Patrick L. Holland

Professor of Chemistry
Yale University
PO Box 208107
New Haven, CT 06520-8107

phone: 203-432-5162
FAX: 203-432-6144
email: patrick.holland@yale.edu
website: http://holland.chem.yale.edu/

Professional Positions

Yale University

Professor of Chemistry (2013-)

University of Rochester

Professor of Chemistry (2010-2013)
Associate Professor of Chemistry (2005-2010)
Assistant Professor of Chemistry (2000-2005)

University of Minnesota (1997-2000)

National Institutes of Health Postdoctoral Fellow
Advisor: Prof. William B. Tolman

Education

University of California, Berkeley (1993-1997)

Ph.D. in Chemistry, September 1997
Advisors: Profs. Robert G. Bergman and Richard A. Andersen

Princeton University (1989-1993)

A.B. *magna cum laude* (high honors) in Chemistry, June 1993

Awards

Watkins Visiting Professor, Wichita State University, 2019
Xingda Lectureship, Peking University, 2017
Friedrich Wilhelm Bessel Research Award of the Humboldt Foundation, 2016
Fellow of the American Association for the Advancement of Science, 2015
Blavatnik Award for Young Scientists, 2013
Fulbright Scholar Award, 2012
ACS Rochester Section Volunteerism Award, 2010
Sloan Research Fellowship, 2003
NSF CAREER Award, 2002
NIH Postdoctoral Fellowship, University of Minnesota, 1997-1999
American Institute of Chemists Student Awardee, 1993
Phi Beta Kappa, Princeton University, 1993

Service to Chemistry Community

Guest Editor of *Chemical Reviews* Special Issue "Dinitrogen: 2020"
Organizer of Tolman Symposium at National ACS Meeting, San Francisco, CA (2017)
Chair of Inorganic Reaction Mechanisms Gordon Research Conference (2017)

Participant in DOE N_2 Fixation Workshop (2016)
Participant in NSF Nitrogen Cycle Workshop (2015)
Vice-Chair of Inorganic Reaction Mechanisms Gordon Research Conference (2015)
Organometallics Roundtable (2013)
Member, *Inorganic Syntheses* (2013-)
Editorial Board of *Inorganic Chemistry* (2012-2014)
Editorial Board of *Journal of Biological Inorganic Chemistry* (2009-2012)
Awards Co-Chair, ACS Inorganic Division (2010-2012)
Chair, Harrison Howe Award Committee, ACS Rochester Section (2007-2009)
Organized symposium ("New Faces of Biomimetic Coordination Chemistry") at National ACS Meeting, Washington, DC (2009)
Co-organized symposium ("Beta-Diketiminates: A Renaissance of Reaction Chemistries") at National ACS Meeting, Washington, DC (2005)
Discussion leader at Gordon-Kenan Graduate Research Seminar in Bioinorganic Chemistry (2005 and 2012)
ad hoc member of many panels for NIH, DOE, and NSF grant review

Research Interests

Synthesis, electronic structure, geometry, and mechanisms of iron and cobalt complexes, with a particular focus on low-coordinate and high-spin complexes. Activation of small molecules, particularly N_2. Organometallic and bioinorganic catalysis.

Publications

h-index = 53.

Journal Publications from Independent Career

148. S. F. McWilliams, E. Bill, G. Lukat-Rodgets, K. R. Rodgets, B. Q. Mercado, P. L. Holland, "Effects of N_2 Binding Mode on Iron-Based Functionalization of Dinitrogen to Form an Iron(III) Hydrazido Complex," *J. Am. Chem. Soc.* **2018**, *140*, 8586-8598.
147. K. L. Skubi, P. L. Holland, "So Close, Yet Sulfur Away: Opening the Nitrogenase Cofactor Structure Creates a Binding Site," *Biochemistry* **2018**, *57*, 3540-3541.
146. V. Pelmentschikov, L. B. Gee, H. Wang, K. C. MacLeod, S. F. McWilliams, K. L. Skubi, S. P. Cramer, P. L. Holland, "High-Frequency Fe-H Vibrations in a Bridging Hydride Complex Characterized by NRVS and DFT," *Angew. Chem.* **2018**, *57*, 9367-9371.
145. J. G. Chen, R. M. Crooks, L. C. Seefeldt, K. L. Bren, R. M. Bullock, M. Y. Darensbourg, P. L. Holland, M. J. Janik, A. K. Jones, M. G. Kanatzidis, P. King, K. M. Lancaster, S. V. Lymar, P. Pfromm, W. F. Schneider, R. R. Schrock, "Beyond fossil-fuel-driven nitrogen transformations," *Science* **2018**, *359*, 873.
144. S. J. Bonyhady, D. E. DeRosha, J. Vela, D. J. Vinyard, R. E. Cowley, B. Q. Mercado, W. W. Brennessel, P. L. Holland, "Iron and Cobalt Diazoalkane

Complexes Supported by β-Diketiminate Ligands: A Synthetic, Spectroscopic and Computational Investigation," *Inorg. Chem.* **2018**, *57*, 5959-5972.

