Catalysis).
230. F. W. Zuo, **D. E. Prokopchuk**, A. J. Lough and 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*, 301-314.
231. R. H. Morris, "Brønsted−Lowry Acid Strength of Metal Hydride and Dihydrogen Complexes" *Chemical Reviews*, **2016**, 8588–8654 (invited for special issue on Transition Metal Hydrides).
232. **D. E. Prokopchuk,** A. J. Lough, R. E. Rodriguez-Lugo, R. H. Morris and H. Grützmacher, "Insights Into Metal-Ligand Hydrogen Transfer: A Square-Planar Ruthenate Complex Supported by a Tetradentate Amino-amido-diolefin Ligand " *Chem. Commun.*, **2016**, *52*, 6138-6141.
233. **K. Y. Wan**, A. J. Lough and R. H. Morris, "Transition Metal Complexes of an (S,S)-1,2-Diphenylethylamine Functionalized N-Heterocyclic Carbene: a New Member of the Asymmetric NHC Ligand Family" *Organometallics*, **2016**, *35*, 1604-1612.
235. **K. Z. Demmans** and R. H. Morris, "Aqueous Biphasic Iron-Catalyzed Asymmetric Transfer Hydrogenation of Aromatic Ketones." *RSC Advances*, **2016**, 6, 88580 – 88587.
236. R. H. Morris, "Iron Group Hydrides in Noyori Bifunctional Catalysis" *Chemical Record*, **2016**, *16*, 2640–2654.
237. **M. M. H. Sung** and R. H. Morris, "DFT Calculations Support the Additive Nature of Ligand Contributions to the pKa of Iron Hydride Phosphine Carbonyl Complexes" *Inorg. Chem.*, **2016**, *55*, 9596−9600.237.

238. A. Zirakzadeh, K. Kirchner, A. Roller, B. Stöger, M. Widhalm and R. H. Morris, “Iron(II) Complexes Containing Chiral Unsymmetrical PNP′ Pincer Ligands: Synthesis and Application in Asymmetric Hydrogenations.” *Organometallics*, 2016, 35, 3781–3787.
239. **J. F. Sonnenberg, P. E. Sues, K. Y. Wan** and R. H. Morris,” Ketone Asymmetric Hydrogenation Catalyzed by P-NH-P’ Pincer Iron Catalysts: an Experimental and Computational Study.” *ACS Catalysis*, 2017, *7*, 316–326.
240 **S. A. M. Smith**, A. J. Lough and R. H. Morris, " The crystal structure of [(1S,2S)-N1-[2-(diphenylphosphino)ethyl],N2-[2-(dicyclohexylphosphino)ethylidenyl]-1,2-diphenyl-1,2-ethanediamine]chlorocarbonyliron(II) tetraphenylborate" *IUCrData*, 2017, https://doi.org/10.1107/S2414314617004527.
241 **S. A. M. Smith**, P. O. Lagaditis, **A. Lüpke**, A. J. Lough and R. H. Morris, "Unsymmetrical iron P-NH-P’ complexes for the asymmetric hydrogenation of aryl ketones" *Chem. Eur. J.*, 2017, *23*, 7212-7216.
242 **K. Z. Demmans, C. S. G. Seo**, A. J. Lough, R. H. Morris, "From Imine to Amine: an Unexpected Left Turn. Cis-β Iron (II) PNNP' Precatalysts for the Asymmetric Transfer Hydrogenation of Acetophenone" *Chem. Sci.* 2017, *8*, 6531-6541.
243 R. H. Morris. “Six coordinate capped trigonal bipyramidal complexes” *Coord. Chem. Rev.* 2017, *350*, 105-116 (special issue in honour of Pierre Braunstein).
244 **S. A. M. Smith, D. E. Prokopchuk,** A. J. Lough, 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'" Israel J. Chem. 2017, *57*, 1204-1215, invited for special issue on Base Metal Catalysis.
245 **K. W. Yang, M. M. Sung**, A. J. Lough and R. H. Morris, “Half-Sandwich Ruthenium Catalyst Bearing an Enantiopure Primary Amine Tethered to an N-Heterocyclic Carbene for Ketone Hydrogenation” *ACS Catal.* 2017, *7*, 6827-6842.
246 R. H. Morris, "A capped trigonal pyramidal molybdenum hydrido complex and an unusually mild sulfur-carbon bond cleavage reaction" *Chem. Commun.*, **2017**, *53*, 11032 – 11035.
247. **K. Y. Wan**, **F. Roelfes**, A. J. Lough, F. E. Hahn and R. H. Morris, "Iridium and Rhodium Complexes Containing Enantiopure Primary Amine-Tethered N-Heterocyclic Carbenes: Synthesis, Characterization, Reactivity, and Catalytic Asymmetric Hydrogenation of Ketones" *Organometallics*, **2018**, *37*, 491–504.
248. **J. P. Unsleber**, J. Neugebauer and R. H. Morris, "DFT methods applied to answer the question: how accurate is the Ligand Acidity Constant method for estimating the pK_a of transition metal hydride complexes $MHXL_4$ when X is varied?" *Dalton Transactions*, **2018**, *47*, 2739-2747.
250. R. H. Morris, "Mechanisms of the H_2- and transfer hydrogenation of polar bonds catalyzed by iron group hydrides" *Dalton Transactions*, **2018**, *47*, 10809–10826.
251 **S. E. Trentowsky**, A. J. Lough and R. H. Morris, “The effect of the counteranion on the loss of hydrogen from cationic ruthenium dihydrogen complexes in the solid state.” *Polyhedron*, **2018**, *156,* 342–349; invited for special issue in honour of Prof. Bill Jones.
252 R. H. Morris, “Estimating the wavenumber of terminal metal-hydride stretching vibrations of octahedral d^6 transition metal complexes” *Inorg. Chem.* **2018**, *57*, 13809−13821.
253. **M. M. H. Sung**, **S. Jdanova** and R. H. Morris, "Ligand Acidity Constants as Calculated by Density Functional Theory for PF_3 and N-Heterocyclic Carbene Ligands in Hydride Complexes of Iron(II)" *J. Organometal. Chem.*, **2018**, *880*, 15-21, invited for special issue in honour of Dick Puddephatt.
254. **K. Z. Demmans, M. E. Olson** and R. H. Morris, "Asymmetric Transfer Hydrogenation of Ketones With Well-Defined Manganese(I) PNN and PNNP Complexes" *Organometallics*, **2018**, *37*, 4608−4618.
255. **C. S. G. Seo** and R. H. Morris, "Catalytic homogeneous asymmetric hydrogenation – successes and opportunities" *Organometallics*, **2019**, *38*, 57–65. Invited for special issue on ""Organometallics in pharmaceutical synthesis".
256. **M. V. Gradiski, B. T. H. Tsui,** A. J. Lough and R. H. Morris, "PNN’ & P2NN’ Ligands via Reductive Amination of Phosphine Acetaldehydes: Synthesis and Base-Metal Coordination Chemistry" *Dalton Trans.*, **2019**, *48*, 2150–2159.
257. **M. V. Gradiski** and R. H. Morris, "ACETALDEHYDE, 2-(DIPHENYLPHOSPHINO)- PHENYL PHOSPHONIUM DIMER" *Electronic encyclopedia of reagents for organic synthesis*, **2019**, 10.1002/047084289X.rn02276.

258. U. Ulmer, T. Dingle, P. Duchesne, R. Morris, A. Tavasoli, T. Wood and G. Ozin, " Fundamentals and applications of photocatalytic CO2 methanation " *Nature Commun.*, **2019**, Article number: 3169. DOI: 10.1038/s41467-019-10996-2
260 **D. Schnieders, B. T. H. Tsui, M. M. H. Sung,** M. R. Bortolus, G. J. Schrobilgen, J. Neugebauer and R. H. Morris, "Metal-Hydride Vibrations: the trans-Effect of the Hydride" *Inorg. Chem.*, **2019**, *18,* 12467-12479.
261. R. H. Morris, "Physical Insights into Mechanistic Processes in Organometallic Chemistry: an Introduction" *Faraday Discussions*, **2019**, *220*, 10-27. Invited for special issue.
262. 1. Y. Aoki, M. Bauer, T. Braun, J. Cadge, G. Clarke, D. Durand, Odile Eisenstein, S. Gallarati, M. Greaves, J. Harvey, A. Haynes, U. Hintermair, A. Hulme, Youichi Ishii, M. Jakoobi, V. R. Jensen, P. Kennepohl, S. Kuwata, A. Lei, G. Lloyd-Jones, J. Love, J. Lynam, S. Macgregor, R. Morris, D. Nelson, A. Odom, R. Perutz, M. Reiher, J. Renny, J. Roithova, L. Schafer, S. Scott, P. Seavill, J. Slattery, T. Takao, J. Walton, J. Wilden, C.-Y. Wong and T. Young, "Mechanistic insight into organic and industrial transformations" *Faraday Discussions*, **2019**, *220*, 282-316.
263. Y. Aoki, M. Bauer, T. Braun, J. Cadge, D. Davies, D. Durand, O. Eisenstein, D. Ess, I. Fairlamb, N. Fey, S. Gallarati, M. George, M. Greaves, M. Halse, A. Hamilton, J. Harvey, Anthony Haynes, U. Hintermair, A. Hulme, Y. Ishii, M. Jakoobi, V. R. Jensen, P. Kennepohl, S. Kuwata, A. Lei, G. Lloyd-Jones, J. Love, K. Lovelock, J. Lynam, S. Macgregor, T. Marder, E. J. Meijer, P. Morgan, R. Morris, J. Mwansa, D. Nelson, A. Odom, R. Perutz, M. Reiher, J. Renny, J. Roithov´a, L. Schafer, D. Schilter, S. Scott, J. Slattery, J. Walton, J. Wilden, C.-Y. Wong, T. Yaman and T. Young, "Physical methods for mechanistic understanding: general discussion" *Faraday Discussions*, **2019**, *220*, 144-178.
264. M. Bauer, J. Cadge, D. Davies, D. Durand, O. Eisenstein, D. Ess, N. Fey, S. Gallarati, M. George, A. Hamilton, J. Harvey, U. Hintermair, A. Hulme, Y. Ishii, V. R. Jensen, G. Lloyd-Jones, J. Love, J. Lynam, S. Macgregor, T. Marder, E. J. Meijer, P. Morgan, R. Morris, J. Mwansa, A. Odom, R. Perutz, M. Reiher, L. Schafer, J. Slattery and T. Young, "Computational and theoretical approaches for mechanistic understanding: general discussion" *Faraday Discussions*, **2019**, *220*, 464-488.
265. **C.S. G. Seo, T. Tannoux, S. A. M. Smith,** A. J. Lough, R. H. Morris, " Enantioselective hydrogenation of activated aryl imines catalyzed by an iron(II) P-NH-P' complex." J. Org. Chem. **2019**, *84*, 12040-12049. 10.1021/acs.joc.9b01964
266. **M. M. H. Sung, D. E. Prokopchuk** and R. H. Morris, "Phosphine-free ruthenium NCN-ligand complexes and their use in catalytic CO2 hydrogenation" Dalton Transactions, 2019, 48, 16569-16577. 10.1039/C1039DT03143J.
267. R. H. Morris, "Methane activation by a single copper center in particulate methane monooxygenase: A computational study" *Inorg. Chimica Acta*, **2020**, *503*, DOI 10.1016/j.ica.2020.119441. Invited for special issue on Mechanistic Inorganic Chemistry.
268. **M. V. Gradiski**, A. N. Kharat, **M. S. E. Ong**, A. J. Lough, **S. A. M. Smith** and R. H. Morris, "A One-Step Preparation of Tetradentate Ligands with Nitrogen and Phosphorus Donors by Reductive Amination and Representative Iron Complexes" *Inorg. Chem.*, **2020**, *59*, 11041-11053.
269. R. M. Bullock, J. G. Chen, L. Gagliardi, P. J. Chirik, O. K. Farha, C. H. Hendon, C. W. Jones, J. A. Keith, J. Klosin, S. D. Minteer, R. H. Morris, A. T. Radosevich, T. B. Rauchfuss, N. Strotman, A. Vojvodic, T. R. Ward, J. Y. Yang and Y. Surendranath, "Using Nature's Blueprint to Enable Catalysis with Earth-Abundant Metals" *Science*, **2020**, *369*, eabc3318 1-10.
269a. R. M. Bullock, J. G. Chen, L. Gagliardi, P. J. Chirik, O. K. Farha, C. H. Hendon, C. W. Jones, J. A. Keith, J. Klosin, S. D. Minteer, R. H. Morris, A. T. Radosevich, T. B. Rauchfuss, N. Strotman, A. Vojvodic, T. R. Ward, J. Y. Yang and Y. Surendranath, "Review Summary: Using Nature's Blueprint to Enable Catalysis with Earth-Abundant Metals" *Science*, **2020**, *369*, 786.
270. **B. E. Rennie**, R. H. Morris and A. J. Lough, "Crystal structure of Bis(di-(R,R-1,2-(binaphthylphosphonito)ethane)iron(II) chloride, bis dichloromethane solvate" *Acta Cryst. E.*, **2020**, *76*, 1525-1527.
271. **B. E. Rennie**, **R. G. Eleftheriades** and R. H. Morris, "Systematic Trends in the Electrochemical Properties of Transition Metal Hydride Complexes Discovered by Using the Ligand Acidity Constant Equation" *J. Am. Chem. Soc.*, **2020**, *142*, 17607–17629.
272. **J. Shangguan**, A. Hensley, **M. V. Gradiski,** N. Pfriem, J.-S. McEwen, R. H. Morris and Y.-H. C. Chin, "The Role of Protons and Hydrides in the Catalytic Hydrogenolysis of Guaiacol at the Ruthenium Nanoparticle-water Interface" *ACS Catalysis*, **2020**, *10*, 12310–12332.

273. **S. D. Drouin**, **P. A. Maltby**, **B. E. Rennie**, **C. T. Schweitzer**, **A. Golombek**, **E. P. Cappellani** and R. H. Morris, "Electrochemistry of transition metal hydride diphosphine complexes trans-$MH(X)(PP)_2$ and trans-$[MH(L)(PP)_2]^+$, M = Fe, Ru, Os; PP = chelating phosphine ligand" *Inorg. Chim. Acta*, **2021**, 516,120124. DOI:10.1016/j.ica.2020.120124. Invited for special issue in honour of Maurizio Peruzzini.
274. **C. S. G. Seo**, **B. T. H. Tsui**, **M. V. Gradiski, S. A. M. Smith** and R. H. Morris, "Enantioselective direct, base-free hydrogenation of ketones by a manganese amido complex of a homochiral, unsymmetrical P-N-P' ligand" *Catal. Sci. Technol.*, **2021,** *11*, 3153-3163. DOI:10.1039/D1CY00446H.
275. E. C. Keske, **M. O. Sattler**, A. J. Lough and R. H. Morris, "Tridentate NPN Ligands with a Central Secondary Phosphine Oxide Donor and their Corresponding Metal Complexes" *Zeitschrift fur Anorganische und Allgemeine Chemie*, **2021**, *647*, 1436-1441. 10.1002/zaac.202100073. Invited for special issue about pincer ligand chemistry.
277. **B. T. Tsui** and R. H. Morris "Trans Element-Hydrogen Bonds: A Distinctive Difference Between Transition Metals and Main Group Elements" *Inorg. Chem.* **2021,** *16,* 13920-13928. 10.1021/acs.inorgchem.1c00801.
278. **H. Cai,** R. Schimmenti, **M. V. Gradiski**, R. H. Morris, M. Mavrikakis and Y.-H. C. Chin "Mechanistic Similarities and Differences for Hydrogenation of Aromatic Heterocycles and Aliphatic Carbonyls on Sulfided Ru Nanoparticles" *ACS Catalysis* **2021,** *11,* 12585-12608. 10.1021/acscatal.1c01925
280. **M. V. Gradiski, B. E. Rennie,** A. J. Lough and R. H. Morris, "Electronic Insights into Aminoquinoline-Based PNHN Ligands: Protonation State Dictates Geometry While Coordination Environment Dictates N-H Acidity and Bond Strength" *Dalton Trans.*, **2022**, 51, 11241–11254 10.1039/D2DT01556K.
281. H.-L. Shek, K.-T. Tam, S.-M. Yiu, M.-K. Tse, R. H. Morris and C.-Y. Wong, "Osmium(II)-Induced Rearrangement of Allenols for Metallafuran Complexes" *Organometallics*, **2022,** *41*, 1931-1941. 10.1021/acs.organomet.2c00113.
282. **B. T. H. Tsui, M. M. H. Sung, J. Kinas,** F. E. Hahn and R. H. Morris, "A Ruthenium Protic N-Heterocyclic Carbene Complex as a Precatalyst for the Efficient Transfer Hydrogenation of Aryl Ketones" *Organometallics,* **2022,** *41*, 2095-2105. 10.1021/acs.organomet.2c00228.
283. **A. L. Kwan** and R. H. Morris, "A Plausible Mechanism for the Iridium-Catalyzed Hydrogenation of a Bulky N-Aryl Imine in the (S)-Metolachlor Process" *Molecules*, **2022**, *27*, 5106. 10.3390/molecules27165106
284. **S. J. Oliphant** and R. H. Morris, "Density Functional Theory Study on the Selective Reductive Amination of Aldehydes and Ketones Over Their Reductions to Alcohols Using Sodium Triacetoxyborohydride" *ACS Omega*, **2022**, *7*, 30554–30564. 10.1021/acsomega.2c04056
285. **P. D. Dutschke, B. T. H. Tsui**, M. von Bremen-Kühne, R. H. Morris and F. E. Hahn, "Methanol Mediated Formation of an Iridium(III) NHC/Azolato Chelate Complex. An Experimental and Theoretical Study" *Organometallics*, **2022**, *41*, 3732-3740. 10.1021/acs.organomet.2c00489
286. **B. E. Rennie**, J. S. Price, D. J. H. Emslie and R. H. Morris, "The Trans Ligand Determines the Stability of Paramagnetic Manganese(II) Hydrides of the Type trans-$[MnH(L)(dmpe)_2]^+$ Where L is PMe_3, C_2H_4, or CO" *Inorg. Chem.*, **2023**, 10.1021/acs.inorgchem.1022c0443
287. **Madeleine O. Sattler**, Tomilola J. Ajayi, Eric C. Keske, Alan J. Lough and Robert H. Morris, "Synthesis, Spectroscopic Characterization, Crystal Structure, DFT and Hirschfeld Surface Analysis of a Manganese(I) Complex ([Mn(P-NH-NH-P)(CO)2][BPh4])" J. Mol. Struct. 2023, https://doi.org/10.1016/j.molstruc.2023.136028.
288. **P. Parusel**, **P. Dutschke**, M. Hebenbrock, A. Hepp, R. Morris and F. E. Hahn, "Synthesis of N-Heterocyclic Carbene Complexes by Oxidative Addition of 4-Iodo-Imidazolium Salts Followed by an Unusual Rearrangement" *Organometallics*, **2024**, *43*, 532-539. https://doi.org/10.1021/acs.organomet.3c00479.
289. R. H. Morris, "Reactivity Umpolung (Reversal) of Ligands in Transition Metal Complexes" *Chem. Soc. Rev.*, **2024,** *53,* 2808 – 2827. http://doi.org/10.1039/d3cs00979c.
290. T. J. Ajayi, A. J. Lough and R. H. Morris, "Mechanochemical Synthesis of Chromium(III) Complexes Containing Bidentate PN, and Tridentate P-NH-P and P-NH-P' Ligands" *ACS Omega*, **2024**, 10.1021/acsomega.1024c02076.
291 R. H. Morris, "Insights into the chemistry of Kubas' chromium dihydrogen complexes" *Inorganica Chimica Acta*, **2024**, *569*, 122147. https://authors.elsevier.com/a/1j6O9_TMQYWnk