143. D. E. DeRosha, P. L. Holland, "Incorporating Light Atoms Into Synthetic Analogues of FeMoco," *Proc. Natl. Acad. Sci. USA* **2018**, *115*, 5054-5056.
142. D. L. J. Broere, B. Q. Mercado, J. T. Lukens, A. C. Vilbert, G. Banerjee, H. M. C. Lant, S. H. Lee, E. Bill, S. Sproules, K. M. Lancaster, P. L. Holland, "Reversible Ligand-Centered Reduction in Low-Coordinate Iron Formazanate Complexes," *Chem. Eur. J.* **2018**, *24*, 9417-9425.
141. D. L. J. Broere, B. Q. Mercado, P. L. Holland, "Selective Conversion of CO_2 to Isocyanate by Low-Coordinate Iron," *Angew. Chem. Int. Ed.* **2018**, *57*, 6507-6511.
140. D. L. J. Broere, B. Q. Mercado, E. Bill, K. M. Lancaster, S. Sproules, P. L. Holland, "Alkali Cation Effects on Redox-Active Formazanate Ligands in Iron Chemistry," *Inorg. Chem.* **2018**, *57*, 9580-9591.
139. D. L. J. Broere, P. L. Holland, "Boron compounds tackle dinitrogen," *Science* **2018**, *359*, 871.
138. E. Rozen, Y. Erlich, M. E. Reesbeck, P. L. Holland, C. N. Sukenik, "Functionalized Self-Assembled Monolayers Bearing Diiminate Complexes Immobilized through Covalently Anchored Ligands," *Langmuir* **2018**, in press.
137. G. P. Connor, N. Lease, A. Casuras, A. S. Goldman, P. L. Holland, J. M. Mayer, "Protonation and electrochemical reduction of rhodium- and iridium-dinitrogen complexes in organic solution," *Dalton Trans.* **2017**, *46*, 14325-14330.
136. N. A. Arnet, S. F. McWilliams, D. E. DeRosha, B. Q. Mercado, P. L. Holland, "Synthesis and Mechanism of Formation of Hydride-Sulfide Complexes of Iron," *Inorg. Chem.* **2017**, *56*, 9185-9193.
135. M. Horitani, K. Grubel, S. F. McWilliams, B. D. Stubbert, B. Q. Mercado, Y. Yu, P. M. Gurubasavaraj, N. S. Lees, P. L. Holland, B. M. Hoffman, "ENDOR Characterization of an Iron-Alkene Complex Provides Insight into a Corresponding Organometallic Intermediate of Nitrogenase," *Chem. Sci.* **2017**, *8*, 5941-5948.
134. S. F. McWilliams, E. Brennan-Wydra, K. C. MacLeod, P. L. Holland, "Density Functional Calculations for Prediction of ^{57}Fe Mössbauer Isomer Shifts and Quadrupole Splittings in β-Diketiminate Complexes," *ACS Omega* **2017**, 2594-2606.
133. P. L. Holland, "Reaction: Opportunities for Sustainable Catalysts," *Chem* **2017**, *2*, 443-444.
132. D. L. J. Broere, I. Čorić, A. Brosnahan, P. L. Holland, "Quantitation of the THF Content in $Fe[N(SiMe_3)_2]_2 \cdot xTHF$," *Inorg. Chem.* **2017**, *56*, 3140-3143.
131. J. C. Lo, D. Kim, C.-M. Pan, J. T. Edwards, Y. Yabe, J. Gui, T. Qin, S. Gutiérrez, J. Giacoboni, M. W. Smith, P. L. Holland, P. S. Baran, "Fe-Catalyzed C-C Bond Construction from Olefins via Radicals," *J. Am. Chem. Soc.* **2017**, *139*, 2484-2503.
130. D. E. DeRosha, B. Q. Mercado, G. Lukat-Rodgers, K. R. Rodgers, P. L. Holland, " Enhancement of C-H Oxidizing Ability in Co-O_2 Complexes through an Isolated

Heterobimetallic Oxo Intermediate," *Angew. Chem. Int. Ed.* **2017**, *56*, 3211-3215.

129. M. E. Reesbeck, K. Grubel, D. Kim, W. W. Brennessel, B. Q. Mercado, P. L. Holland, "Diazoalkanes in Low-Coordinate Iron Chemistry: Bimetallic Diazoalkyl and Alkylidene Complexes of Iron(II)," *Inorg. Chem.* **2017**, *56*, 1019-1022.
128. K. C. MacLeod, R. A. Lewis, D. E. DeRosha, B. Q. Mercado, P. L. Holland, "C-H and C-N Activation at Redox-Active Pyridine Complexes of Iron," *Angew. Chem. Int. Ed.* **2017**, *56*, 1069-1072.
127. A. M. Speelman, P. L. Holland, "Sulfur-Supported Iron Complexes for Understanding N_2 Reduction," *Top. Organomet. Chem.*, **2017**, *60*, 197-214.
126. G. P. Connor, P. L. Holland, "Coordination chemistry insights into the role of alkali metal promoters in dinitrogen reduction," *Catalysis Today* **2017**, *286*, 21-40.
125. Y. Liu, D. J. Vinyard, M. E. Reesbeck, T. Suzuki, K. Manakongtreecheep, P. L. Holland, G. W. Brudvig, D. Söll, "A [3Fe-4S] cluster is required for tRNA thiolation in archaea and eukaryotes," *Proc. Natl. Acad. Sci. USA* **2016**, *113*, 12703-12708.
124. S. M. Bellows, N. A. Arnet, P. M. Gurubasavaraj, W. W. Brennessel, E. Bill, T. R. Cundari, P. L. Holland, "The Mechanism of N-N Double Bond Cleavage by an Iron(II) Hydride Complex," *J. Am. Chem. Soc.* **2016**, *138*, 12112-12123.
123. K. C. MacLeod, F. S. Menges, S. F. McWilliams, S. M. Craig, B. Q. Mercado, M. A. Johnson, P. L. Holland, "Alkali-Controlled C-H Activation or N-C Bond Formation from N_2-Derived Iron Nitrides and Imides," *J. Am. Chem. Soc.* **2016**, *138*, 11185-11191.
122. K. C. MacLeod, S. F. McWilliams, B. Q. Mercado, P. L. Holland, "Stepwise N-H Bond Formation From N_2-Derived Iron Nitride, Imide and Amide Intermediates to Ammonia," *Chem. Sci.* **2016**, *7*, 5736-5746.
121. I. Čorić, P. L. Holland, "Insight into the FeMoco of nitrogenase from synthetic iron complexes with sulfur, carbon, and hydride ligands," *J. Am. Chem. Soc.* **2016**, *138*, *138*, 7200-7211.
120. S. M. Bellows, W. W. Brennessel, P. L. Holland, "Effects of Ligand Halogenation on the Electron Localization, Geometry and Spin State of Low-Coordinate β-Diketiminate Iron Complexes," *Eur. J. Inorg. Chem.* **2016**, 3344-3355.
119. S. F. McWilliams, K. R. Rodgers, G. Lukat-Rodgers, B. Q. Mercado, K. Grubel, P. L. Holland, "Alkali Metal Variation and Twisting of the FeNNFe Core in Bridging Diiron Dinitrogen Complexes," *Inorg. Chem.* **2016**, *55*, 2960-2968.
118. C. Chen, M. Hecht, A. Kavara, W. W. Brennessel, B. Q. Mercado, D. J. Weix, P. L. Holland, "Rapid, Regioconvergent, Solvent-Free Alkene Hydrosilylation with a Cobalt Catalyst," *J. Am. Chem. Soc.* **2015**, *137*, 13244-13247.
117. N. A. Arnet, T. R. Dugan, F. S. Menges, B. Q. Mercado, W. W. Brennessel, E. Bill, M. A. Johnson, P. L. Holland, "Synthesis, Characterization, and Nitrogenase-Relevant Reactions of an Iron Sulfide Complex with a Bridging Hydride," *J. Am. Chem. Soc.* **2015**, *137*, 13220-13223.

116. I. Čorić, B. Q. Mercado, E. Bill, D. J. Vinyard, P. L. Holland, "Binding of dinitrogen to an iron-sulfur-carbon site," *Nature* **2015**, *526*, 96-99.

115. C. Chen, S. M. Bellows, P. L. Holland, "Tuning Steric and Electronic Effects in Transition-Metal β-Diketiminate Complexes," *Dalton Trans.* **2015**, *44*, 16654-16670.

114. S. F. McWilliams, P. L. Holland, "Dinitrogen Binding and Cleavage by Multinuclear Iron Complexes," *Acc. Chem. Res.* **2015**, *48*, 2059-2065.

113. M. H. Al-Afyouni, E. Bill, D. E. DeRosha, W. W. Brennessel, P. L. Holland, "Spin Isomers and Ligand Isomerization in a Three-Coordinate Cobalt(I) Carbonyl Complex," *J. Am. Chem. Soc.* **2015**, *137*, 10689-10699.

112. M. E. Reesbeck, M. M. Rodriguez, W. W. Brennessel, B. Q. Mercado, D. J. Vinyard, P. L. Holland, "Oxidized and Reduced [2Fe-2S] Clusters from an Iron(I) Synthon," *J. Biol. Inorg. Chem.* **2015**, *20*, 875-883.

111. P. L. Holland, "Distinctive Reaction Pathways at Base Metals in High-Spin Organometallic Catalysts," *Acc. Chem. Res.* **2015**, *48*, 1696-1702.

110. S. J. Bonyhady, J. M. Goldberg, N. Wedgwood, T. R. Dugan, A. G. Eklund, W. W. Brennessel, P. L. Holland, "Electronic structure and N-N cleavage reactivity of a redox-active cobalt diazoalkane complex," *Inorg. Chem.* **2015**, *54*, 5148-5150.

109. A. Das, Z. Han, W. W. Brennessel, P. L. Holland, R. Eisenberg, "Nickel Complexes for Robust Light-Driven and Electrocatalytic Hydrogen Production from Water," *ACS Catal.* **2015**, *5*, 1397-1406.

108. K. Grubel, W. W. Brennessel, B. Q. Mercado, P. L. Holland, "Alkali Metal Control over N−N Cleavage in Iron Complexes," *J. Am. Chem. Soc.* **2014**, *136*, 16807-16816.

107. T. E. Machonkin, M. D. Boshart, J. A. Schofield, M. R. Rodriguez, K. Grubel, D. Rokhsana, W. W. Brennessel, P. L. Holland, "Structural and Spectroscopic Characterization of Iron(II), Cobalt(II), and Nickel(II) *ortho*-Dihalophenolate Complexes: Insights into Metal-Halogen Secondary Bonding," *Inorg. Chem.* **2014**, *53*, 9837-9848.

106. R. A. Lewis, K. C. MacLeod, B. Q. Mercado, P. L. Holland, "Geometric and redox flexibility of pyridine as a redox-active ligand that can reversibly accept one or two electrons," *Chem. Commun.* **2014**, *50*, 11114-11117.

105. K. C. MacLeod, D. J. Vinyard, P. L. Holland, "A Multi-Iron System Capable of Rapid N_2 Formation and N_2 Cleavage," *J. Am. Chem. Soc.* **2014**, *136*, 10226-10229.

104. J. A. Gladysz, R. B. Bedford, M. Fujita, F. P. Gabbaï, K. I. Goldberg, P. L. Holland, J. L. Kiplinger, M. J. Krische, J. Louie, C. C. Lu, J. R. Norton, M. A. Petrukhina, T. Ren, S. S. Stahl, T. D. Tilley, C. E. Webster, M. C. White and G. T. Whiteker, "*Organometallics* Roundtable 2013-2014," *Organometallics* **2014**, *33*, 1505-1527.