B. Books and/or Chapters

6 James, B. R.; Mahajan, D.; Morris, R. H. "Catalysis using rhodium complexes containing either diphosphine ligands or mono- or disulfoxide ligands, including chiral ones" *Symp. Rhodium Homogeneous Catal.,* Proceedings. 1978.

44. B. R. James, A. Joshi, P. Kvintovics, R. H. Morris and I. S. Thorburn in "Catalysis of Organic Reaction" ed. D. W. Blackburn, Marcel Dekker, New York, 1990.

53. R. H. Morris "Metal hydrides and metal hydride complexes" *1992 McGraw-Hill Yearbook of Science and Technology* .

107. R. H. Morris, "The Chemistry of the Dihydrogen Ligand in Transition Metal Compounds With Sulfur-donor Ligands" in *Transition Metal Sulfides in Chemistry and Catalysis*, NATO Advanced Research Workshop Series, T. Weber et al. (eds) Kluwer Press, 57–87, 1998.

123. **Forde, C. E**.; Morris, R. H. "Transition metal complexes as models of the active sites of hydrogenases" in *Electron Transfer in Chemistry* 2001, Vol 2 section 2, 905-926, ed Balzani Wiley VCH, Weinheim, Germany.

125. Morris, R. H. "Non-classical hydrogen bonding along the pathway to the heterolytic splitting of dihydrogen″ in *Transition Metal Hydrides* 2001, 1-38, M. Perruzini and R. Poli, Ed.; VCH: Amsterdam.

149. R. H. Morris "Hydrogenases and Model Complexes" In *Concepts and Models in Bioinorganic Chemistry*; B. Kraatz and N. Metzler-Nolte, Ed.; VCH-Wiley, Weinheim, 2006, pp 329-360.

150. R. H. Morris "Ruthenium and Osmium." In *The Handbook of Homogeneous Hydrogenation*; Elsevier, C. J., de Vries, J. G., Eds.; WILEY-VCH: New York, 2006, pp 45-70.

188. **A. A. Mikhailine** and R. H. Morris, "Iron Catalysis" *McGraw Hill 2011 Yearbook of Science and Technology*, pages 130-133.

228. **Prokopchuk, D. E.; Smith, S. A. M.**; Morris, R. H. "Ligands for Iron -based Homogeneous Catalysts for the Asymmetric Hydrogenation of Ketones and Imines" In *Ligand Design in Metal Chemistry: Reactivity and Catalysis*; Stradiotto, M.; Lundgren, R. J., Ed.; VCH Wiley: 2016, pp 205-236. http://ca.wiley.com/WileyCDA/WileyTitle/productCd-1118839838.html.

249 R. H. Morris "Hydride Complexes of the Transition Metals" *Encyclopedia of Inorganic and Bioinorganic Chemistry*, John Wiley & Sons, **2018** 16 pp https://onlinelibrary.wiley.com/doi/book/10.1002/9781119951438.

259. **B. T. H. Tsui**, E. C. Keske, **K. Z. Demmans, C. S. G. Seo, B. E. Rennie,** A. Nemati and R. H. Morris, "Group 7 and 8 hydrogenation catalysts" in *Comprehensive Coordination Chemistry III*, eds. C. Lu and N. Szymczak, Elsevier Ltd, N.Y., 2021, 657-714.

8. Non-Refereed Publications

147. R. Morris, "Discovery of the First Dinitrogen Complex" Canadian Chemical News 57 (2005) 44.

151. R. H. Morris. Book Review of "Mechanisms in Homogeneous Catalysis: A Spectroscopic Approach Edited by Brian Heaton (University of Liverpool)." *J. Am. Chem. Soc.* **2005**, *127*, 17963 - 17964.

164. R. H. Morris. "IDW2007 in Review." *Canadian Chemical News* **2008**, 60 (2), 6.

172. R. H. Morris, A. Lee and A. Hadzovic. "The Guided Tours of Metalloproteins (now with Jmol or Chime)" *"World Index of BioMolecular Visualization Resources" http://molvis.sdsc.edu/visres/ready-to-use/subjects.jsp*, 2009.

189. R. H. Morris,"The International Year of Chemistry 2011" RSC *Academy III Bulletin*, **2011**, *1*, 3-4.

234. P. J. Chirik and R. H. Morris, "Getting down to Earth: The Renaissance of Catalysis with Abundant Metals" *Acc. Chem. Res.* **2015**, *48*, 2495-2495 1502 (Special issue on Earth-Abundant Metals in Homogeneous Catalysis).

276. R. H. Morris, "Focusing on transition metal hydride complexes" *Can. J. Chem.*, **2021**, *99,* v-vii. (Introduction to the special issue in my honour)

279. Heiko Rebmann, Kai Y. Wan, Alan J. Lough, and Robert H. Morris, CCDC 2068165: Experimental Crystal Structure Determination, 2021, DOI: 10.5517/ccdc.csd.cc27f30t, Refcode UNOPIZ

9. Manuscripts/publications, etc. in preparation and submitted to publishers but not yet accepted.

10. Papers presented at meetings and symposia.

1-19. (1979-1985)

20. R.H. Morris, M. Shiralian, J.D. Zubkowski. "Aromatic C-H Bond Activation Using Ru(eta-2-C_6Me_6)$(H)_2(PHCy_2)$. 189th A.C.S. National Meeting, Miami Beach, INOR 168, Apr 1985.
21. R.L. Luck, R.H. Morris and J.F. Sawyer "Synthesis, Properties and Reactions of the First Mixed-metal Complexes to Contain Unbridged Quadruple Bonds" C.I.C. Conference, Kingston, June 1985.
22. N.J. Lazarowych and R.H. Morris. "Infrared and NMR Spectroscopic Properties of 15N2 Enriched Bis(dinitrogen) Complexes of Molybdenum and Tungsten" C.I.C. Conference, Kingston, June 1985.
23. R.H. Morris, M. Shiralian, J.D. Zubkowski "NEW HYDRIDOPHOSPHINE COMPLEXES OF RUTHENIUM AND THEIR USE IN AROMATIC C-H BOND ACTIVATION" Biennial Inorganic Chemical Symposium, York University, June 1985.
24. B.R. James, S.N. Gamage and R.H. Morris "Formation of Rhodium(III) ¥¡-Ylidic Enamine or Carbene Complexes on Using Triethylamine or Proton Sponge, Respectively, for Base-promoted Reactions." X11th Int. Conf. Organomet. Chem. Vienna, Sept, 1985.
25. Maria Bautista, Robert H. Morris, Mahmoud Shiralian, Jeffery Sawyer and Jeffrey D. Zubkowski."Transition Metal Complexes of Dihydrogen With the H-H Bond Still Intact" 18th Inorganic Discussion Weekend. U. of Toronto, Oct.1985.
26. Rudy L. Luck and Robert H. Morris "The Synthesis, 31P{1H} and 1H NMR Spectra and Electrochemical Properties of Group(VI) Metal Dimers, Each Containing a Bridging ¥§-Arylphosphine Ligand" 18th Inorganic Discussion Weekend. U. of Toronto, Oct.1985.
27. Andrea Sella and Robert H. Morris "Synthesis of New ¥§-Arylphosphine Complexes of Molybdenum(0) and Their Reactions with HBF›" 18th Inorganic Discussion Weekend. U. of Toronto, Oct.1985.
28. M. Bautista, R.H. Morris, M. Shiralian, J.F. Sawyer and J.D. Zubkowski. "C-H and H-H Bond Activation by Hydride Complexes of the Iron-Group Metals" ICC/CIC '86 Conference, Saskatoon, June 1986.
77. R.H. Morris, P. I. Amrhein, T. Bartucz, A. J. Lough, A. Petroff and M. Schlaf. "Protonation at a Thiolato or Cyano Ligand and then at a Hydrido Ligand to give New dihydrogen complexes of the iron group metals." 31st International Conference on Coordination Chemistry, Vancouver. Aug. 1996.
78. C. Forde and R. H. Morris. "Hydration of nitriles to amides at iron: functional models of nitrile hydratase." 31st International Conference on Coordination Chemistry, Vancouver. Aug. 1996.
79. S. H. Park, A. J. Lough and R. H. Morris. “Intra- and Intermolecular Hydrogen Bonding in Dihydrido Pyrazole, Acetaldoxime or Glyoxime Complexes or Ir(III)”. 29th IDW, U. McGill, Nov. 1996.
80. T. P. Fong and R. H. Morris,“Kinetic and Thermodynamic Products in the Preparation of $[RuH(CN)R_2PCH_2CH_2PR_2)_2]$ (R = Et, Ph)”. . 29th IDW, U. McGill, Nov. 1996.
81. T. P. Fong, P. I. Amrhein, C. E. Forde, A. J. Lough, R. H. Morris and T. Stephan “Ancillary ligand control of reactivity. protonation at hydride versus cyanide in *trans*-$[MH(CN)(L)_2]$ (M = Fe, Ru, Os; L = dppe, depe, dtpe)”. June, 1997. Windsor, Ont. 80thCSC Conference
82. D. Gusev and R. H. Morris “Synthesis and reactions of new hydrido(tertiaryphosphine)-metallates”. June, 1997. Windsor, Ont. 80thCSC Conference
83. S. H. Park, A. J. Lough and R. H. Morris. “Intra- and Intermolecular Hydrogen Bonding in Dihydrido Complexes or Ir(III)”. June, 1997. Windsor, Ont. 80thCSC Conference.
84. 30th IDW, Toronto, T. P. Fong, A. J. Lough, and R. H. Morris "Novel Dihydrogen Complexes via Protonation of $[RuH(CN)(R_2PCH_2CH_2PR_2)_2]$ (R = Et, Ph), Oct. 1997, oral by Fong.
85. 30th IDW, Toronto, S. E. Trentowsky, P. Aroca, and R. H. Morris "Solid state NMR analysis of ruthenium compounds which reversibly bind H_2; Investigations directed towards the development of hydrogen detection and storage units" Oct. 1997, poster.
86. 30th IDW, Toronto, S. Landau, A. J. Lough, and R. H. Morris "Preparation and Characterization of Some Fe and Ir Dihydrogen and Hydride Complexes" Oct, 1997, poster.

87. 81st CSC Conference, Whistler BC " Iron Group Dihydrogen Complexes With pKa Ranging Over 30 Units", June 1998, oral.
88. 82nd CSC Conference, Toronto "Proton-Hydride Interactions Involving Polyhydride Anions and Potassium(aza-crown) Cations" Abdur-Rashid K., Gusev D.G., Landau S.E., Lough A., Morris R.H May 1999, oral.
89. 82nd CSC Conference Toronto, "Dihydrogen Complexes of Iron: Pushing the Limits of Heterolytic Activation and Acidity of Dihydrogen" Landau S.E., Morris R.H., Lough A.J., May 1999, oral.
90. 82nd CSC Conference Toronto, "The Guided Tour of Metalloproteins" Lee, A., Morris, R. H., May 1999, oral.
91. 82nd CSC Conference Toronto, "Investigations into the Reversible Binding of Hydrogen Gas in Ru(H2)H(dppe)2+ X- where X-= BPh4 - , B(ArF)4 - , BF4 - , PF6 - ." Trentowsky S.E., Morris R.H. May 1999, poster.
92. 32nd IDW Conference, Windsor. "An Acidity Scale in THF for Molecular Hydrogen and for Phosphorus-containing Compounds Including Metal Hydrides and Dihydrogen Complexes" K. Abdur-Rashid, T. P. Fong, B. Greaves, D. G. Gusev, S. E. Landau, A. J. Lough and R. H. Morris Oct. 1999, poster.
93. 32nd IDW Conference, Windsor. "Ruthenium(II) Catalysts Activated by Proton-Hydride Bonds" Abdur-Rashid, A. J. Lough and R. H. Morris. Oct. 1999, oral.
94. 83rd CSC Conference, Calgary, "Ruthenium dihydride RuH2(PPh3)2(R,R-Cyclohexyldiamine) and Ruthenium Monohydride RuHCl (PPh3)2(R,R-Cyclohexyldiamine): Active Catalyst and Catalyst Precursor for the Hydrogenation of Ketones and Imines." May, 2000, oral.
95. 83rd CSC Conference, Calgary, "Synthesis, Characterization and Reactions of the Bisdihydrogen Complex $Ru(H_2)_2(H)_2(P^iPr_3)_2$ and the Dinitrogen Complexes $Ru(N_2)_2(H)_2(P^iPr_3)_2$ and $\{Ru(N_2)(H)_2(P^iPr_3)_2\}_2(\mu\text{-}N_2)$.", May 2000, poster.
96. 83rd CSC Conference, Calgary, "Synthesis of Chiral Alcohols and Chiral Amines by RuH_2(diphosphine)(diamine) Catalyzed Hydrogenation of Ketones and Imines." May 2000, poster.
97. IDW Conference, York U., Oct. 2000, "New Anionic Rhenium Polyhydrides." Oral. J. Hinman and R. H. Morris.
98. IDW Conference, York U., Oct. 2000 "New Acidity Scale for Phosphorus Containing Compounds in CH_2Cl_2." Poster. T. Li and R. H. Morris
99. IDW Conference, York U., Oct 2000 "Mechanism of Ketone Hydrogenation Catalyzed by Ruthenium Diamine Complexes." K. Abdur-Rashid and R. H. Morris.
100. 84th CSC Conference, Montreal, May 2001. T. Li, A. J. Lough and R. H. Morris "New Acidity Scale for Phosphorus Containing Compounds in CH_2Cl_2."
101. ACS Meeting Chicago, Aug. 2001 "Ionic Asymmetric Hydrogenation: Direct Hydride and Proton Transfer from Chiral Catalysts Trans-$Ru(H)_2$(diphosphine)(diamine) to ketones and imines." K. Abdur-Rashid, S. Clapham, M. Faatz, A. Lough and R. H. Morris.
102. IDW Conference, Waterloo U., Oct 2001 "Role of the Bifunctional RuH..HN Motif in the Ionic Hydrogenation of Ketones and Imines Catalyzed by the Ruthenium Dihydride Complexes $RuH_2(PR_3)_2$(diamine) and RuH_2(diphosphine)(diamine). K. Abdur-Rashid, S. Clapham, M. Faatz, A. Lough and R. H. Morris.
103. IDW Conference, Waterloo, Oct 2001 "A Novel Hydrido-Amido Compound: The Synthesis, Characterization and Some Reactions of an Intermediate in the Catalytic Hydrogenation of Polar Multiple Bonds. S Clapham, R. H. Morris, A.J. Lough and K. Abdur-Rashid.
104. 85th CSC Conference, Vancouver. June, 2002. Oral IN774. R. H. Morris, S. Clapham, J. N. Harvey, A. J. Lough, A. Hadzovic. The Activation of dihydrogen by ruthenium amido complexes as the turnover-limiting step of ketone asymmetric hydrogenation catalysts.
105. 85th CSC Conference, Vancouver. June, 2002. Poster IN638. K. Abdur-Rashid, A. Hadzovic, J. Harvey, A. J. Lough, R. H. Morris. Chemistry of Ruthenium(II) Monohydride and Dihydride Complexes Containing Nitrogen Donor Ligands: Evidence for an Ionic Mechanism in Catalytic Hydrogenation Reactions.
106. 85th CSC Conference, Vancouver. June, 2002. Poster IN654. S. E. Landau, J. Hinman, K. E. Groh, A. J. Lough and R. H. Morris. Large effects of ion pairing and protonic-hydridic bonding on the stereochemistry and basicity of anionic hydride complexes.

107. ACS National Meeting. Boston. Aug., 2002. Oral. R. H. Morris, K. Abdur-Rashid, S. Clapham, M. Faatz, M. Eberhardt, A. J. Lough. Ruthenium hydride complexes as active catalysts for the homogeneous hydrogenation of carbon-oxygen and carbon-nitrogen multiple bonds.
108. 35th Inorganic Discussion Weekend, Montreal. Oct. 2002. Oral. S. Clapham, K. Abdur-Rashid, A. Lough, and R.H. Morris "Kinetic and Computer Modeling Studies into the Hydrogenation of Acetophenone by the Novel Hydrido amido Catalyst $RuH(NHCMe_2CMe_2NH_2)(PPh_3)_2$
109. 35th Inorganic Discussion Weekend, Montreal. Oct. 2002. Poster. R. H. Morris, K. Abdur-Rashid, T. Fedorkiw, A. J. Lough, L. Soltay New Hydride Complexes of Ruthenium and Iridium Bearing N-Heterocyclic Carbene Ligands.
110. IUPAC Meeting, Ottawa. Aug. 2003. Oral. A. Hadzovic, R. Abbel, A. J. Lough, R. H. Morris, K. Abdur-Rashid, J. Harvey. A Cascade of Dihydride Isomers of Ruthenium. Which One Is the Ketone Hydrogenation Catalyst? A. Hadzovic, R. Abbel, A. J. Lough, R. H. Morris, K. Abdur-Rashid, J. Harvey
111. 226th ACS National Meeting, New York City. Sept. 2003. Poster. T. Li, A. J. Lough, R. Churlaud, K. Abdur-Rashid and R. H. Morris. Trans-dihydride and amido complexes derived from the precatalyst for ketone hydrogenation, trans-RuH(Cl){PNHtmeNHP}, where {PNHtmeNHP} is a tetradentate ligand.
112. 36th Inorganic Discussion Weekend, McMaster U., Oct. 2003. Oral. T. Li, A. J. Lough, R. Churlaud, K. Abdur-Rashid and R. H. Morris. Ruthenium tetradentate trans-dihydride and amido complexes derived from the precatalyst for ketone hydrogenation.
113. 36th Inorganic Discussion Weekend, McMaster U., Oct. 2003. Poster. S. Clapham, L. Soltay, N. Rasool, and R. H. Morris. Examining the Reactivity of Complexes RuHX(diamine)(PPh3)2, Prepared by Reaction of HX with Their Respective Amido Precursors.
114. 14th International Conference on Homogeneous Catalysis, Munich, July 2004. Poster. R.H. Morris, R. Guo, A. J. Lough, D. Song. "Asymmetric Catalytic Reactions of New Ruthenium Hydride Complexes with a Phosphane-amine Ligand Derived from (+)-(1S, 2R)-Norephedrine**.**"
115 XXIst International Conference on Organometallic Chemistry. July 2004. Oral. R. Guo, R. H. Morris, A. J. Lough, D. Song. "Asymmetric Catalytic Reactions of New Ruthenium Hydride Complexes with a Phosphane-amine Ligand Derived from (+)-(1S, 2R)-Norephedrine**.**"
116. 228th American Chemical Society National Meeting in Philadelphia, Aug. 2004. **T. Li**, A. J. Lough, D. Song and R. H. Morris "Ruthenium PNNP Tetradentate Ligand Complexes as Catalysts for Nitrile Hydrogenation."
117. 37th Inorganic Discussion Weekend, Queens U. Oct. 2004. Oral. **S. Clapham** and R. H. Morris. "Reactions of the amido hydrido complex of osmium, $OsH(NHCMe_2CMe_2NH_2)(PPh_3)_2$: HX addition, HX transfer and ketone H_2-hydrogenation", refereed.
118. CSC Conference, Saskatoon, May 2005. Poster. R. H. Morris, R. Guo, X. Chen, C. Elpelt and D. Song. "Asymmetric Reactions Catalyzed by Hydridoruthenium Binop Complexes."
119. NUCC Conference, Ottawa, Aug. 2005. Lecture. **Nipa F. Haque**, Alen Hadzovic and Robert H. Morris "Synthesis and Characterization of Fe(II) Complexes Modelling Aspects of the [2Fe-2S] Cluster of the Rieske Centre."
120. IDW 2005 Conference. London, Ont. Nov. 2005. Lecture. **M. Zimmer-De Iuliis**, S. Clapham, R. H. Morris. "Density Functional Study of Dihydrogen Splitting in Both the Presence and Absence of MeOH based on $RuH(NHCMe_2CMe_2NH_2)(PPh_3)_2$ and $OsH(NHCMe_2CMe_2NH_2)(PPh_3)_2$."
121. IDW 2005 Conference. London, Ont. Nov. 2005. Poster. **S. E. Clapham**, M. Zimmer-De Iuliis, N. Rasool, D. Song, A. Lough, R. H. Morris "Hydrido Amido Complexes of Ruthenium and Osmium and Their Reactions with Weak Acids and Their Role in Catalysis."
122. SOUSCC 2006 York U. Mar 2006. **F. N. Haque**, R. H. Morris, A. J. Lough, J. Chin, and H. Kim. "Ruthenium(II) Complexes of PNNP Tetradentate Ligands and Their Catalytic Activity in the Hydrogenation of Polar Bonds."
123. CSC Conference, Halifax, June 2006. **Sean E. Clapham**, Rongwei Guo, **Marco Zimmer-De Iuliis**, Nailyn Rasool, Alan Lough, Robert H. Morris. "Synthesis and Characterization of Complexes of the Type RuHX(diamine)(PPh_3)2 and Their Use as Catalysts."
124. ACS Conference, San Francisco, Sept. 2006. "Hydrido Diamine Ruthenium Complexes and Their Use as Hydrogenation and Michael Addition Catalysts." Robert H. Morris, **Sean E. Clapham**, Rongwei Guo, **Marco Zimmer-De Iuliis**, Nailyn Rasool, Alan Lough, Robert H. Morris.

125. 39th IDW, Carleton University, Nov. 2006. "Autocatalysis in Noyori-type catalytic systems: A marked alcohol effect in the H2-hydrogenation of ketones with RuH(S-binap)(app) catalyst" **Alen Hadzovic**, Christina M. MacLaughlin, Datong Song and Robert H. Morri; (Lecture award).
126. 39th IDW, Carleton University, Nov. 2006. "Ruthenium(II) and iron(II) complexes of the tetradentate PNNP ligands N1,N3-bis(2-(diphenylphosphino)-benzylidene)propane-1,3-diamine and N1,N3-bis(2-(diphenylphosphino)benzyl)propane-1,3-diamine" **Fahmida N. Haque**, Alan J. Lough and Robert H. Morris; (Poster award).
127. 39th IDW, Carleton University, Nov. 2006. "Density Functional Study of Dihydrogen Splitting and Polar Bond Hydrogenation with MH(NHCMe2CMe2NH2)(PPh3)2 [M = Fe, Ru, Os] and RuH(PPh2C6H4CH2NHCH2CH2NHCH2C6H4PPh2)" **Marco Zimmer-De Iuliis** and Robert H. Morris (Poster award).
128. 39th IDW, Carleton University, Nov. 2006. "Novel Hydrido-Ruthenium(II) Complexes with Histidine Derivatives and Their Application in the Hydrogenation of Ketones". Christine Sui-Seng, Alan J. Lough and Robert H. Morris (poster award).
129. 39th IDW, Carleton University, Nov. 2006. "Amido-Hydrido Complexes of Ruthenium and Osmium: A Comparison with Respect to Catalysis" **Sean E. Clapham**, Robert H. Morris.
130. CSC Conference, Winnipeg, May 2007. "Enantioselective Michael Addition and H_2-hydrogenation Reactions catalyzed by BINAP/1,2-Diamine-Ruthenium(II) Complexes." Christine Sui-Seng, Alan J. Lough and Robert H. Morris.
131. CSC Conference, Winnipeg, May 2007. Novel Iron(II) Complexes with Tetradentate P-N-N-P Donor Ligands and their Application in Hydrogenation of Ketones." Pütz, A.-M.; **Hadzovic, A**.; Haque, F. N.; Freutel, F.; Sui-Seng, C.; **Zimmer-De Iuliis M.**; Lough, A. J. and Morris, R. H.
132. 40th IDW, U. Toronto, Nov 2007. "Hydrogenation of Benzonitrile to Benzylamine Catalyzed by Ruthenium Hydride Complexes with P-N-N-P Ligands: Evidence for an Outersphere Mechanism. **Marco Zimmer-De Iuliis**, **Tianshu Li,** Ines Bergner F. Nipa Haque and Robert H. Morris.
133. 40th IDW, U. Toronto, Nov 2007 "Highly Efficient Catalysts with Tetradentate P-N-N-P Ligands for the Asymmetric Hydrogenation of Polar Bonds. Christine Sui-Seng, Friederike Freutel, Alan Lough and Robert H. Morris.
134. 40th IDW, U. Toronto, Nov 2007. "Iron(II) Complexes with New Tetradentate PNNP and Tridentate PNN Ligands." **Alexandre Mikhailine**, Eunice Kim, Alan J. Lough, Robert H. Morris.
135. Int. Confer. Organometallic Chemistry, Rennes, France, July 2008. "Asymmetric Hydrogenation of Ketones Using Iron(II) Complexes." R. H. Morris, C. Sui-Seng, F. Freutel, A. Mikhailine, C. Dingels, V. Reuss, N. Meyer, M. Zimmer-De Iuliis, A. J. Lough.
136. QOMSBOC 2008. Toronto, Oct 2008 "Asymmetric reduction of ketones using iron(II) compounds" **Alexandre A. Mikhailine,** Nils Meyer and Robert H. Morris
137. 41st IDW, Brock U. Nov. 2008 "Template synthesis of iron(II) complexes containing PNNP ligands for the catalytic asymmetric reduction of ketones." **Alexandre A. Mikhailine,** C. Dingels, Alan J. Lough and Robert H. Morris.
138. 41st IDW, Brock U. Nov. 2008 "Nitrile-functionalized N-Heterocyclic Carbene Complexes of Ag(I), Rh(I) and Pd(II): Syntheses, Characterization, and Observation of Metal-Mediated Ligand Hydrolysis" **Wylie W. N. O**, Alan J. Lough, and Robert H. Morris.
139. 41st IDW, Brock U. Nov. 2008. "Template Synthesis of Novel Iron (II) Complexes Featuring PNNP, PNS, PNN and PNP ligands." **Paraksevi O. Lagaditis**, Alexandre Mikhailine, Robert H. Morris.
140. 41st IDW, Brock U. Nov. 2008. "DFT Study on Palladium Catalyzed Allylic Amination with Dimethylamine and Aziridine." **Marco Zimmer De Iuliis**, Iain D. G. Watson, Andrei K. Yudin and Robert H. Morris.
141. 41st IDW, Brock U. Nov. 2008. "Asymmetric Reduction of Ketones Using Iron(II) Complexes." Nils Meyer and Robert H. Morris.
142. CSC Conference Hamilton 2009. "Nitrile-functionalized N-Heterocyclic Carbene Complexes of Late Transition Metals; Observation of Metal-Mediated Ligand Hydrolysis and Routes to an Amino-functionalized N-Heterocyclic Carbene Complex of Nickel(II)" **Wylie W. N. O,** Alan J. Lough, and Robert H. Morris (winner of CSC Division of Inorg Chem Poster award).
143. 42nd IDW U. Guelph. Nov 2009. 0060 "Transmetallation of a Primary AminofunctionalizedN-Heterocyclic Carbene from Nickel(II) to Platinum Group Metal Precatalysts for Transfer and Direct Hydrogenation of Ketones". **O W. W. N.**, Lough A. J., Morris R. H.

144. 42nd IDW U. Guelph. Nov 2009. 0071 "Facile synthesis of cyclic phosphonium salts for use as phosphine-aldehyde precursors in metal templating and ligand synthesis." **Mikhailine A. A.**, **Lagaditis P**., **Sues P.**, Lough A. J., Morris R. H. (Poster prize winners).
145. 42nd IDW U. Guelph. Nov 2009. 0091 "Template Synthesis of Iron(II) and Ruthenium(II) Complexes Containing Multidentate Ligands with Phosphorus and Nitrogen Donor Atoms." **Lagaditis P.O.**, Lough A.J., Morris R.H. (lecture winner).
146. CSC Conference Toronto June 2010. 0097 "Transfer hydrogenation of ketones using iron(II) catalysts: ligand effects in H_2 transfer." **Mikhailine A. A.**, **Lagaditis P. O.**, Lough A. J., Morris R. H.
147. CSC Conference Toronto June 2010. 0327. "Platinum group metal complexes bearing a primary amino-functionalized N-heterocyclic carbene as ligand-metal bifunctional catalysts in the hydrogenation of ketones. **O, W. W. N. ;** Lough, A. J.; Morris, R. H. (poster prize winner).
148. 24th International Conference on Organometallic Chemistry. Tapei. July 2010. PS2-079. Ligand-Metal Bifunctional Catalysts Featuring a Primary Amino-functionalized N-Heterocyclic Carbene Ligand for the Hydrogenation of Ketones." **O, W. W. N. ;** Lough, A. J.; Morris, R. H.
149. 3rd IUPAC Conference on Green Chemistry. Ottawa. Aug. 2010. 043. "From Ruthenium to Iron in the Catalytic Reduction of Ketones: Ligand Design, Synthesis of Complexes, Catalysis and Mechanistic Insight." **Mikhailine A. A.**, Lagaditis P. O., Sues, P.; Lough A. J., Morris R. H.
150. 43rd IDW U. Windsor, Nov 2010. "Kinetic studies of the asymmetric transfer hydrogenation of ketones using an iron(II) catalyst containing a chiral P-N-N-P ligand." **Mikhailine A. A.**, Maishan, M., Lough A. J., Morris R. H.
151. 43rd IDW U. Windsor, Nov 2010. "Iron(II) complexes with P-N-N-P ligands for the asymmetric transfer hydrogenation of ketones." **Lagaditis, P. O**., Mikhailine, A. A., Lough A. J., Morris R. H.
152. 43rd IDW U. Windsor, Nov 2010. "Mechanistic Studies into Transfer Hydrogenation Catalysis with Tetradentate P-N-N-P Iron(II) Metal Complexes." **Prokopchuk, D. E.,** Zimmer-De Iuliis, M., Meyer, N., Sonnenberg, J. F., Lough, A. J.; Morris, R. H. (Presentation award).
153. 43rd IDW U. Windsor, Nov 2010. "Mechanisms of Hydrogenation of Ketones Catalyzed by Ruthenium and Iridium Complexes Featuring a Chelating N-Heterocyclic Carbene with a Tethered Primary-Amine Donor." **O, W. W. N. ,** Lough, A. J.; Morris, R. H.
154. ACS Conference. Anaheim, CA Mar 2011. "Mechanisms of hydrogenation of polar double bonds catalyzed by platinum group metal complexes featuring a chelating N-heterocyclic carbene with a tethered primary-amine donor." **O, W. W. N. ,** Lough, A. J.; Morris, R. H.
155. ACS Conference. Anaheim, CA Mar 2011. "Mechanistic Studies into Transfer Hydrogenation Catalysis with Tetradentate P-N-N-P Iron(II) Metal Complexes." **Prokopchuk, D. E.,** Lough, A. J., Morris, R. H.
156. European Association for Chemical and Molecular Sciences Conference. EICC-1 Manchester, UK. Apr. 2011. OC16. "Ligand effects on the catalytic activity of iron(II) complexes for the transfer hydrogenation of ketones." **Lagaditis, P. O**., Mikhailine, A. A., Lough A. J., Morris R. H.
157. Canadian Society for Chemistry Conference, Montreal, June 2011, "Investigations into Water Splitting Using Well Defined Ruthenium-based Metal Complexes" **D. E. Prokopchuk**, S. E. Clapham, A. J. Lough and R. H. Morris.
158. Canadian Society for Chemistry Conference, Montreal, June 2011, Strong Evidence for Iron Nanoparticles Catalyzing Asymmetric Transfer Hydrogenation **J. F. Sonnenberg,** R. H. Morris and D. E. Prokopchuk, N. Coombs, P. Dube.
159. Canadian Society for Chemistry Conference, Montreal, June 2011, "Steric and Electronic Effects in the Asymmetric Transfer Hydrogenation of Ketones Catalyzed by Iron Complexes" **P. Sues**, A. J. Lough and R. H. Morris.
160. ACS Conference Denver, Aug. 2011, Evidence for Iron Nanoparticles Catalyzing Asymmetric Transfer Hydrogenation **J. F. Sonnenberg,** R. H. Morris and D. E. Prokopchuk, N. Coombs, P. Dube.
161. Entretien Jacques Cartier. Ottawa. Sept. 2011, "Conventional Bifunctional Mechanism for Ketone Hydrogenation Catalyzed by Structurally Similar Ruthenium and Iridium Complexes but with Unconventional Intermediates for Iridium. **W. W. N. O**, A. J. Lough, and R. H. Morris.
162. Organometallic Chemistry, York University. Feb. 2012. "Unexpected Tridentate Phosphine Oxide, Phosphine, and Mixed Phosphine–Phosphine Oxide Ligands that Resemble Diphenylphosphinomethane and Diphenylphosphinoethane **." P. E. Sues**, A. J. Lough, and R. H. Morris