103. T. R. Dugan, E. Bill, K. C. MacLeod, W. W. Brennessel, P. L. Holland, "Synthesis, Spectroscopy and Hydrogen/Deuterium Exchange in High-Spin Iron(II) Hydride Complexes," *Inorg. Chem.* **2014**, *53,* 2370-2380.

102. C. Chen, T. R. Dugan, W. W. Brennessel, D. J. Weix, P. L. Holland, "*Z*-Selective Alkene Isomerization by High-Spin Cobalt(II) Complexes," *J. Am. Chem. Soc.* **2014**, *136*, 945-955.

101. K. P. Chiang, S. M. Bellows, W. W. Brennessel, P. L. Holland, "Multimetallic cooperativity in activation of dinitrogen at iron-potassium sites," *Chem. Sci.* **2014**, *5*, 267-274.

100. W. Yao, P. M. Gurubasavaraj, P. L. Holland, "All-Ferrous Iron-Sulfur Clusters," *Struct. Bonding* **2014**, *160*, 1-37.

99. R. E. Cowley, M. R. Golder, N. A. Eckert, M. Al-Afyouni, P. L. Holland, "Mechanism of Catalytic Nitrene Transfer from Iron(I)–Isocyanide Complexes," *Organometallics* **2013**, *32*, 5289-5298.

98. S. M. Bellows, T. R. Cundari, P. L. Holland, "Spin Crossover during β-Hydride Elimination in High-Spin Iron(II)- and Cobalt(II)-Alkyl Complexes," *Organometallics* **2013**, *32*, 4741-4751.

97. Z. Han, L. Shen, W. W. Brennessel, P. L. Holland, R. Eisenberg, "Nickel Pyridylthiolate Complexes for the Photocatalytic Production of Hydrogen from Aqueous Solutions in Noble-Metal-Free Systems," *J. Am. Chem. Soc.* **2013**, *135*, 14659-14669.

96. C. J. Pollock, K. Grubel, P. L. Holland, S. DeBeer, "Experimentally Quantifying Small Molecule Bond Activation Using Valence-to-Core X-ray Emission Spectroscopy," *J. Am. Chem. Soc.* **2013**, *135*, 11803-11808.

95. T. R. Dugan, K. C. MacLeod, W. W. Brennessel, P. L. Holland, "Cobalt-Magnesium and Iron-Magnesium Complexes with Weakened Dinitrogen Bridges," *Eur. J. Inorg. Chem.* **2013**, 3891-3897.

94. B. D. Stubbert, J. Vela, W. W. Brennessel, P. L. Holland, "A Sulfide-Bridged Diiron(II) Complex with an N_2H_4 Ligand," *Z. Anorg. Allg. Chem.* **2013**, *639*, 1351-1355.

93. R. M. Davydov, M. P. McLaughlin, E. Bill, B. M. Hoffman, P. L. Holland, "Generation of High-Spin Iron(I) in a Protein Environment Using Cryoreduction," *Inorg. Chem.* **2013**, *52*, 7323-7325.

92. K. C. MacLeod, P. L. Holland, "Recent Developments in Homogeneous Dinitrogen Reduction by Molybdenum and Iron," *Nature Chem.* **2013**, *5*, 559-565. (Invited Perspective)

91. Z. Chen, C. R. K. Glasson, P. L. Holland, T. J. Meyer, "Electrogenerated polypyridyl ruthenium hydride and ligand activation for water reduction to hydrogen and acetone to iso-propanol," *Phys. Chem. Chem. Phys.* **2013**, *15*, 9503-9507.

90. P. Chandrasekaran, K. P. Chiang, D. Nordlund, U. Bergmann, P. L. Holland, S. DeBeer, "On the Sensitivity of X-ray Core Spectroscopy to Changes in Metal Ligation: A Systematic Study of High-Spin Ferrous Complexes," *Inorg. Chem.* **2013**, *52*, 6286-6298.

89. T. R. Dugan, E. Bill, K. C. MacLeod, G. J. Christian, R. E. Cowley, W. W. Brennessel, S. Ye, F. Neese, P. L. Holland, "Reversible C-C Bond Formation Between Redox-Active Pyridine Ligands in Iron Complexes," *J. Am. Chem. Soc.* **2012**, *134*, 20352-20364.

88. M. P. McLaughlin, M. Retegan, E. Bill, T. M. Payne, H. S. Shafaat, S. Peña, J. Sudhamsu, A. E. Ensign, B. R. Crane, F. Neese, P. L. Holland, "Azurin as a protein scaffold for a low-coordinate non-heme iron site with a small-molecule binding pocket," *J. Am. Chem. Soc.* **2012**, *134*, 19746-19757.

87. B. L. Edelbach, B. M. Pharoah, S. M. Bellows, P. R. Thayer, C. N. Fennie, R. E. Cowley, P. L. Holland, "An Expedient Synthesis of 2,4,6-Tris(trifluoromethyl)-aniline," *Synthesis* **2012**, *44*, 3595-3597.

86. Z. Han, F. Qiu, R. Eisenberg, P. L. Holland, T. D. Krauss, "Robust Photogeneration of H_2 in Water Using Semiconductor Nanocrystals and a Nickel Catalyst," *Science* **2012**, *338*, 1321-1324.

85. C. R. K. Glasson, W. Song, D. L. Ashford, A. Vannucci, Z. Chen, J. J. Concepcion, P. L. Holland, T. J. Meyer, "Self-Assembled Bilayers on Indium-Tin Oxide (SAB-ITO) Electrodes: A Design for Chromophore-Catalyst Photoanodes," *Inorg. Chem.* **2012**, *51*, 8637-8639.

84. R. E. Cowley, P. L. Holland, "Ligand Effects on Hydrogen Atom Transfer from Hydrocarbons to Three-Coordinate Iron Imides," *Inorg. Chem.* **2012**, *51*, 8352-8361.

83. T. M. Figg, P. L. Holland, T. R. Cundari, "Cooperativity Between Low-Valent Iron and Potassium Promoters in Dinitrogen Fixation," *Inorg. Chem.* **2012**, *51*, 7546-7550.

82. M. M. Rodriguez, B. D. Stubbert, C. C. Scarborough, W. W. Brennessel, E. Bill, P. L. Holland, "Isolation and Characterization of Stable Iron(I)-Sulfide Complexes," *Angew. Chem. Int. Ed.* **2012**, *51*, 8246-8250. (Chosen as a "Hot Paper")

81. W. R. McNamara, Z. Han, C.-J. Yin, W. W. Brennessel, P. L. Holland, R. Eisenberg, "Cobalt-Dithiolene Complexes for the Photocatalytic and Electrocatalytic Reduction of Protons in Aqueous Solutions," *Proc. Natl. Acad. Sci. USA* **2012**, *109*, 15594-15599.

80. K. P. Chiang, C. C. Scarborough, M. Horitani, N. S. Lees, K. Ding, T. R. Dugan, W. W. Brennessel, E. Bill, B. M. Hoffman, P. L. Holland, "Characterization of the Fe-H Bond in a Three-Coordinate Terminal Hydride Complex of Iron(I)," *Angew. Chem. Int. Ed.* **2012**, *51*, 3658-3662. (Chosen as a "Hot Paper")

79. K. Grubel, P. L. Holland, "New iron-sulfur clusters help hydrogenases tolerate oxygen," *Angew. Chem. Int. Ed.* **2012**, *51*, 3308-3310. (Highlight)

78. T. R. Dugan, J. M. Goldberg, W. W. Brennessel, P. L. Holland, "Low-Coordinate Cobalt Fluoride Complexes: Synthesis, Reactions, and Production from C-F Activation Reactions," *Organometallics* **2012**, *31*, 1349-1360. (Special Issue on Fluorine in Organometallic Chemistry)

77. Z. Han, W. R. McNamara, M.-S. Eum, P. L. Holland, R. Eisenberg, "A Nickel-

Thiolate Catalyst for the Long-Lived Photocatalytic Production of Hydrogen in a Noble-Metal-Free System," *Angew. Chem. Int. Ed.* **2012**, *51*, 1667-1670. (Chosen as a "Hot Paper")

76. R. E. Cowley, G. J. Christian, W. W. Brennessel, F. Neese, P. L. Holland, "A Reduced β-Diketiminatoiron Complex with End-on and Side-on Nitriles: Strong Backbonding or Ligand Non-Innocence?" *Eur. J. Inorg. Chem.* **2012**, 479-483. (Special Issue on Cooperative & Redox Non-Innocent Ligands in Directing Open-Shell Organometallic Reactivity)

75. B. A. Reisner, J. L. Stewart, B. S. Williams, L. A. Goj, P. L. Holland, H. J. Eppley, A. R. Johnson, "Virtual Inorganic Pedagogical Electronic Resource Learning Objects in Organometallic Chemistry," *J. Chem. Educ.* **2012**, *89*, 185-187.

74. M. P. McLaughlin, T. H. Darrah, P. L. Holland, "Palladium(II) and platinum(II) bind strongly to an engineered blue copper protein," *Inorg. Chem.* **2011**, *50*, 11294-11296.

73. M. M. Rodriguez, E. Bill, W. W. Brennessel, P. L. Holland, "N_2 Reduction and Hydrogenation to Ammonia by a Molecular Iron-Potassium Complex," *Science* **2011**, *334*, 780-783.

72. M. U. Delgado-Jaime, B. R. Dible, K. P. Chiang, W. W. Brennessel, P. L. Holland, U. Bergmann, S. DeBeer, "Identification of Light Atoms within Multinuclear Metal Clusters using Valence-to-Core X-Ray Emission Spectroscopy," *Inorg. Chem.* **2011**, *50*, 10709-10717.

71. T. M. McCormick, Z. Han, D. J. Weinberg, P. L. Holland, R. Eisenberg, "The Impact of Ligand Exchange in Hydrogen Production from Cobaloxime-Containing Photocatalytic Systems," *Inorg. Chem.* **2011**, *50*, 10660-10666.

70. B. R. Dible, R. E. Cowley, P. L. Holland, "Remote Substitution on *N*-Heterocyclic Carbenes Heightens the Catalytic Reactivity of Their Palladium Complexes," *Organometallics* **2011**, *30*, 5123-5132.

69. W. R. McNamara, Z. Han, P. J. Alperin, P. L. Holland, R. Eisenberg, "Cobalt-Dithiolene Complexes for the Photocatalytic and Electrocatalytic Reduction of Protons," *J. Am. Chem. Soc.* **2011**, *133*, 15368-15371.

68. T. R. Dugan, X. Sun, E. V. Rybak-Akimova, O. Olatunji-Ojo, T. R. Cundari, P. L. Holland, "A Masked Two-Coordinate Cobalt(I) Complex That Activates C-F Bonds," *J. Am. Chem. Soc.* **2011**, *133*, 12418-12421.

67. R. E. Cowley, N. A. Eckert, S. Vaddadi, T. M. Figg, T. R. Cundari, P. L. Holland, "Selectivity and Mechanism of Hydrogen Atom Transfer by an Isolable Imidoiron(III) Complex," *J. Am. Chem. Soc.* **2011**, *133*, 9796-9811.