163. Canadian Society for Chemistry Conference, Calgary, June 2012, "The Catalytic Reduction of Ketones and Imines Using Iron-Based Precatalysts: Catalysis and Mechanistic Insight." **A. A. Mikhailine**, M. I. Mashan and R. H. Morris.
164. Canadian Society for Chemistry Conference, Calgary, June 2012, "DFT Studies on the Mechanism of Transfer Hydrogenation Using Fe(II) P-N-N-P Complexes: Inner Sphere Activation Followed by Stepwise Outer Sphere Catalysis. **D. E. Prokopchuk** and R. H. Morris
165. Canadian Society for Chemistry Conference, Calgary, June 2012, "Unexpected Tridentate Phosphine Oxide, Phosphine, and Mixed Phosphine–Phosphine Oxide Ligands that Resemble Diphenylphosphinomethane and Diphenylphosphinoethane **." P. E. Sues**, A. J. Lough and R. H. Morris.
166. Canadian Society for Chemistry Conference, Calgary, June 2012. "Electronic Aspects of H_2 Splitting by d^6 Ru-Amides." F. Hasanayn and R. H. Morris.
167. Canadian Society for Chemistry Conference, Calgary, June 2012. "Iron Complexes for Ketone Hydrogenation." **P. O. Lagaditis**, A. J. Lough and R. H. Morris.
168. ACS Meeting, Philadelphia, Aug. 2012. "Iron Complexes for Ketone Hydrogenation." **P. O. Lagaditis**, A. J. Lough and R. H. Morris. (REAXYS Prize symposium).
169. "Electronic Aspects of H_2 Splitting by d^6 Ru-amides. " F. Hasanayn and R. H. Morris, ACS Conference, ACS Catalysis Lectureship for the Advancement of Catalytic Science Award Symposium, Philadelphia, Aug. 2012.
170. "Iron Nanoparticles Reversibly Catalyzing the Asymmetric Transfer Hydrogenation and Oxidation Reactions " **J. F. Sonnenberg** and R. H. Morris. NanoOntario Conference, Waterloo, Oct. 2012.
171. "Unexpected Tripodal Phosphine Lignds and the Reactivity of their Ruthenium eta-5-C_5Me_5 Complexes." **P. E. Sues**, A. J. Lough and R. H. Morris, IDW Conference, U. Ottawa. Nov. 2012.
172. "Synthesis of New Metal Complexes Using Phosphonium Dimers as Convenient Ligand Precursors." **K. H. Park**, A. J. Lough, and R. H. Morris, 45th IDW Conference, U. Ottawa, Nov. 2012.
173. "Highly Strained Tripodal Phosphine Ligands 1,1,2-Tris(diarylphosphino)ethane and the Reactivity of Their Ruthenium η^5-C_5Me_5 Complexes **P. E. Sues**, A. J. Lough, and R. H. Morris. ACS Conference, New Orleans, April, 2013.
174. "Zero-valent iron nanoparticles for asymmetric transfer hydrogenation, oxidative kinetic resolution and ammonia-borane dehydrogenation." **J. F. Sonnenberg** and R. H. Morris. ACS Conference, New Orleans, April 2013.
175. "Highly Strained Tripodal Phosphine Ligands 1,1,2-Tris(diarylphosphino)ethane and the Reactivity of Their Ruthenium η^5-C_5Me_5 Complexes **P. E. Sues**, A. J. Lough, and R. H. Morris. CSC Conference, Quebec City, May, 2013.
176. "The most active asymmetric transfer hydrogenation catalysts of iron." Weiwei Zu, **Alexandre Mikhailine** and Robert H. Morris, CSC Conference, Quebec City, May, 2013.
177. "Effective Iron Catalysts for the Asymmetric Reduction of Ketones and Imines." W. Zuo, A. J. Lough, **Y. Li** and R. H. Morris. 46th IDW York U. Toronto, Nov. 2013.
178. "New Pincer-Type Ru(II) Complexes Designed for Small Molecule Activation via Metal-Ligand Cooperation" **D. E. Prokopchuk**, **T. H. Tsui**, A. J. Lough and R. H. Morris, 46th IDW York U. Toronto, Nov. 2013.
179. "Reactivity of Ruthenium Phosphido Complexes and Implications for Hydrophosphination, as well as Molecular Oxygen Activation and Analogous Bis(diphosphino)thioether Systems" **P. E. Sues**, M. W. Forbes, A. J. Lough, and R. H. Morris. IN68, CSC2014, Vancouver, June 2014
180. "Iron-PNP Pincer Complexes: Synthesis, Mechanistic Insights and Direct Asymmetric Hydrogenation of Ketones" **J. F. Sonnenberg**, **P. O. Lagaditis**, A. J. Lough, R. H. Morris, IN981 CSC2014, Vancouver, June 2014.
181. "Metal-ligand Cooperation with Carbene Centered Ruthenium Pincer-type Complexes" **D. E. Prokopchuk, T. H. Tsui**, A. J. Lough, R. H. Morris, IN1282 CSC2014, Vancouver, June 2014.
182. "Iron-PNP Pincer Complexes: Synthesis, Mechanistic Insights and Direct Asymmetric Hydrogenation of Ketones." **J. F. Sonnenberg**, **P. O. Lagaditis**, A. J. Lough, R. H. Morris. ISHCXIX 19th International Symposium on Homogeneous Catalysis. Ottawa, July 2014.
183. "Reduction of ketones using Fe(II)(P-NH-N-P') catalysts." **S. A. M. Smith,** R. H.Morris. IDW2014 Montreal, Nov. 2014.

184. "Ketone Asymmetric Hydrogenation Catalyzed by P-NH-P' Pincer Iron Catalysts: an Experimental and Computational Study." **K. Y. Wan**, **J. F. Sonnenberg**, **P. E. Sues**, R. H. Morris. . IDW2014 Montreal, Nov. 2014.
185. "Iron (II) P-NH-N-P Transfer Hydrogenation in Water". **K. Z. Demmans**, R. H. Morris. IDW2014 Montreal, Nov. 2014.
186. "Ruthenium complexes for chemical and solar energy applications**." D. E. Prokopchuk, M. M.-H. Sung**, R. H. Morris. ISE Workshop, Toronto, Nov. 2014.
187. "Donor-tethered N-heterocyclic carbenes for applications in bifunctional catalysis." **K. Y. Wan, D. E. Prokopchuk, M. M.-H. Sung, H. Rebmann** and R. H. Morris. Muenster-Toronto IRTG Workshop, Toronto, Mar. 2015.
188. **K. Z. Demmans** and R.H. Morris. "Iron(II) P-NH-N-P catalyst for the transfer hydrogenation of acetophenone in water employing sodium formate as the hydride source." CSC2015. Ottawa. June 2015.
189. **S. A. M. Smith** and R.H. Morris. "New Unsymmetrical Iron(II) PNNP' Asymmetric Transfer Hydrogenation Catalyst." OMCOS-18, Sitges – Barcelona, Spain, June 2015.
190 **K. Z. Demmans, O. W. K. Ko** and R.H. Morris, "Aqueous Biphasic Iron-Catalyzed Asymmetric Transfer Hydrogenation of Ketones" 49th IDW Royal Military College.
191. **Samantha A. M. Smith**, A.J. Lough, R.H. Morris, "Tuning the Steric and Electronic Properties of Iron-Based Catalysts Using Modular Phosphine Moieties." 49th IDW Royal Military College.
192. **Kai Y. Wan,** Alan J. Lough, Heiko Rebmann, and Robert H. Morris, "Enantiomerically Pure Bidentate Amine Tethered N-heterocyclic Carbenes: Synthesis, Transition Metal Complexes and their Asymmetric Catalytic Applications." 49th IDW Royal Military College.
193. **Kai Y. Wan,** Alan J. Lough, Heiko Rebmann, and Robert H. Morris, "Enantiomerically Pure Bidentate Amine Tethered N-heterocyclic Carbenes: Synthesis, Transition Metal Complexes and their Asymmetric Catalytic Applications." Pacifichem 2015, Honolulu.
194 **Kai Y. Wan,** Robert H. Morris, Enantiomerically pure bidentate amine tethered N-heterocyclic carbenes: Synthesis, transition metal complexes and their asymmetric catalytic applications. IRTG Workshop Mar 2016.
195. **K. Z. Demmans** and R. H. Morris, "Green Chemistry in the Morris Group." Poster. IRTG Workshop. Mar 2016.
196 R. H. Morris, "Using ligand acidity constants to predict the pKa of transition metal hydride and dihydrogen complexes and implications for catalyst design" 99th CSC Conference, Symposium on Ligand Design, Halifax, June 2016.
197. **K. Z. Demmans** and R. H. Morris, "Efforts to increase the Stability of a Highly Active Asymmetric Iron Catalyst: Synthesis of More Robust PNNP Ligands." 99th CSC Conference, Halifax, June 2016
198. **M. M.-H. Sung** and R. H. Morris, "The Reactivity of a Ruthenium-NHC Complex toward the Production of Renewable Fuels. 99th CSC Conference, Halifax, June 2016.
199. **S. A. M. Smith** and R. H. Morris. "Improved Synthesis of Fe(II)(P-NH-P') Catalysts and Asymmetric Hydrogenation of Ketones. 99th CSC Conference, Halifax, June 2016.
200. R. H. Morris "Brønsted-Lowry acidity of transition metal hydrides-implications for catalysis (INOR 601). ACS Conference, Philadelphia, Aug. 2016.
201. **S. A. M. Smith**, P. O. Lagaditis and R. H. Morris. "Improved Synthesis of Efficient and Enantioselective Iron-based Hydrogenation Catalysts. 49th Inorganic Discussion Weekend. McMaster U. Nov. 2016.
202. **K. Z. Demmans, S. G. Seo** and R. H. Morris, "Synthesis of New Iron(II) PNNP Catalysts to Increase the Stability of a Highly Active Catalyst for the Transfer Hydrogenation of Aromatic Ketones." 49th Inorganic Discussion Weekend. McMaster U. Nov. 2016.
203. **M. V. Gradiski,** P. O. Lagaditis and R. H. Morris, "Iron Pincer Ester Hydrogenation Catalysts: Synthesis and Preliminary Activity. 49th Inorganic Discussion Weekend. McMaster U. Nov. 2016.
204. **M. M.-H. Sung** and R. H. Morris, "DFT calculations toward the development of the ligand-acidity constant method of predicting pKa values of metal-hydrides." 49th Inorganic Discussion Weekend. McMaster U. Nov. 2016.
205. **K. Y. Wan, F. Roelfes**, A. J. Lough, E. F. Hahn, and R. H. Morris. "Iridium and Rhodium Complexes Containing Enantiopure Primary Amine Tethered N-Heterocyclic Carbenes: Synthesis, Characterization and Reactivity." IRTG Spring Symposium, U. Toronto, Mar. 2017.

206. **S. A. M. Smith** and R. H. Morris, "Iron P-NH-P' Pressure Hydrogenation Catalysts", Talk, IRTG Symposium, U. Toronto, Mar. 2017.
207. **K. Y. Wan, M. M. Sung,** A. J. Lough, R. H. Morris. "INOR 1165 Half-sandwich ruthenium catalysts with enantiopure primary amine-tethered N-heterocyclic carbenes for asymmetric ketone hydrogenation." ACS Conference, San Francisco, Apr. 2017.
208. **V. T.Y. Lee**, **S. A. M. Smith, M. M.-H. Sung**, and R. H. Morris. "Synthesis and Acidity Predictions of Unsymmetric Tripodal NPP'$_2$ Iron Hydride Complexes" SOUSCC Conference. York U. Apr. 2017.
209. A. G. De Crisci, J. Samonina-Kosicka, R. Gieleciak, M. Fleischauer, R. H. Morris, R. M. Waymouth. "Electrocatalytic Transfer Hydrogenation for Carbon Dioxide (CO_2) Activation and Utilization" Toronto Connaught Global Challenge Symposium, Toronto, May 2017.
210. **S.A.M. Smith, P. O. Lagaditis, A. Lüpke**, A. J. Lough, R. H. Morris "Unsymmetrical Iron P-NH-P' Catalysts for the Asymmetric Pressure Hydrogenation of Aryl Ketones." CSC Conference 2017, Toronto, May 2017.
211. **K .Y. Wan**, A. J. Lough, **M. M. H. Sung, F. Roefles, H. Rebmann, S. S. Santana, E. Bergen, B. T. H. Tsui, T. T. Y. Tan**, F. E. Hahn, R. H. Morris. "Transition Metal Complexes With Enantiomerically Pure Bidentate Amine Tethered N-heterocyclic Carbenes: Synthesis, Coordination and Catalysis." . CSC Conference 2017, Toronto, May 2017.
212. **B. T. T. Tsui, M. V. Gradiski, K. Y. Wan, P. O. Lagaditis**, R. H. Morris. "Ligand Design for Iron Hydrogenation Catalysis." CSC Conference 2017, Toronto, May 2017.
213. **M. M. H. Sung**, R. H. Morris "DFT Calculations toward the Development of the Ligand-acidity Constant Method of Predicting pKa Values of Metal-hydrides." CSC Conference 2017, Toronto, May 2017.
214. **K. Z. Demmans, S. G. Seo**, A. J. Lough and R. H. Morris. "An In-depth Study on the Activation of Orthophenylene-based PNNP Iron Precatalysts: How their Cis-β Structure Affects the Asymmetric Transfer Hydrogenation of Ketones." CSC Conference 2017, Toronto, May 2017.
215 **M. M. H. Sung, K.Y. Wan** and R. H. Morris "Density Functional Theory Calculations: Predicting the pK_a of Metal Hydride Complexes and Mechanistic Investigation of Hydrogenation Catalysts" HPCS (High Performance Computing Symposium) Conference, Kingston, June 2017.
216 **Kai Y. Wan** and R. H. Morris, "Developing Ruthenium Asymmetric Hydrogenation catalysts for Ketone and Imine Reduction and Hydrogenation Catalysts for Ester and Carbon Dioxide Hydrogenation using Chiral Amino Substituted N-heterocyclic Carbene Ligand" 41st IPMI Conference, Pensacola, Florida, June 2017.
217. **S. A. M. Smith, P. O. Lagaditis, A. Lupke,** A. J. Lough and R. H. Morris. "New Iron (II) and Manganese(I) Asymmetric Pressure Hydrogenation Catalysts" ACS Green Chemistry and Engineering Conference. Reston, Virginia, June 2017.
218. **S. A. M. Smith, P. O. Lagaditis, A. Lupke,** A. J. Lough and R. H. Morris. "New Iron (II) and Manganese(I) Asymmetric Pressure Hydrogenation Catalysts" ACS Summer School on Green Chemistry and Sustainable Energy, Colorado School of Mines in Golden, Colorado, June 2017.
219 **K. Z. Demmans** and R. H. Morris, "An In-Depth Study on the Activation of Orthophenylene-Based PNNP' Iron Precatalysts" 6th IRTG Symposium, Muenster, Germany, September 2017.
220 **S. A. M. Smith** and R. H. Morris, "Base Metal Pincer Catalysts for the Direct Hydrogenation of Ketones to Enantiomerically Enriched Alcohols" 6th IRTG Symposium, Muenster, Germany, September 2017.
221 **C. S. G. Seo, S. A. M. Smith**, Robert H. Morris "Highly Enantioselective Activated Imine Hydrogenation by Iron P-NH-P' Catalyst" 50th IDW 2017 Ryerson U. Nov. 2017.
222 **M. V. Gradiski,** A. J. Lough and R. H. Morris, "PNMeP', PNN', & P2NN' Ligands for First-Row Transition Metal Hydrogenation Catalysts" 50th IDW 2017 Ryerson U. Nov. 2017.
223 **Tsz Ho Brian Tsui, Kai Y. Wan**, and Robert H. Morris, "Towards the Development of Homochiral N-Heterocyclic Carbenes Iron Complexes for Asymmetric Hydrogenation of Ketones and Imines" 50th IDW 2017 Ryerson U. Nov. 2017.
224. **T. T. Y. Tan, D. Schnieders, K. Y. Wan, J. Linde**, J. Neugebauer, R. H. Morris, F. E. Hahn. "Bifunctional N-Heterocyclic Carbene Catalysis Bifunctional N-Heterocyclic Carbene Catalysis." IRTG 2027 Review. Feb. 2018.
225 **N. Francesca Farac**, **K. Y. Wan, E. Bergen**, R. H. Morris, "Synthesis and Characterization of Novel Copper(I) and Nickel(II) Complexes with a Tetradentate Bis(amino)-Bis(N-heterocyclic carbene)

(CNNC) ligand." 46th Southern Ontario Undergraduate Student Chemistry Conference, Laurier U. Mar. 2018.