66. P. L. Holland, "Two-Coordinate Transition Metal Centers With Metal-Metal Bonds," *Angew. Chem. Int. Ed.* **2011**, *50*, 6213-6214. (Highlight)

65. P. L. Holland, "All square with high-spin iron(II)," *Nature Chem.* **2011**, *3*, 507-508. (News & Views)

64. P. L. Holland, "Techniques Used in Functional and Structural Modeling of Nitrogenase," in *Methods in Molecular Biology – Nitrogen Fixation* (M. Ribbe, ed.), Springer: New York, **2011**, pp. 249-263.

63. M. P. McLaughlin, T. M. McCormick, R. Eisenberg, P. L. Holland, "A stable molecular nickel catalyst for the homogeneous photogeneration of hydrogen from water," *Chem. Commun*. **2011**, *47*, 7989-7991.

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- "Characterization of Catalytic Imide Group Transfer Reactions with Iron Catalysts"
  Petroleum Research Fund, 44942-AC, $80,000
  PI: Patrick Holland
  9/06-9/08
- "Low-Coordinate Synthetic Models for Nitrogenase Activity"
  National Institutes of Health, R01 GM065313, $1,073,394

PI: Patrick Holland
4/04-3/10

- "Synthetic Models of the Catalytic Nickel-Copper Site of Acetyl Coenzyme A"
  Petroleum Research Fund, 38275-G, $35,000
  PI: Patrick Holland
  9/02-8/05
- "CAREER: Reactive Low-Coordinate Compounds of the Late Transition Metals"
  National Science Foundation, CHE-0134658, $495,000
  PI: Patrick Holland
  1/02-12/06

Equipment, Education

- "MRI: Development of a Hybrid Mass Spectrometry Platform with Mass-Selective Optical Spectroscopy of Cryogenic Ions"
  National Science Foundation, CHE-1828190
  7/18
- "CRIF: Acquisition of A Matrix-Assisted Laser Desorption/Ionization Time of Flight (MALDI-TOF) Mass Spectrometer"
  National Science Foundation, CHE-0840410, $279,643
  8/09
- "GAANN: Graduate Assistance in Chemistry"
  Department of Education, P200A060048, $540,000
  8/06-8/09
- "CRIF: Purchase of a Gas Chromatograph-Mass Spectrometer"
  National Science Foundation, CHE-0443581, $104,174
  2/05
- "CRIF: Upgrade of an X-ray Diffractometer"
  National Science Foundation, CHE-0342508, $121,750
  2/04

Invited Lectures at Universities & Colleges

Hamilton College (Clinton, NY) – January 2001
Trinity College (Hartford, CT) – February 2001
West Chester University (West Chester, PA) – September 2001
Nazareth College (Pittsford, NY) – January 2002
SUNY Buffalo (Buffalo, NY) – February 2002
Carnegie Mellon University (Pittsburgh, PA) – April 2002
University of West Virginia (Morgantown, WV) – September 2002
SUNY Fredonia (Fredonia, NY) – September 2002
Colgate University (Hamilton, NY) – October 2002
Rochester Institute of Technology (Rochester, NY) – October 2002
SUNY Brockport (Brockport, NY) – November 2002

Purdue University (West Lafayette, IN) – February 2003
Rose-Hulman Institute of Technology (Terre Haute, IN) – February 2003
Indiana University (Bloomington, IN) – February 2003
University of Minnesota (Minneapolis, MN) – September 2003
St. John's University and College of St. Benedict (St. Cloud, MN) – September 2003
Yale University (New Haven, CT) – September 2003
Alfred University (Alfred, NY) – September 2003
Princeton University (Princeton, NJ) – October 2003
Notre Dame University (Notre Dame, IN) – October 2003
University of California-Berkeley (Berkeley, CA) – October 2003
Utah University (Salt Lake City, UT) – October 2003
Utah State University (Logan, UT) – October 2003
Fordham University (New York, NY) – December 2003
University of Chicago (Chicago, IL) – January 2004
University of Guelph (Guelph, ON) – March 2004
Syracuse University (Syracuse, NY) – March 2004
University of California-San Diego (La Jolla, CA) – April 2004
University of California-Irvine (Irvine, CA) – May 2004
California Institute of Technology (Pasadena, CA) – May 2004
University of Southern California (Los Angeles, CA) – May 2004
University of California-Riverside (Riverside, CA) – May 2004
James Madison University (Harrisonburg, VA) – July 2004
University of Rochester (Rochester, NY) – September 2004
Northwestern University (Evanston, IL) – October 2004
Messiah College (Grantham, PA) – October 2004
Haverford College (Haverford, PA) – October 2004
Boston University (Boston, MA) – November 2004
Brandeis University (Waltham, MA) – November 2004
University of Toronto-Missassauga (Missassauga, ON) - November 2004
Massachusetts Institute of Technology (Cambridge, MA) - January 2005
University of North Carolina (Chapel Hill, NC) - January 2005
North Carolina State University (Raleigh, NC) - January 2005
University of Akron (Akron, OH) - January 2005
University of Delaware (Newark, DE) - March 2005
University of Seattle (Seattle, WA) - May 2005
University of British Columbia (Vancouver, BC) - May 2005
University of Washington (Seattle, WA) - May 2005
Miami University (Oxford, OH) - October 2005
University of Cincinnati (Cincinnati, OH) - October 2005
Bucknell University (Lewisburg, PA) - October 2005
Juniata College (Huntingdon, PA) - October 2005
Dickinson College (Carlisle, PA) - October 2005
University of North Texas (Denton, TX) - January 2006

University of North Carolina (Charlotte, NC) - February 2006
Duke University (Durham, NC) - February 2006
University of Albany (Albany, NY) - March 2006
University of Wisconsin (Madison, WI) - April 2006
University of Illinois (Urbana-Champaign, IL) - April 2006
University of Florida (Gainesville, FL) - April 2006
Max Planck Institute for Bioinorganic Chemistry (Mülheim, Germany) - September 2006
Ithaca College (Ithaca, NY) - October 2006
University of Victoria (Victoria, BC) - October 2006
Simon Fraser University (Vancouver, BC) - October 2006
SUNY Cortland (Cortland, NY) - November 2006
McGill University (Montreal, QC) - November 2006
Monroe Community College (Rochester, NY) - December 2006
Gustavus Adolphus College (St. Peter, MN) - February 2007
Duquesne University (Pittsburgh, PA) - October 2007
Tsukuba University (Tsukuba, Japan) - November 2007
Osaka University (Osaka, Japan) - November 2007
Osaka City University (Osaka, Japan) - November 2007
Buffalo State College (Buffalo, NY) - November 2007
Dartmouth College (Hanover, NH) - May 2008
University of Pennsylvania (Philadelphia, PA) - September 2008
SUNY Geneseo (Geneseo, NY) - September 2008
SUNY New Paltz (New Paltz, NY) - September 2008
Johns Hopkins University (Baltimore, MD) - October 2008
Georgetown University (Washington, DC) - October 2008
Brock University (St. Catharine's, ON) - October 2008
University of Toronto (Toronto, ON) - November 2008
Bloomsburg University (Bloomsburg, PA) - November 2008
New Mexico State University (Las Cruces, NM) - November 2008
University of Texas (Austin, TX) - May 2009
University of Montreal (Montreal, QC) - September 2009
University of Oregon (Eugene, OR) - October 2009
Columbia University (New York, NY) - November 2009
Pennsylvania State Erie (Erie, PA) - November 2009
West Chester University (West Chester, PA) - November 2009
York University (Toronto, ON) - December 2009
Marquette University (Milwaukee, WI) - January 2010
University of Wyoming (Laramie, WY) - September 2010
Colorado State University (Fort Collins, CO) - September 2010
Northwestern University (Evanston, IL) - October 2010
LeMoyne College (Syracuse, NY) - October 2010
Pennsylvania State University (University Park, PA) - October 2010
University of North Carolina (Chapel Hill, NC) - January 2011

East Carolina University (Greenville, NC) - February 2011
University of North Carolina (Charlotte, NC) - March 2011
Temple University (Philadelphia, PA) - March 2011
Virginia Polytechnic Institute (Blacksburg, VA) - April 2011
Yale University (New Haven, CT) - September 2011
Ithaca College (Ithaca, NY) - September 2011
University of Illinois (Chicago, IL) - September 2011
University of Oklahoma (Norman, OK) - October 2011
University of Kansas (Lawrence, KS) - October 2011
Princeton University (Princeton, NJ) - November 2011
University of Illinois (Urbana-Champaign, IL) - December 2011
University of Miami (Coral Gables, FL) - December 2011
Weizmann Institute (Rehovot, Israel) - January 2012
Bar Ilan University (Ramat Gan, Israel) - January 2012
University of Wisconsin (Madison, WI) - January 2012
University of Göttingen (Göttingen, Germany) - April 2012
University of Münster (Münster, Germany) - April 2012
Max-Planck-Institut für Kohlenforschung (Mülheim, Germany) - April 2012
University of Kiel (Kiel, Germany) - May 2012
Humboldt University - Berlin (Berlin, Germany) - May 2012
ETH (Zürich, Switzerland) - May 2012
University of Basel (Basel, Switzerland) - May 2012
Friedrich Alexander University - Erlangen-Nürnberg (Erlangen, Germany) - June 2012
SUNY Potsdam (Potsdam, NY) - October 2012
University of Toledo (Toledo, OH) - November 2012
University of Georgia (Athens, GA) - January 2013
North Carolina State University (Raleigh, NC) - February 2013
University of Tennessee (Knoxville, TN) - February 2013
Valparaiso University (Valparaiso, IN) - April 2013
Brandeis University (Boston, MA) - January 2014
Carleton College (Northfield, MN) - January 2014
University of West Virginia (Morgantown, WV) - February 2014
Shanghai Institute of Organic Chemistry (Shanghai, China) - March 2014
Fudan University (Shanghai, China) - March 2014
Brown University (Providence, RI) - May 2014
Tufts University (Medford, MA) - September 2014
College of the Holy Cross (Worcester, MA) - October 2014
Swarthmore College (Swarthmore, PA) - October 2014
University of California (Santa Barbara, CA) - October 2014
University of Southern California (Los Angeles, CA) - October 2014
University of California (Irvine, CA) - October 2014
University of Missouri (St. Louis, MO) - December 2014
Wayne State University (Detroit, MI) - February 2015