226 **M. Olson, K. Demmans**, R. H. Morris, "Synthesis and Characterization of Mn(I) Complexes for Asymmetric Polar Bond Reduction." 46th Southern Ontario Undergraduate Student Chemistry Conference, Laurier U. Mar. 2018.

227 **M. V. Gradiski**, A. J. Lough, R. H. Morris. PNMeP', PNN', & P2NN' Ligands: Synthesis and Coordination Chemistry of Base-Metals For Catalysis. CSC2018 Edmonton, May 2018.

228. **M. M. H. Sung, J. P. Unsleber, J.** Neugebauer and R. H. Morris "Predicting the pK_a of transition metal hydrides: using density functional theory to access the acidity constants of a large library of ligands." CSC2018 Edmonton, May 2018.

229. **S. G. Seo, S. A. M. Smith,** A. J. Lough and R. H. Morris, "INOR 300: Highly enantioselective activated imine hydrogenation by an iron P-NH-P' catalyst." ACS National Meeting. Boston. Aug. 2018.

230. **T. T. Y. Tan, D. Schnieders,** J. Neugebauer, R. H. Morris, F. E. Hahn. "Synthesis and reactivity of IrIII complexes bearing NHC/imidazolyl chelate ligands." 8th IRTG Symposium. Toronto. Sept. 2018.

231. **M. V. Gradiski**, A. J. Lough, R. H. Morris. "PNMeP', PNN', & P2NN' Ligands: Synthesis and Coordination Chemistry of (Mostly) Base-Metals For Catalysis." 8th IRTG Symposium. Toronto. Sept. 2018.

232**. B. T. H. Tsui, K. Y. Wan** and R. H. Morris "Development of Chiral Transition Metal N-Heterocyclic Carbene Complexes for Asymmetric Hydrogenation of Ketones and Imines." 8th IRTG Symposium. Toronto. Sept. 2018.

233. **J. Shangguan, A. Hensley, N. Chaudhary, J. Bray, M. Gradiski**, R. H. Morris, J.-S. McEwen, Y.-H. C. Chin. "Kinetic and Isotopic Evidence of Proton and H-adatom Transfer during Guaiacol Hydrodeoxygenation at Protic Solvent – Transition Metal Interfaces." CSChe2018, Toronto Oct. 2018.

234. **A. Hensley, J. Shangguan, J. Bray, N. Chaudhary, M. Gradiski**, R. H. Morris, J.-S. McEwen, Y.-H. C. Chin. "Elucidating the Solvent Effect on the Catalytic Hydrodeoxygenation of Model Bio-oil Compounds. CSChe2018, Toronto Oct. 2018.

235. **S. Jdanova, M. M. H. Sung**, and R. H. Morris. "Ligand Acidity Constants of PF_3 and N-Heterocyclic Carbene Ligands Calculated by Density Functional Theory (DFT) in Iron(II) Hydride Complexes." 51st Inorganic Discussion Weekend. U. Waterloo. Nov. 2018.

236. **M. V. Gradiski, B. T. H. Tsui,** A. J. Lough, R. H. Morris. "Novel PNN' & P2NN' Ligands via Reductive Amination with Phosphine Aldehydes: Synthesis and Coordination Chemistry for Catalysis." 51st Inorganic Discussion Weekend. U. Waterloo. Nov. 2018.

237. **C. S. G. Seo, T. Tannoux, S. A. M. Smith,** A. J. Lough, and R. H. Morris, "Highly Enantioselective Activated Imine Hydrogenation by an Iron P-NH-P' Catalyst." 51st Inorganic Discussion Weekend. U. Waterloo. Nov. 2018.

238. **B. T. H. Tsui, N.-F. Farac,** and R. H. Morris "Development of Homochiral Transition Metal N-Heterocyclic Carbene Complexes for Asymmetric Hydrogenation of Ketones and Imines." 51st Inorganic Discussion Weekend. U. Waterloo. Nov. 2018.

239. **S. Jdanova, M. M. H. Sung,** R. H. Morris, "Determination of Ligand Acidity Constants for N-Heterocyclic Carbenes on Fe, Ru, and Os through Synthetic and Theoretical Analysis." SOUCC 2019, Toronto, Apr 2019.

240. **M. Ong, M. Gradiski,** A. J. Lough, R. H. Morris, "Synthesis and Reactivity of Unsymmetrical NP2P' Tripodal Ligands." SOUCC 2019, Toronto, Apr. 2019.

241. **D. Schneiders, B. T. H. Tsui,** J. Neugebauer, R. H. Morris, "Metal-hydride vibrations: the trans-effect of a hydride." IRTG Meeting Muenster, Apr 2019.

242. **D. Schneiders**, J. Neugebauer, R. H. Morris,"Tuning the metal-hydride vibrational frequency" IRTG Meeting Muenster, Apr 2019.

243 **M. M. H. Sung**, R. H. Morris, "Ligand Design by additive Ligand Acidity Constants" IRTG Meeting Muenster, Apr 2019.

244. **J. Shangguan, Z. Wu, A. J. R. Hensley, M. V. Gradiski**, **J. Bray,** J.-S. McEwen, R. H. Morris, , Y.-H. C. Chin. "Isotopic Manifestations and Kinetic Relevance of H-adatom and Proton Transfer during Hydrodeoxygenation Catalysis on Supported Group VIII Transition Metal Nanoparticles." 2019 North American Catalysis Society Meeting NAM26, Chicago, June 2019.

245. **D. Schneiders**, J. Neugebauer, R. H. Morris, "Reaction-Specific Molecular Descriptors: The Metal-Hydride Vibration. Hong Kong-Shanghai-Muenster Symposium on organometallic chemistry, Muenster, June 17, 2019
246. **B. E. Rennie, S. Drouin, P. Cappellani, P. Maltby, C. Schweitzer**, R. H. Morris "Lever Parameter for the Hydride and Di-tertiaryphosphine Ligands" CCCE 2019 Quebec city, June 6, 2019..
247. **M. Ong, M. Gradiski,** A. J. Lough, R. H. Morris, "Synthesis and Reactivity of Unsymmetrical NP2P' Tripodal Ligands." CCCE 2019 Quebec city, June 4, 2019. The Future Starts Now - Highlighting Undergraduate Research Oral Presentations. Meagan won a presentation award.
248. **B. T. H. Tsui,** A. J. Lough, R. H. Morris." Improving the enantioselectivity of ketone hydrogenation with chiral N-heterocyclic carbene ruthenium complexes by cyclometallation of the chiral backbone" CCCE 2019 Quebec city, June 4, 2019.
249. **M. Gradiski, B. Tsui,** A. Lough, R. Morris. "Tri and tetradentate phosphorus, nitrogen-donor ligands via reductive amination with phosphine aldehydes: synthesis and base-metal coordination chemistry" CCCE 2019 Quebec city, June 4, 2019. Symposium in honor of Barry Lever.
250. J. Russell, M. V. Gradiski, A. J. Lough, R. H. Morris "Ester Hydrogenation with Cobalt Amido Catalysts & Synthetic Progress Towards Nacnac-phosphine PNNN Ligands" Summer Student poster session. Aug. 2019.
251. A. Hensley, **J. Shangguan**, **M. Gradiski**, J. Bray, R. Morris, J.-S. McEwen, C. Chin "Hydrodeoxygenation of Phenolics at Solvent-Metal Interfaces: Enabling New Catalytic Pathways By Modifying the Reactive Hydrogen Species", IChE, Orlando, Florida, Nov.13, 2019.
252. **J. Shangguan**, A. Hensley, **M. Gradiski**, J. Bray, R. Morris, J.-S. McEwen, C. Chin "Protic Solvents Catalyzed Synergistic H-Adatom and Proton Transfer during Methoxyphenol Hydrodeoxygenation on Ru Clusters" IChE, Orlando, Florida, Nov.13, 2019.
253. **M. V. Gradiski,** A. Nemati, A. J. Lough and R. H. Morris "Tri and tetradentate PN donor ligands and their iron and cobalt complexes synthesis, reactivity, and preliminary catalytic activity in base-free ester hydrogenation., IDW2019, Oshawa, Nov. 2019.
254. **M. M. H. Sung, S. Jdanova, D. E Prokopchuk**, R. H. Morris. "Ligand Design by additive Ligand Acidity Constants." IDW2019, Oshawa, Nov. 2019
255. **B. T. H. Tsui, K. Y. Wan,** R. H. Morris "Improving the enantioselectivity of ketone hydrogenation with chiral Nheterocyclic carbene ruthenium complexes by cyclometallation of the chiral backbone. IDW2019, Oshawa, Nov. 2019.
256. **B. Rennie**, **R. G. Eleftheriades,** R. H. Morris. "An exploration of paramagnetic hydride complexes' acidity and electrochemistry" RSC Inorganic Reaction Mechanism Group, Bath UK (virtual), Sept. 2020.
257. **B. E. Rennie**, **R. G. Eleftheriades,** R. H. Morris. "An exploration of paramagnetic hydride complexes' acidity and electrochemistry" IRTG Meeting, Muenster Germany (virtual), Sept. 2020
258. Y.-H. Chin, **J. Shangguan**, A. Hensley, **H. Cai**, **M. Gradiski**, J.-S. McEwen and R. H. Morris. "Mechanistic Involvement of Interfacial Proton and Hydride on Transition Metal Surfaces in Breaking Strong Aromaticity and Carbon-Oxygen Bonds" 2020 AIChE Annual Meeting. San Francisco (on-line) Nov. 2020.
259. **M. V. Gradiski**, A. J. Lough, R. H. Morris. Facile synthesis of tri and tetradentate PN donor ligands and their chemistry with iron and cobalt" CCCE2020, Manitoba (on line), Aug. 2020.
260. B. E. Rennie, M.V. Gradiski and R. H. Morris. An Exploration of Metal Hydride Acidity, Electrochemistry, and Bond Strength. IUPAC| CCCE 2021. August 2021
261. B. E. Rennie, J. Price, D. Emslie, R. H. Morris. "Synthesis and Reactivity of Paramagnetic Manganese(II) Hydrides." 12th IRTG Symposium. Virtual. Toronto. September 2021.
262. Cai, H.; Schimmenti, R.; **Gradiski, M. V.**; Morris, R. H.; Mavrikakis, M.; Chin, Y.-H. C. Charge of Reactive Hydrogen at Fluid-Transition Metal or Fluid-Transition Metal Sulfide Interfaces and Their Catalytic Roles in Hydrogenation and Hydrotreating Catalysis 2021 AIChE Annual Meeting. In person.. Boston November, 2021.
263 **Adi Fishkin**, Benjamin E. Rennie, Robert H. Morris "Synthesizing and Characterizing Novel Paramagnetic Metal Hydrides" SOUSCC50. Poster. Virtual. March 2022.
264. R. H. Morris "Learning the Chemistry of Metals in Biology" Arts and Science Teaching & Learning Community of Practice Showcase, May 2022. 30 min.

265. **A. Kwan** and R. H. Morris. "An Outer-Sphere Mechanism for the Ir-Catalyzed Industrial Asymmetric Hydrogenation of the (S)-Metolachor Imine Precursor" CCCE Conference Calgary. June 2022.
266. **B. E. Rennie**, J. Price, D. Emslie and R. H. Morris. "Synthesis of Paramagnetic Manganese Hydrides Guided by Acidity and Electrochemistry Data" CCCE Conference Calgary. June 2022.
267. **H. El-Hadid** and R. H. Morris. "A Convenient Method for Creating Chelating Bidentate P,N-Ligands" Undergrad research, University of Toronto, August 2022.
268. **A. Kwan** and R. H. Morris. "A Plausible Mechanism for the Iridium-Catalyzed Hydrogenation of a Bulky N-Aryl Imine in the (S)-Metolachlor Process" IDW Conference, Brock U.. Nov. 2022.
269. **R. Eleftheriades**, B. Rennie and R. H. Morris. "Towards Paramagnetic Abundant Metal Catalysts" IDW Conference, Brock U.. Nov. 2022.
270. R. H. Morris "Inorganic Chemistry Research at the University of Toronto" CHM236 tutorial groups. November 2022.
271. R. H. Morris, "Baking with Phosphonium Dimers", Symposium in honour of Tom Baker, CSC2023 Vancouver, June 2023, 20 min. In person.
272. **R. Eleftheriades** and R. H. Morris. "Novel Cobalt PNNP Complexes." Inorganic chemistry poster session. CSC2023. Vancouver. June 2023. Poster. In person.
273 R. H. Morris. "Reactivity Umpolung (Reversal) of Ligands in Transition Metal Complexes" CSC2024 Winnipeg, June. 20 min. In person.
274. **A. Fishkin** and R. H. Morris. "A Safer Alternative Synthesis of Tetradentate NP3 Ligands Using Phosphonium Dimers" CSC2024. Winnipeg, June. Poster. In person.

11. Invited Lectures

1.-6. "Sulfoxide complexes of rhodium and iridium" Cambridge U., May 1979. U. Michigan, Jan. 1980. Oregon State U. Mar. 1980. SUNY Buffalo, Mar. 1980. U. Toronto, Mar. 1980. SOHIO, Cleveland, Feb 1980.
7.-8."Electron-rich Transition Metal Complexes for the Activation of C-H and N_2 Bonds and the Formation of Mixed Metal Quadruple Bonds" University of Western Ontario, Feb 1985. University of Waterloo, Mar 1985.
9. "The Activation of C-H, N2, and H2 Bonds by Transition Metal Complexes. Should the Complexes be Electron-rich or Electron-poor?" York University, Nov 1985.
10. "15N NMR Spectroscopic Properties of 15N- Enriched Bis(dinitrogen) Complexes of Molybdenum and Tungsten" U. of Guelph, Mar. 1986.
11. "A Range of Reactivity Modes of Transition Metal Complexes Containing eta-2-Dihydrogen or Hydride Ligands." National Meeting of the American Chemical Society, Symposium on Hydrides. Apr 1986, New York.
12.-15. Relationship Between the Coordination Chemistry of eta-1-Dinitrogen and eta-2-Dihydrogen." U. British Columbia, June 1986; U. Toronto, Dec. 1986; U. Rochester, Dec. 1986; Brookhaven National Laboratoriees, Jan. 1987.
18-19 "Transition Metal Complexes of Dihydrogen with the H-H Bond Intact" University of Ottawa, June 1987; University of Sussex, July 1987.
20. " NMR Properties of the η^2–Dihydrogen Complexes $[M(H_2)(H)(PEt_2CH_2CH_2PEt_2)_2]BF_4$, M = Fe, Ru, Os" 4th Platinum Metal Conference, Royal Soc. of Chemistry, Dalton Div., Sheffield, July, 1987.
21. "Complexes des Metaux de Transition Ayant Comme Ligand l'Hydrogène Moleculaire." Laboratoire de Chimie de Coordination, CNRS, Toulouse, Oct., 1987.
22. " η^2–Dihydrogen Complexes of the Iron Group Metals" Yale University, April, 1988.
23. "Neutron Diffraction Studies of eta-2-Dihydrogen Complexes." McMaster U. Jan. 1989.
24. "η^2–Dihydrogen Complexes of the Iron Group Metals" U. Windsor, Feb. 1989.
25. η^2–Dihydrogen and η^3–Trihydrogen" U. Guelph, Feb. 1989.
26. "Chemistry of η^2–Dihydrogen Complexes of the Iron Group Metals" Symp. on Kinetics and Catalysis, 72 Canadian Chemical Congress, Victoria, BC, June, 1989.
27. "Hydride Complexes of Molybdenum and Tungsten in a Sulfur Environment" Int. Conf. on the Chemistry of the Early Transition Metals, Brighton, July, 1989.

28. "Recent Research on η^2-dihydrogen Complexes of the Iron Group Metals" Gordon Conference, Inorg. Chem., New Hampshire Aug. 1989.
29. "Dihydrogen Complexes of the Iron Group Metals" SUNY Buffalo, Sept. 1989.
30. " Dihydrogen Complexes of the Iron Group Metals" Ohio State U., Feb. 1990.
31. "Reactions of Dihydrogen Complexes of Transition Metals" University of British Columbia, Dec. 1990.
32. "Reactions of η^2-Dihydrogen Complexes" University of Chicago, May, 1991.
33. "Reaction des Complexes de Metaux d Transition Ayant Comme Ligand l'Hydrogene Moleculaire" University of Sherbrook, ACFAS Conference, May, 1991.
34. "Unexpected Chemistry of Hydrogen Gas" Public Forum, Royal Society of Canada Annual Meeting at Queen's University, June 1991.
35.-38. "Reactions of η^2-Dihydrogen Complexes of Transition Metals" Simon Fraser University, Oct. 1992, U. Victoria, Oct. 1992, Brock University, Nov., 1992. University of Western Ont., Feb. 1993.
39. "Inter- and Intra-molecular Proton Transfer From Coordinated Dihydrogen" Symposium on Transition Metal Hydrides, Canadian Chemical Congress, Sherbrooke, Quebec, June 1993.
40. "Inter- and Intra-molecular Proton Transfer From Coordinated Dihydrogen" Symposium on Dihydrogen Complexes, American Chemical Society Conference, Chicago, Aug. 1993.
41. New Orleans, Sept. 1994, "Reactions of Dihydrogen Complexes of Transition Metals".
42. U. Sussex, Brighton, U.K., Oct. 1994, "New Insights into the Heterolytic Splitting of Dihydrogen" , in the symposium in honour of Prof. G. J. Leigh.
43. U. Wurzburg, Germany, Oct. 1994, "Reactions of Dihydrogen Complexes of Transition Metals".
44. Los Alamos National Labs, Oct. 1994, "Reactions of Dihydrogen Complexes of Transition Metals".
45. Iowa State U., Nov. 1994, "Reactions of Dihydrogen Complexes of Transition Metals".
46. U. of Toronto, Jan. 1995. "New Hydrogen-hydrogen Interactions in Inorganic Chemistry"
47. Can. Soc. Chemistry Conference, Guelph, May 28, 1995, Alcan Lecture Award, "Intermediates in the Homolytic and Heterolytic Splitting of Dihydrogen by Transition Metal Complexes " .
48. Organometallic Gordon Conference, Rhode Island, July 1995 "Chemistry of Short and Long Hydrogen-hydrogen Bonds".
49. "New Hydrogen-hydrogen Interactions in Inorganic Chemistry" Oct. 1995, U. Oklahoma, The C. Karcher Lecture.
50. "Determining H-H Distances of Dihydrogen Complexes In Solution" Dec. 1995. Hydrogen and Quantum Mechanical Phenomena Conference, Santa Fe, NM
51. "Chemistry of Weak Hydrogen-hydrogen bonding" in the "Activation of Small Molecules" symposium, PACIFICHEM'95 Conference, Honolulu, Dec. 1995.
52. "NMR Studies of Dideuterium Complexes in Solution and the Solid State" in the symposium on the "Role of Spectroscopic Methods in Modern Inorganic Chemistry", PACIFICHEM'95 Conference, Honolulu, Dec. 1995.
53. "Intermediates in the Homolytic and Heterolytic Splitting of Dihydrogen", Jan. 1996, Montreal, U. Montreal.
54. "New Hydrogen-hydrogen Interactions in Inorganic Chemistry" Feb. 1996, Stanford U.
55. "New Hydrogen-hydrogen Interactions in Inorganic Chemistry" Feb. 1996, U. California, Berkeley.
56. "New Hydrogen-hydrogen Interactions in Inorganic Chemistry" Aug. 1996, U. Calgary, Calgary.
57. "What are Molybdenum and Zinc Doing in My Body?" Feb. 1997, U. Toronto, Trinity College Science and Nature Society.
58. "Is Metal to Dihydrogen Backbonding Required to Make Stable Dihydrogen Complexes? June, 1997. Windsor, Ont. 80thCSC Conference, symposium on Activation of Small Molecules.

59. “The Chemistry of the Dihydrogen Ligand in Transition Metal Compounds with Sulfur-Donor Ligands” Sept. 1997, Varna, Bulgaria, NATO Workshop organized by Prof. Weber, ETH Zurich.
60. ‘Long and Short Hydrogen-hydrogen Interactions in Chemistry” Oct. 1997, U. Milan, Milan, Italy.
61. ‘Long and Short Hydrogen-hydrogen Interactions in Chemistry” Nov. 1997, U. Illinois
62–64. “New Chemistry of the Dihydrogen Ligand” Dec. 1997. U. Zurich, Switz., U. Erlangen, Erlangen, Frei Univ. Berlin”
65. ‘Long and Short Hydrogen-hydrogen Interactions in Chemistry” Feb.. 1998, Harvard and M.I.T.
66. Boston Am. Chem. Soc. Meeting, symposium on hydrogen bonding " Hydrogen bonding and the heterolytic splitting of dihydrogen", Aug. 1998, oral, invited
67. The IV Italian Meeting on Organometallic Chemistry, "Long and Short Hydrogen-hydrogen Interactions in Chemistry”, invited plenary lecturer, Sept. 1998.
68-69. ‘The Proton-Hydride Bond” CRS Firenze; U. Venezia, Sept. 1998.
70.-72. “Non-classical Hydrogen Bonding and the Heterolytic Splitting of Dihydrogen” Lakehead U., U. Winnipeg; U. Manitoba. November 1998.
73. "The Proton-Hydride Bond” Queen's University, February, 1999.
74. “Non-classical Hydrogen Bonding and the Heterolytic Splitting of Dihydrogen” John Innes Centre, Norwich, UK, Nov. 1999
75. “Non-classical Hydrogen Bonding and the Heterolytic Splitting of Dihydrogen” U. Bristol, UK Nov. 1999.
76. “Non-classical Hydrogen Bonding and the Heterolytic Splitting of Dihydrogen” Yale U. Feb. 2000.
77. "Active catalysts for the hydogenation of ketones." Firmenich. Geneva, Switz. Sept. 2000.
78. "The Heterolytic Splitting of Dihydrogen and Proton-hydride Bonds in Metal Complexes and Catalysts." Euro-Hydrides 2000 Conference, Dijon, Sept. 2000.
79. "Active ruthenium catalysts for the hydrogenation of Imines." Dow Chemical Co. Midland Mich. Oct. 2000.
80. “Non-classical Hydrogen Bonding and the Heterolytic Splitting of Dihydrogen” Michigan State U. Nov. 2000.
81. "From protonic-hydridic bonding to the catalytic hydrogenation of polar bonds." Texas A&M University, College Station, USA, Mar. 2001.
82. "From protonic-hydridic bonding to the catalytic hydrogenation of polar bonds." University of Western Ont., London, Ont. Mar. 2001.
83. "Ruthenium hydride complexes as active catalysts for the homogeneous hydrogenation of carbon-oxygen and carbon-nitrogen multiple bonds." 84th CSC Conference, Montreal, May 2001.
84. "Acid-Base and Catalytic Chemistry of Transition Metal Hydrides." University of Bristol, July. 2001.
85. "Unconventional Mechanism for the Catalytic Hydrogenation of Polar Bonds. Chirotech, Cambridge, U.K. Oct 2001.
86. "Heterolytic Hydrogenation: an Unconventional Mechanism for the Hydrogenation of Polar Bonds." University College London, Oct. 2001.
87. "Heterolytic Hydrogenation: an Unconventional Mechanism for the Hydrogenation of Polar Bonds." University of Bristol, Oct. 2001.
88. "Acid-base chemistry of transition metal dihydrogen and hydride complexes of relevance to the action of hydrogenase." R. H. Morris, T. Li. ACS National Meeting. Boston. Aug., 2002.
89. "Catalytic Cycle for the Asymmetric Hydrogenation of Ketones Involving Ruthenium Dihydride and Hydridoamido Intermediates." K. Abdur-Rashid, S. E. Clapham, Alen Hadžović, Alan J. Lough, Robert H. Morris, J. N. Harvey. 13th International Symposium on Homogeneous Catalysis. Tarragona, Spain, Sept. 2002.
90. "Protonic-hydridic bonding and reactivity in transition metal complexes and catalysts." R. H. Morris. Oct. 2002. U. Alberta.
91. "Playing with the NH···HRu effect in ketone and imine hydrogenation catalysis. R. H. Morris, K. Abdur-Rashid, R. Churlaud, R. Guo, A. J. Lough, and T. Li., Late transition metals in catalysis symposium. 87 Canadian Soc. Chem. Conf., London, June 2004.

92. "Hydrido- ruthenium and osmium catalysts utilizing MH…HN interactions" R. H. Morris, Transition metal hydrides symposium. Pacifichem Honolulu, Dec. 2005.
93. “Ligands for the catalytic hydrogenation and asymmetric hydrogenation of polar bonds” R. H. Morris, Ligand design symposium. 88th Can. Soc. Chem. Conf. Halifax, June 2006.
94, 95. “Homogenous catalysts for the outersphere hydrogenation of polar bonds.” R. H. Morris, U. Stuttgart; U. Freiburg, July 2006.
96. “Surprising New Discoveries in the Chemistry of Hydrogen” University of Toronto, Mississauga Colloquium Series, Feb. 2007.
97. “Models of Iron Metalloprotein Active Sites.” CSC Conference, Winnipeg, May 2007.
98. “Hydrogen and hydrogenation catalysts” Chemistry Student Union, U. Toronto, Nov. 2007
99. “Hydrogen and hydrogenation catalysts” York University, Dec. 2007.
100. “Moving from Ruthenium to Iron Homogenous Hydrogenation Catalysts” CSC Conference, Edmonton, May 2008.
101. “Iron Homogeneous Asymmetric Hydrogenation Catalysts” International conference on Hydrogen and Hydrogen Storage: Methods and Materials, Bangalore India, Jan. 2009.
102-105. “Moving from ruthenium to iron in the catalytic asymmetric reduction of ketones” Chinese University of Hong Kong; University of Hong Kong; Hong Kong University of Science and Technology; City University of Hong Kong. Jan 2009.
106-109 “Moving from ruthenium to iron in the catalytic asymmetric reduction of ketones” University of Kyoto, Uji Campus; University of Kyoto, Katsura Campus; Tokyo Institute of Technology; University of Tokyo. Jan. 2009.
110. “Moving from ruthenium to iron in the catalytic asymmetric reduction of ketones” Eastman Chemicals, Kingsport Tennessee, Feb. 2009.
111. “Enantioselective reduction of ketones catalyzed by iron complexes.” CSC Conference, Hamilton 2009. (Organometallic chemistry of the d and f block metal chemistry symposium).
112. “Enantioselective reduction of ketones catalyzed by iron complexes.” International Conference on Concerto Catalysis, Sapporo Japan Aug. 2009.
113. “Replacing Expensive Metals with Iron in Asymmetric Reduction Catalysts for the Production of Valuable Alcohols”. Dave Farrar Lecture. U. Toronto. Sept. 2009.
114. “Electronic and steric effects of ligands on the activity of iron catalysts” R. H. Morris, A. A. Mikhailine, P. O. Lagaditis, P. Sues, A. J. Lough and N. Meyer. CSC 2010 Conference Toronto. “Interplay of Ligand Design and Small Molecule Activation Symposium. June 2010.
115. “Why are asymmetric transfer hydrogenation catalyst systems trans-[Fe(CO)(P-N-N-P)(NCMe)]$^{2+}$/base so active?” Organometallic Gordon Conference, Salve Regina U. July 2010.
116. “Iron catalysts for the enantioselective reduction of ketones” Pacifichem 2010, Honolulu, Dec. 2010.
117. “Surprising mechanisms of action of asymmetric ketone hydrogenation catalysts.” CSC2011 Conference, Montreal, June 2011 (symposium in honour of John Harrod).
118. “Budgeting for Chairs.” R. H. Morris and J. Pak. University of Toronto New Administrator’s Workshop. June. 2011.
119. “Chemistry at the University of Toronto.” Xerox Research Centre. Mississauga. June 2011.
120. “Collaborative Opportunities with Chemistry at the University of Toronto.” China-Ontario Partnership Development Workshop . Aug. 2011.
121. “Chemists have solutions” Toronto Reference Library, Sept. 2011.
122. “Catalytic reduction of ketones and aldehydes” DOE Workshop on CO_2 Utilization, Maryland, Nov. 2011.
123. “Designing efficient hydrogenation catalysts for greener chemical processes.” McGill University, Jan. 2012.
124. “Chemists have solutions” Natural Philosophers Society. University of Toronto. Feb. 2012.
125. “Surprising mechanisms of action of asymmetric ketone hydrogenation catalysts. University of Stockholm, Sweden, June, 2012.
126. “Surprising mechanisms of action of asymmetric ketone hydrogenation catalysts. Johannes Guttenberg U., Germany, June, 2012.
127. “Budgeting for Chairs.” R. H. Morris and J. Pak. University of Toronto New Administrator’s Workshop. June. 2012.
128. “Designing efficient hydrogenation catalysts for greener chemical processes.” R. H. Morris, Queens University, Green Centre of Canada Lecturer. Jan. 2013.

129. “Moving hydrogen using iron catalysts” R. H. Morris, ACS Conference New Orleans, Symposium on Hydrogen Production, Storage and Utilization. April 2013.
130. “Asymmetric hydrogenation of ketones and imines catalyzed by iron complexes.” R. H. Morris, Plenary lecture. 4th BIT Global Conference on Catalysis, Dalian, China. June 2013.
131. “My interest in base metal catalysis is the asymmetric hydrogenation of ketones and imines” NSF Workshop on Base Metal Catalysis. Indianapolis, September, 2013.
131. “Iron catalysts for the asymmetric reduction of ketones and imines” ACS Conference Indianapolis. Symposium on non precious metal catalysis. September, 2013.
132. “Transition metal hydride and dihydrogen chemistry” U. Muenster, Germany, September 2013.
133. “Homogenous catalytic hydrogenation using ruthenium catalysts” U. Muenster, Germany, September, 2013.
134. “Iron catalysts for the asymmetric reduction of ketones and imines.” Leibniz-Institut fűr Katalyse, Universtät Rostock, Rostock, Germany, September 2013.
135. “Developing Iron Catalysts for the Efficient Asymmetric Transfer Hydrogenation of Ketones and Imines” University of Graz, Graz, Austria, October 2013.
136. “Iron catalysts for the asymmetric reduction of ketones and imines.” Technical U. Vienna, Vienna, Austria, October 2013.
137. “Moving from ruthenium to iron. Efficient asymmetric reduction of ketones and imines using iron-based homogeneous and nanoparticle catalysts.” Westfälische Wilhelms-Universität Münster, Germany, October, 2013.
138. “Iron catalysts for the asymmetric reduction of ketones and imines.” University of Goettingen, Goettingen, Germany, October, 2013 (50 min). .
139. “Iron Catalysts for the Asymmetric Reduction of Ketones and Imines.” Beijing University of Chemical Technology, Beijing, November 2013. (50 min)
140. “Homogenous catalytic hydrogenation using ruthenium catalysts” Beijing Normal University, Beijing, November 2013. (50 min)
141. “Iron Catalysts for the Asymmetric Reduction of Ketones and Imines.” Beijing Normal University, Beijing, November 2013. (50 min)
142. “Moving from ruthenium to iron. Efficient asymmetric reduction of ketones and imines using iron-based homogeneous and nanoparticle catalysts.” Peking University, Beijing, November 2013. (50 min)
143. “Developing Iron Catalysts for the Efficient Asymmetric Hydrogenation of Ketones and Imines” University of Alberta, Jan. 2014. (50 min)
144. “Developing Iron Catalysts for the Efficient Asymmetric Hydrogenation of Ketones and Imines” University of Rochester, Feb. 2014. (50 min)
145. “Developing Iron Catalysts for the Efficient Asymmetric Hydrogenation of Ketones and Imines” Chemical Company (name withheld), Mar. 2014. (50 min) .
146. “The Contrary Alchemist. Why Turn Platinum into Iron?” Next Steps in Green Chemistry Research GCI Workshop, U. Toronto, May 2014 (90 min). .
147. “Developing Iron Catalysts for the Asymmetric Hydrogenation of Ketones and Imines,” CSC2014, Vancouver, May 2014 (20 min). .
148. “Efficient asymmetric hydrogenation of ketones and imines catalyzed by iron complexes” XIX International Symposium on Homogeneous Catalysis. Plenary Lecture, Ottawa, July 2014 (30 min).
149. “Homogeneous iron catalysts for the asymmetric hydrogenation of ketones and imines.” 64th Canadian Chemical Engineering Conference. Symposium on Catalysis for Sustainable Resources in honour of Garry Rempel. Oct. 2014 (20 min).
150. “Iron Catalysts for the Asymmetric Hydrogenation of Ketones and Imines” University of Saskatchewan. Jan. 2015 (50 min).
151. “Iron Catalysts for the Asymmetric Hydrogenation of Ketones and Imines” University of British Columbia. Jan. 2015 (50 min).
152. “Asymmetric Hydrogenation of Ketones and Imines Using Iron Catalysts” KAUST Research Conferences: Catalytic Carbon and Hydrogen Management (KRC-CCHM). Saudi Arabia. Feb. 2015 (30 min).
153. “Bifunctional hydrogenation - moving from ruthenium- to iron-based catalysts.” Max Planck Institute. Mulheim. Mar. 2015 (50 min).
154. “Bifunctional hydrogenation - moving from ruthenium- to iron-based catalysts.” U. Aachen. Institutes of Inorganic and Organic Chemistry. Mar. 2015 (50 min).

155. “Bifunctional hydrogenation - moving from ruthenium- to iron-based catalysts.” U. Aachen. Institutes of Technical Chemistry. Mar. 2015 (50 min).
156. “Asymmetric Hydrogenation of Ketones and Imines Using Iron(II) Catalysts.” NCCC XVI Netherlands Catalysis Conference. Noordwijkerhout, Mar. 2015 (30 min). Plenary lecture.
157. “Iron catalysts for the asymmetric synthesis of alcohols and amines.” CSC2015, Symposium on Catalysts for Synthesis. Ottawa, June 2015 (40 min).
158. “Bifunctional catalysis using chelating NHC ligands.” CSC2015, Joint UK/Canada symposium. Ottawa. June 2015 (20 min).
159. “N-heterocyclic carbene ligands for bifunctional catalysis.” IRTG Symposium, Muenster, Germany, October 2015 (30 min).
160. “Catalysis enabled by metal-ligand cooperation.” Brock University, Oct. 2015.
161. “Catalysis enabled by metal-ligand cooperation.” Princeton University, Nov. 2015.
162. “Catalysis enabled by metal-ligand cooperation.” University of Winnipeg, Feb. 2016.
163. “Catalysis enabled by metal-ligand cooperation.” University of Manitoba, Feb. 2016.
164. “Catalysis enabled by metal-ligand cooperation.” Frontiers in Catalysis & Engineering Science Seminar, Pacific Northwest National Labs, May. 2016.
165. “Catalysis enabled by metal-ligand cooperation.” University of Washington, May. 2016.
166. “Catalysis enabled by metal-ligand cooperation.” ACS Conference, Philadelphia, Aug. 2016.
167. “Catalytic asymmetric hydrogenation enabled by iron-ligand cooperation” Base Metal Catalysis Workshop, Princeton U. Sept. 2016.
168. “Catalysis enabled by metal-ligand cooperation.” University of Strasbourg, Sep. 2016.
169. “Catalysis enabled by metal-ligand cooperation.” University of Meunster, Sep. 2016.
170. “Catalysis enabled by metal-ligand cooperation.” ETH Zuerich, Sep. 2016.
171. “Catalysis enabled by metal-ligand cooperation.” University of Karlsruhe, Sep. 2016.
172. “Catalysis enabled by metal-ligand cooperation.” University of Regina, Oct. 2016
173. “Catalysis enabled by metal-ligand cooperation.” Laval University, Feb. 2017.
174. “Catalysis enabled by iron-ligand cooperation” University of Muenster, May 2017.
175. “Developing sustainable catalysts.” University of Toronto, Ask a Laureate Lectures. May 2017.
176. “Developing sustainable catalysts.” Pujiang Innovation Forum. Toronto-China Cleantech Meeting, Toronto Convention Center. May 2017.
177. “Mechanisms of the H_2- and transfer hydrogenation of polar bonds catalyzed by iron group hydrides” Dalton Conference, Warwick U., UK, plenary award lecture, Apr 2018.
178. “Mechanisms of the H_2- and transfer hydrogenation of polar bonds catalyzed by iron group hydrides” U. Bath, UK, Apr 2018.
179. “Mechanisms of the H_2- and transfer hydrogenation of polar bonds catalyzed by iron group hydrides” U. Leicester, UK, Apr 2018.
180. “2017 CGCEN Award Lecture: The use of abundant metals in homogeneous catalysts for asymmetric hydrogenation.” CSC2018 Edmonton, May 2018.
181. “The use of the abundant metals iron and manganese in homogeneous catalysts for asymmetric hydrogenation” University of Ottawa, June 2018.
182. “Catalytic Asymmetric Hydrogenation. Practice and Theory.” International Conference on Theoretical Aspects of Catalysis, ICTAC. UCLA, CA. Plenary Lecture. June 2018.
183. “The use of the abundant metals iron and manganese in homogeneous catalysts for asymmetric hydrogenation” University of Rochester, August 2018.
184. “Mechanisms of the asymmetric hydrogenation of ketones and imines catalyzed by iron- and manganese-group hydrides.” R. H. Morris, 8th IRTG Symposium, Toronto, September 2018.
185. “The use of the abundant metals iron and manganese in homogeneous catalysts for asymmetric hydrogenation” Columbia University, New York. Nov. 2018.
186. “The use of the abundant metals in homogeneous catalysts for asymmetric hydrogenation” University of Toronto, Chemistry Course Community. Feb. 2019.
187. “Homogeneous cobalt system for the hydrogenation of CO_2 to methanol” DOE Workshop, Washington, DC. April 25, 2019.
188. “Vibrational spectroscopy as an indicator of the nucleophilicity of the hydride ligand” 102nd Canadian Chemistry Conference, Quebec City, Symposium on Inorganic Reaction Mechanisms. R. Morris*, D. Schnieders, M. Sung, B. Tsui, J. Neugebauer, 20 min. June 2020

189. “Physical insights into mechanistic processes in organometallic chemistry – an introduction” RSC Faraday Discussion Conference plenary lecture. September 2, 2019.
190. “Discovering sustainable catalysts.” UTM, Jan. 22. 2020. 50 min. new.
191.”Discovering sustainable catalysts.” Ryerson U., Mar. 5 2020. 50 min new.
Cancelled due to Covid-19: “Catalytic asymmetric hydrogenation using manganese-based catalysts” 26th Canadian Symposium on Catalysis, Vancouver June 2020.
Postponed due to Covid-19: A COMPARISON OF MANGANESE AND IRON COMPLEXES FOR THE ASYMMETRIC PRESSURE HYDROGENATION OF PROCHIRAL KETONES. International Conference in Coordination Chemistry, July 2020.
192. “Sustainable catalysis using hydrides of earth-abundant metals”, York U. (virtual) Oct. 1, 2020.
193. “Asymmetric bifunctional hydrogenation catalysts based on the sustainable metals iron and manganese” Pacifichem Conference. December 2021. Invited for Symposium on Metal-Ligand Cooperation. Virtual, synchronous. 30 min talk. New. A recording was also available on demand.
194. “Chemistry of molecular dihydrogen and hydride complexes of the iron group metals” Pacifichem Conference. December 2021. Invited for Symposium on Hydrogen and Materials. Virtual, synchronous. 30 min talk. New. A recording was also available on demand.
195. “Applications of the Ligand Acidity Constant Equation for Transition Metal Hydride Complexes” American Chemical Society Conference, San Diego. March 2022. 30 min. In person. Invited for Symposium in honor of Morris Bullock.
196. “Transition Metal Hydride and Dihydrogen Complexes” Canadian Society for Chemistry Conference, Calgary, June 2022. 30 min. In person.
197. “Catalysts for the asymmetric hydrogenation of imines” Beijing University of Chemical Technology. Sept. 2022. 50 min. (Virtual).
198. “Restructuring the Second-Year Inorganic Chemistry Course at the St. George Campus” with Dr. John De Backere. Touch Base on Teaching. February, 2023. 20 min. Virtual.
199. “Muenster-Toronto Transition Metal Hydride Chemistry.” IRTG Meeting. Apr. 2023. 30 min. in person.
200. Hydride complexes of abundant metals in catalysis. Seminar, Rutgers University. Sept. 2023 50 min. In person.
201. The hydride transfer step in asymmetric hydrogenation. International Conference of Computational Organometallic Catalysis (ICCOC2023), Beijing, China. Oct. 2023 45 min. Keynote. In person.
202. Hydride complexes of abundant metals in catalysis. Seminar, Shaanxi Normal University, Xi'An, China, Oct, 2023. 50 min. In person.
203. Hydride complexes of abundant metals in catalysis. Department of Chemistry Seminar, Tsinghua University, Beijing, China. Oct. 2023. 50 min. In person.
204. Hydrogenation. Princeton Organometallics graduate course. Dec 2023 2 h. In person.
205. Hydride complexes of abundant metals in catalysis. Department of Chemistry, Princeton University, Princeton, NJ. Dec. 2023. Colloquium 50 min. In person.
206. Synthesis and study of paramagnetic transition metal hydrides. American Chemical Society Conference, Denver CO. Aug. 2024. 25 min. In person. Invited.

D. LIST OF COURSES

A. Undergraduate courses taught

Taught at the Scarborough Campus until 1995:

CHMA02	General Chemistry (part)
CHMB01Y	Introductory Inorganic Chemistry
CHMB33Y	Introductory Inorganic Chemistry
CHMC35F	Environmental Inorganic Chemistry

Taught at the St George Campus:

CHM151Y (1/3)	Chemistry: The Molecular Science
CHM139S (1/3)	General Chemistry.
CHM238F (1/2)	Introductory Inorganic Chemistry
CHM338F	Intermediate Inorganic Chemistry

CHM435S/1207S	Coordination Chemistry (Inorganic Stereochemistry)
CHM437S/1263S	Bioinorganic Chemistry
CHM439Y,499Y	Introduction to Research.
CHM432F	Organometallic Chemistry and Catalysis

B. Graduate courses taught

CHM1204F	Organometallic Chemistry and Catalysis
CHM1209S (part)	Structural Methods in Inorganic Chemistry
CHM1263S	Biological Inorganic Chemistry
CHM1258	Reactions of Coordinated Ligands
CHM1261S (part)	Topics In Inorganic Chemistry
CHM1266F (part)	Physical methods in Inorganic Chemistry
CHM1270S (part)	Frontiers In Inorganic Chemistry
CHM1290Y	Inorganic seminar series coordinator.
Chemical Safety	

C. Theses supervised.

Masters Students:

Completed theses

1. Rudy L. Luck, MSc, **1984** "The synthesis and Reactions of Some Molybdenum(0) Phosphine Compounds Containing an η^6–Bonded Methyldiphenylphosphine Ligand"
2. Natalie J. Lazarowych, **1985** " Chemical and Physical Properties of Some Bis Dinitrogen and eta-6-Bonded Substituted Pyridine Complexes of Molybdenum(0) and Their Reactions with HBF_4 and HF."
3. Andrea Sella, MSc, **1986** "Synthesis of New Electron-rich η^6–Arylphosphine Complexes of Molybdenum(0) and Their Reactions With HBF_4 and HF"
4. Kelly A. Earl, MSc, **1987** "The Synthesis and Spectroscopic Properties of Some Molecular Hydrogen Complexes of Osmium.
5. Maria T. Bautista, MSc, **1988** "Molecular Hydrogen Complexes of Iron: Synthesis and Spectroscopic Properties."
6. Patricia A. Maltby, MSc, **1988**, "Molecular Hydrogen Complexes of Osmium: Synthesis and Spectroscopic Properties."
7. Caroline Schweitzer, M.Sc. **1989**, "New Chemistry of Hydride Complexes of Molybdenum and Ruthenium"
8. Timothy Burrow, M.Sc. **1989**. "Hydrido Complexes of Tungsten with Bulky Thiolate Co-ligands"
9. Paul Cappellani, MSc, **1990** "The Acid-Base Properties of Iron Hydride Complexes"
10. Samantha Drouin, MSc, **1991**"Some Chemical Properties of Dihydrogen Complexes"
11. Tina P. W. Fong, MSc, **1994**, "Synthesis and Reactivity of Some Acidic Ruthenium Dihydrogen and Hydride Complexes."
12. Tanya Y. Bartucz, MSc **1996**, "Chemistry of Some Hydride and Dihydrogen Complexes of Rhenium and Osmium."
13. Shaun Landau, **1999**. "Pushing the Limits of Acidity and Basicity of Transition Metal Hydride Complexes: Studies of Acidic Dicationic Dihydrogen Complexes of Iron(II) and Basic Anionic Hydride Complexes of Iridium(III)"
14. Adrian Lee, **1999** "Models of the Active Sites of Dimethylsulfoxide Reductase and Nickel–iron Hydrogenase"
15. Sandra Trentowsky **1999** "Synthesis and investigations of some cationic and neutral ruthenium dihydrogen and hydride complexes"
16. Justin Hinman, **2002**. "Acidity of neutral transition metal polyhydride complexes and the study of anionic rhenium and ruthenium polyhydride dimers."
17. Terry Fedorkiw, **2003.** "Study of new ruthenium and iridium hydride complexes bearing N-heterocyclic carbenes as ligands"
18. Marco Zimmer-De Iuliis, **2006** "Heterolytic splitting of dihydrogen and pK_a studies of transition metal hydrides- a theoretical study."
19. Alexandre Mikhailine, **2008** "Synthesis of Modular Phosphine-imine and amine ligands."

20. Kanghee Park, **2013** "Using Phosphine Aldehydes to Generate New Transition Metal Complexes and the Synthesis of Chiral NHC-Amino Ligands."
21. Madeleine Sattler, **2021,** "Chelating Phosphorus and Nitrogen Donor Ligand Design for Catalytic Hydrogenation"
22. Shannon Oliphant, **2022**, "Density Functional Theory (DFT) Study on Selective Reductive Amination of Sodium Triacetoxyborohydride (STAB) with Respect to Imines over Aldehydes and Ketones"

Current Masters students

Visiting Masters students

Leonie Haeser, visiting MSc Student. University of Aachen. June-September 2022.

Doctoral Students:

Completed theses.

1. R. L. Luck, PhD, **1987** "The Synthesis of η^6–Arylphosphine Complexes of Molybdenum(0) and Their Use as Metallophosphine Ligands"
2. N.J. Lazarowych, PhD, **1989**, "Dinitrogen and Hydride Complexes of Molybdenum with Phosphorus and Sulfur Donor Coligands"
3. Timothy Burrow, PhD, **1993**. "Bulky Thiolate and Selenolate Complexes of Tungsten and Molybdenum"
4. Caroline Schweitzer, PhD, **1993**. "Dihydrogen Complexes of Ruthenium: Synthesis and Properties"
5. Patricia Maltby, PhD **1993** "Dihydrogen and Hydride Complexes of Osmium(II)."
6. Marcel Schlaf, PhD, **1996** "Heterolytic Activation of the Dihydrogen Ligand in Complexes of Ruthenium and Osmium."
7. Cameron Forde, PhD, **1997** "Modelling Biological Iron"
8. Sunghan Park, PhD **1998** "Intramolecular Hydride-proton Bonds in Iridium Complexes. A New Type of Hydrogen Bond"
9. Tina Fong, PhD **1999** "Investigation of Some Acidic Ruthenium Dihydrogen and Hydride Complexes"
10. Tianshu Li, PhD **2005** "The heterolytic splitting of dihydrogen. Ruthenium hydrogenation catalysts and an acidity scale"
11. Alen Hadžovic, PhD **2007.** " Outer Sphere Hydrogenation Of Ketones Catalyzed By Ruthenium(II) Hydride Complexes "
12. Sean Clapham, PhD **2008**. ""'Amido-Hydrido Complexes of Ruthenium and Osmium: Reactivity and Their Use in Catalysis.
13. Marco Zimmer-De Iuliis, PhD **2009, "**Mechanisms of Platinum Group Metal Catalysis Investigated by Experimental and Theoretical Methods "
14. Wylie W. N. O, PhD **2011**. "Late Transition Metal Complexes Bearing Functionalized N-Heterocyclic Carbenes and the Catalytic Hydrogenation of Polar Double Bonds."
15. Alexandre A. Mikhailine, PhD **2012**. "From Ruthenium to Iron for the Catalytic Reduction of Ketones: Catalysis and Mechanistic Insights.
16. Paraskevi O. Lagaditis, PhD **2013**. "Iron Complexes for the Catalytic Reduction of Polar Double Bonds"
17. Peter E. Sues, PhD **2014**. "Design and Synthesis of Phosphorus Containing Ligands for the Formation of Iron Group Metal Complexes and Catalysts"
18. Jessica F. Sonnenberg, PhD **2014**. "Mechanistic Insights into Homogeneous and Heterogeneous Asymmetric Iron Catalysis"
19. Demyan E. Prokopchuk, PhD **2015**. "Synthetic and Computational Studies of Metal-Ligand Cooperation with Iron Group Complexes for Water Splitting and Ketone Hydrogenation"
20. Samantha Smith, PhD **2018**. "Asymmetric Hydrogenation Using Catalysts Based on Abundant Metals."
21. Kai Yang Wan, PhD **2018**. "Chiral Donor-Functionalized N-Heterocyclic Carbenes for Asymmetric Catalytic Applications in Hydrogenation – From Design to Application."
22. Karl Z. Demmans, PhD **2018**. "Increasing the Stability and Turnover Number of a Highly Active Iron Catalyst for the Asymmetric Transfer Hydrogenation of Ketones"

23. Molly Meng Sung, PhD **2020**. "The Ligand Acidity Constant Method Applied to Transition Metal-Hydride Complexes and Hydrogenation Catalysts"
24. Chris Sang Seo, PhD **2021**. "Synthetic Strategies for Enhancing Metal-Ligand Cooperation and Enantioselective Polar Bond Hydrogenation with Base Metal Catalysts
25. Matthew Gradiski, PhD **2021**. "Multidentate Phosphorus and Nitrogen Donor Chelating Ligands: Facile Synthesis and Base-Metal Coordination Chemistry"
26. Tsz Ho Brian Tsui, PhD **2022**. "Transition Metal Hydride Complexes: From Computation to Catalysis and Everything in Between"
27. Benjamin E. Rennie, PhD **2022**. "Odd Electron Transition Metal Hydride and Amine Complexes and their Associated Proton/Electron/Hydrogen Atom Reactivity"

Current PhD Students

Amanda Kwan: "Asymmetric hydrogenation of imines using base metal catalysts."Sept. 2021-present.
Rennie Eleftheriades "Catalysis based on cobalt PNNP complexes." Sept. 2021-present.
Adi Fishkin "Iron-based olefin metathesis catalysts" September 2022-present..

Visiting PhD Students

Florian Roefles. "Iridium NHC complexes" Feb. 2015-July 2015. Visiting from Muenster. Joint supervision with Prof. Ekke Hahn, U. Muenster.
Jan Unsleber. "DFT calculations related to transition metal hydride acidity" Apr. 2016-Sept. 2016 Visiting from Muenster. Joint supervision with Prof. Johannes Neugebauer, U. Muenster.
Tristan Tan. "Complexes Bearing C-Metalated Azolato Ligands: Synthetic Methodology and Reactivity." Jan 2017-Feb. 2019. Joint supervision with Prof. F. E. Hahn, U. Muenster.
Jenny Linde, "Protic NHC complexes in catalysis. Oct 2017 – Mar 2018. Joint supervision with Prof. F. E. Hahn, U. Muenster.
Florian Kampert, "Protic NHC complexes in catalysis. May 2018 – Sept 2018. Joint supervision with Prof. F. E. Hahn, U. Muenster.
Tibault Tannoux, "Iron catalysts for the asymmetric hydrogenation of imines." May – July 2018. U. Rennes, France.
David Schnieders, "Metal-hydride vibrations: the Trans-effect of the Hydride" Sept. 2018-Feb. 2019. Joint supervision with Prof. Johannes Neugebauer, U. Muenster.
Alexander Brand, "Bulky phosphine ligands in catalysis." Feb. 2019-Jun. 2019. Joint supervision with Prof. W. Uhl, U. Muenster.
Patrick Deutche. "Reactions of bimetallic iridium NHC complexes" September 2021- Feb. 2022 Joint supervision with Prof. F. E. Hahn, U. Muenster.
Lars Hellmann. "Theoretical aspects of iron olefin metathesis catalysts" May-October 2022. Joint supervision with Prof. Johannes Neugebauer, U. Muenster.
Peter Paul Parusel. "Polydentate NHC ligands for catalysis" January 2023-April 2023. Joint supervision with Prof. F. E. Hahn, U. Muenster.

Postdoctoral Fellows, Research Associates and Visiting Professors

1. Hormoz Azizian. 1980-1981.
2. Joel Ressner, 1982-1983.
3. Mahmoud Shiralian, 1983-1985.
4. Jeff Zubkowski, 1984-1985.
5. Ravi Gukathasan 1986-1987
6. Gouchen Jia 1989-1991.
7. Philip Jessop, 1990-1992.
8. Brownwyn Greaves, 1993.
9. Ravi Ramachandran, 1993- 1994.
10. Wei Xu (NSERC Postdoctoral award) 1994-1995.
11. Dimtri Goussev,. 1996- 1997.
12. Kamal Abdur-Rashid, 1998- 2002.

13. Raphael Churlaud, 2001- 2002.
14. Rongwei Guo, 2003-2005.
15. Datong Song. 2003- 2004.
16. Christine Sui-Seng, 2006-2008.
17. Nils Meyer, 2008-2010.
18. Weiwei Zuo, 2011-2014.
19. Alexandre Mikhailine, 2012 (4 months).
20. Paraskevi Lagaditis 2013 (4 months)
21. Afrooz Zirakadeh 2015
22. Paraskevi Lagaditis 2016
23. Ali Nemati, visiting Professor, Head of Inorganic Chemistry Department, U. Tehran, 2018-2019
24. Eric Keske 2018-2019
25. Albert Epshteyn, Director of a Naval Research Lab, Washington, DC 2019-2020.
26 Chris Seo 2021 (4 months).
27. Tomilola Joseph Ajayi. 2022-2024.

Undergraduate researchers

David Sutherland, 1980-81.
Rudy Luck, Edward Lin, Ming Liu, Ravi Gukathasan, 1981-82.
Doug Watson, Chris Beacom, Peter Pekos, Peter Jhauj, 1982-83.
Shane Peng, Jim Frizzell 1983-1984.
Eric Tucs, 1984-1985.
Maria Bautista, Theresa Hofstede 1985-1986
Linda Crowfoot, Theresa Hofstede 1986-1987.
L. Ping, Mark Steele 1987-1988.
Samantha Drouin, 1988-1989.
Derek Fung, Mark Johnson (NSERC), 1990.
Mark Johnson, Ming Yeung, 1991.
George Zhacharidis (NSERC) 1992.
Susanne Brinkmann, Bain Chin, Adina Petroff (NSERC) 1993.
Adina Petroff, Cinzia D'Agostino, Martin Steinbeck, Avinash Thadani (NSERC), Sabeshan Kanagalingam (NSERC) 1994.
Leonarda Riccuito, Thomas Schleis, Amanda Chan 1995.
Patrick Amrhein, Dennis Choi, Tim Stephan 1996.
Edward Leung, Adrian Lee, Bernhart Otto 1997
Erin Baker, Oliver Schmitt 1998-1999
Birgit Kranke, Alex Roeche, Britta Boden, Andrew Amborski, Sean Clapham 1999-2000
Sean Clapham, Marc Eberhardt, Michael Faatz, Sonia Yusuf 2000-2001.
Kai Groh, William Au, 2001-2002
Robert Abbel, Marco Zimmer-De Iuliis, Leonie Soltay, 2002-2003
Barbara Skrela, Nailyn Rasool, 2003.
Marco Zimmer-De Iuliis, Lauren Hails, Ines Bergner, Christian Elpelt, 2003-2004.
Ester Pierce, Christina Maclaughlin, Katherine Waterston, Johannes Klos, Duncan Moore, 2004-2005.
Alanna Prasad, Nipa Haque, Anna-Maria Puetz, Florian Diehl, Elizabeth Noel, 2005-2006.
Amina Mulani, Xiaoxi Zhao, Nina Ivanova, Nipa Haque, Friederike Freutel, Dennis Dalmas, Sion Atkins. 2006-2007
Ben Thomas, Carsten Dingels, Valerie Reuss, Xiaoxi Zhao, Angelo Karantza, Riccardo Iafrate 2007-2008.
Fatme Dahcheh, Ali Risvi, Paraskevi Lagaditis 2008
Katharina Mack and Eva Woltmann 2008-2009.
Hisashi Ohara 2009-present. (2nd prize, Inorg. Div. Southwestern Ont. Undergrad. Conf. 2011).
Mazharul Maishan 2010-2012, Jessica Sonnenberg, 2010
Roy Posaratnanathan 2012-2013
Samantha Smith, Young Li, Brian Tsui 2013
Sebastian Tauer 2013-2014.
Savyo Santana, David Perchersky 2014
Martin Yang, Jay Kyungseop Lee 2014-2015

Oliver Ko, Maotong Xu 2015.
Max Olson, 2016, 2017-2018
Vanessa Lee, 2016-2017
Nina Farac 2017-2018
Yiqun Zhang and Sofia Jdanova 2018
Sofia Jdanova and Maegan Ong 2018-2019
John Russell 2019
Eric Bell 2019-2020
Renee Eleftheriades 2020
Qing Yu Zhang 2020-2021
Tony Sharng 2021
Adi Fishkin 2021-2022
Hana El-Haddad 2022-2023
Jelena Golijanin 2023
Madeline Schmuckler 2023

Contributions to the training of highly qualified personnel

Several undergraduate students have gone to graduate school (U. of Toronto, York, Queens, McGill, UBC, MIT, Germany).
Graduate students: Rudy Luck (PhD 1987) associate prof., Michigan Technological University; Kelly Earl-Luck (MSc 1987) US Environ. Prot. Agency; Maria Bautista (MSc 1988) Patent law, Boston; Natalie Lazarowych (MSc 1985, PhD 1989) managing chemist at Dalton Chemicals; Andrea Sella (MSc 1989) Lecturer, Univ. College London, UK. Paul Cappellani (MSc 1990) chemist at Royal Plastics, Brantford; Samantha Drouin (MSc 1991) Postdoctoral fellow. Caroline Schweitzer (MSc 1989, PhD 1993) chemist at Digital Specialty Chemicals, Toronto. Tim Burrow (MSc 1989, PhD 1993) NMR spectroscopist, U. Toronto. Pat Maltby (MSc 1988, PhD 1993) chemist, Neutro-technic. Marcel Schlaf (PhD 1993) Associate Professor, U. Guelph.. Tanya Bartucz, (Law, Havard, patent law), Cameron Forde (PhD 1997) Lawrence Livermore Labs, California. Tina Fong (PhD 1999) Chemist, Patheon, Shaun Landau (MSc 1999) Own web-page company. Adrian Lee (MSc 1999) high school teacher. Sandra Trentowsky (MSc 2000) high school teacher. Justin Hinman (MSc 2002). Forensic Scientist, Gov. Ont. Terry Fedorkiw (MSc 2003), MBA program, Schulich School of Business, York U. Tianshu Li (PhD 2005) Researcher, Karlsruhe, Geremany. Alen Hadzovic (PhD 2007), Associate Professor-Teaching Stream U. Toronto Scarborough. Sean Clapham (PhD 2008), University of Toronto School Teacher. Marco Zimmer-De Iuliis (PhD 2009), Assistant Professor-Teaching Stream U. Toronto Scarborough. Wylie O (PhD 2011), Manager, Product Development and R&D, Innonix Technologies Limited, Hong Kong. Alexandre Mikhailine (PhD 2012), Johnson Mathey. Paraskevi Lagaditis (PhD 2013), safety officer, U. Victoria. Peter Sues (PhD 2014) Assistant Professor Kansas State U. Jessica Sonnenberg (PhD 2014) Consultant at Boston Consulting Group. Demyan Prokopchuk (PhD 2014), Assistant Professor, Rutgers University. Samantha Smith (PhD 2018) Green Centre Canada. Kai Wan (PhD, 2018) Trindent Consulting Group, Toronto. Karl Demmans (PhD, 2018) Applications Scientist ACD Chemicals. Molly Sung (PhD,2020) Research Scientist-Formulation Development Acuitas Therapeutics. Maddy Sattler (MSc 2021), Internal accounts ACD Chemicals. Chris Seo (PhD 2021) Postdoctoral Fellow U. Michigan. Matt Gradiski (PhD 2021) Postdoctoral Fellow, York University. Shannon Oliphant (MSc 2022), ACS Chemicals. Brian Tsui (PhD 2022) Trindent Consulting. Ben Rennie (PhD 2022) Postdoctoral Fellow, U. Calgary.
Postdoctoral fellows: Dr. Hormoz Azizian is a chemist with Ontario Hydro. Dr Mahmoud Shiralian, Toronto Real Estate, Dr Ravi Gukathasan is president of Digital Chemical Company. Dr. G. Jia is professor at the Hong Kong U. of Sci. and Technology. Dr Philip Jessop is a Canada Research Chair, Queens U. Dr Ravi Ramachandran is at Syngenta Crop Protection, Wei Xu is chemist in Saudia Arabia. Dmitri Goussev is a professor at Wilfred Laurier U. Dr Abdur-Rashid set up Kanata Chemical Technologies. Dr R. Churlaud is in France. Dr. Datong Song, Assoc. Prof. at U. Toronto, Dr Rongwei Guo, Kanata Chem. Tech., Dr Christine Sui-Seng, Company in France. Dr Nils Meyer, Chemtura Organometallics GmbH Technology, Germany. Dr Weiwei Zuo, faculty, Donghua University China. Dr Afrooz Zairakzadeh, Faculty, Hormozgan University of Iran.

E. ADMINISTRATIVE POSITIONS

13. A. Positions held and service on committees and organizations within the University.

Past

At the Scarborough Campus:
Member of Academic Affairs Committee, Nov 1985-1987.
Member of the High School Liaison Committee, Sept. 1983-1987.
Member of Search Committee for Chairman of Physical Sciences, 1988.
Advisor for the Chemistry Majors and Biochemistry Majors Programmes 1984-1995.
Presenter of the Scarborough College Students, Convocation, Nov 1985.
WHMIS trainer. May 1990 and December 1990
At the St George Campus:
Member of the NMR committee, 1988-1994
Member of the Colloquium Committee July 1990- 1997.
Member of the High School Liaison Committee July 1992- 2001.
Member of the Undergraduate Curriculum Committee 1985-1987; 1995-1996, 2002, 2004-2007.
Member of the library committee, 1995-1996.
Member of the Graduate Studies Committee, 1997-1999, 2003 –2004.
Member of several Search Committees
Member of 3 year review committees of assistant Professors and senior lecturers
Member of tenure committees of assistant professors and lecturers
Member of advisory committee of many graduate students.
Chair of PhD exams every two years.
Member of the Colloquium Committee. 1990- 2008.
Coordinator of student exchanges with U. Bristol (Sept 2006- 2009) and some Universities in Baden-Wuertemberg, Germany (Sept 2007-8).
Coordinator of student exchanges with Johannes Guttenberg U. Mainz (2005-2018).
Associate Chair of Graduate Studies in Chemistry 2008
Acting Chair, Chemistry July-Dec 2008
Interim Chair, Chemistry July 2009 – June 2010.
Chair of the 2011 International Year of Chemistry Planning Committee
Chair, Chemistry. July 2010-2013.
Chair of Departmental Advisory Committee 2008-2013
Chair of the Awards Committee 2008-2013, 2020-present.
Chair of the NMR Users Committee 2008-2010
Host of the Graduate Student Advisory Committee 2008-2013
Host of the Postdoctoral Fellows/RA Advisory Committee, 2008-2013
PTR Committee 2008-2017, 2020-present.
EDI Committee 2022-present.

Present

EDI Committee
PTR Committee
Chair of the Awards Committee

B. Positions held and service on committees and organizations outside the University of scholarly and academic significance.

Ontario Graduate Studies Evaluation Committee, 1988.
Ontario Council of Graduate Studies review consultant 2009, U. Western Ontario Chemistry Dept.
Director, Math, Physics and Chemistry Fellow Selection Committee, Academy III, Royal Society of Canada (2009-2012)
Member of Executive Committee, Academy III, Royal Society of Canada (2009-2012)
Member of the Nomination Committee, Academy III, Royal Society of Canada (2009-2010).

Chair, Inorganic Program, Canadian Society for Chemistry Conference 2010, Toronto Convention Centre. 11 symposia, 70 invited speakers, 203 contributed talks, 90 posters.
Member of the Canadian Society for Chemistry National 2011 International Year of Chemistry Committee. 2011.
Chair, Inorganic Program, Canadian Society for Chemistry Conference 2017, Toronto Convention Centre.
Symposium Organizer, Inorganic Program, CSC2018, Edmonton.
Symposium Organizer, Inorganic Program, CCCE 2022. Calgary.

F. OTHER RELEVANT INFORMATION

Consultant to CBC and CFRB radio programs and TVO, Space, the Imagination Station and Global television programs on subjects related to chemistry.
Chemical Demonstrations, Franklin Public School, Toronto, Nov. 1993, May 1994, June 1995, June 1996, May 1997, 1998, June 1999. East Alternative School, June 1999.