University of New Mexico (Albuquerque, NM) - February 2015
Whitman College (Walla Walla, WA) - March 2015
University of Washington (Seattle, WA) - March 2015
Indiana University (Bloomington, IN) - April 2015
University of Houston (Houston, TX) - October 2015
Emory University (Atlanta, GA) - October 2015
Georgia Tech University (Atlanta, GA) - October 2015
Georgetown University (Washington, DC) - February 2016
Ursinus College (Collegeville, PA) - April 2016
University of Pennsylvania (Philadelphia, PA) - September 2016
Iowa State University (Ames, IA) - October 2016
University of Göttingen (Göttingen, Germany) - January 2017
Laboratoire de Chimie de Coordination (Toulouse, France) - January 2017
Universitat de Girona (Girona, Spain) - February 2017
Institut Catalá d'Investigació Quimica (Tarragona, Spain) - February 2017
Friedrich-Alexander-Universität (Erlangen-Nuremberg, Germany) - February 2017
Peking University (Beijing, China) - April 2017
Philips-Universität Marburg (Marburg, Germany) - May 2017
TU Braunschweig (Braunschweig, Germany) - May 2017
HU Berlin (Berlin, Germany) - May 2017
TU München (Munich, Germany) - May 2017
Uppsala University (Uppsala, Sweden) - May 2017
University of Regensburg (Regensburg, Germany) - May 2017
Max Planck Institute for Chemical Energy Conversion (Mülheim an der Ruhr, Germany) - June 2017
University of Amsterdam (Amsterdam, Netherlands) - June 2017
Aix Marseille Université (Marseille, France) - June 2017
Rutgers University (New Brunswick, NJ) - September 2017
University of California (San Diego, CA) - October 2017
Scripps Research Institute (La Jolla, CA) - October 2017
University of Oklahoma (Norman, OK) - October 2017
University of California (Berkeley, CA) - January 2018
Massachusetts Institute of Technology (Cambridge, MA) - April 2018
Northwestern University (Evanston, IL) - May 2018
Simon Fraser University (Vancouver, BC) - October 2018
University of Victoria (Victoria, BC) - October 2018
Indiana University Purdue University (Indianapolis, IN) - November 2018
University of Notre Dame (Notre Dame, IN) - February 2019
University of Michigan (Ann Arbor, MI) - February 2019
Calvin College (Grand Rapids, MI) - February 2019
Hope College (Holland, MI) - February 2019
McGill University (Montreal, ON) - March 2019
James Madison University (Harrisonburg, VA) - March 2019

Wichita State University (Wichita, KS) - March 2019

Lectures at Meetings/Conferences (Invited)

Bergman Symposium (Berkeley, CA) – June 2002
Nitrogen Fixation Gordon Conference (New London, NH) – June 2002
International Conference on Coordation Chemistry (Heidelberg, Germany) – July 2002
Metals in Biology Gordon Conference (Ventura, CA) – February 2003
Eisenberg/Jones Symposium, National ACS Meeting (New Orleans, LA) – March 2003
Symposium on Non-Heme Iron in Biology, National ACS Meeting (Anaheim, CA) – March 2004
Nitrogen Fixation Gordon Conference (New London, NH) – June 2004
Organometallic Chemistry Gordon Conference (Newport, RI) – July 2004
European Biological Inorganic Chemistry Conference (EUROBIC 7) (Garmisch-Partenkirchen, Germany) - August 2004
Inorganic Reaction Mechanisms Gordon Conference (Ventura, CA) - February 2005
Pacifichem (Honolulu, HI) - December 2005
Rochester Section ACS Dinner (Rochester, NY) - January 2006
Wieghardt Symposium, National ACS Meeting (Atlanta, GA) - March 2006
Iron-Sulfur Enzymes Gordon Conference (New London, NH) - June 2006
Inorganic Chemistry Gordon Conference (Newport, RI) - July 2006
International Workshop on Bioinorganic and Organometallic Perspectives in Activation of Small Molecules (Nagoya, Japan) - November 2007
Que Symposium, National ACS Meeting (New Orleans, LA) - April 2008
Symposium on Integration of Research and Education at the Frontiers of Inorganic Chemistry, National ACS Meeting (New Orleans, LA) - April 2008
Symposium on Organometallic Chemistry of the Group 15 Elements, Northeast Regional ACS Meeting (Burlington, VT) - June 2008
Symposium on Activation of Dinitrogen, National ACS Meeting (Philadelphia, PA) - August 2008
Metals in Biology Gordon Conference (Ventura, CA) - January 2009
International Conference on Biological Inorganic Chemistry, ICBIC (Nagoya, Japan) - July 2009
Iron-Sulfur Enzymes Gordon Conference (New London, NH) - June 2010
Symposium on Ligand Design, National ACS Meeting (Boston, MA) - August 2010
Wieghardt Retirement Symposium (Mülheim, Germany) - November 2010
Pacifichem (Honolulu, HI) - December 2010
Metal Hydrides Workshop (Oxford, England) - March 2012
Fulbright Berlin Conference (Berlin, Germany) - March 2012
Iron Symposium (Regensburg, Germany) - June 2012
Inorganic Chemistry Gordon Conference (Biddeford, ME) - June 2012
Andersen Symposium (Berkeley, CA) – October 2012
Inorganic Reaction Mechanisms Gordon Conference (Galveston, TX) - March 2013

Symposium on Hydrogen Production, Storage, and Utilization, National ACS Meeting (New Orleans, LA) - April 2013
International Conference on Biological Inorganic Chemistry, ICBIC (Grenoble, France) - July 2013
Symposium on Base Metal Catalysis, National ACS Meeting (Indianapolis, IN) - September 2013
Werner Nobel Centenary Symposium, National ACS Meeting (Indianapolis, IN) - September 2013
New York ACS Section: Frontiers of Inorganic and Organometallic Chemistry (New York, NY) - September 2013
Fusion Conference on Molecules and Materials for Artificial Photosynthesis (Cancun, Mexico) - February 2014
Canadian Chemistry Conference (Vancouver, BC) - June 2014
Rigaku Symposium (New Haven, CT) - June 2014
Fusion Conference on Small Molecule Activation (Chicago, IL) - July 2014
Western Canadian Undergraduate Chemistry Conference (Kelowna, BC) - May 2015
National ACS Meeting (Boston, MA) - August 2015
International Conference on Nitrogen Fixation (Monterey, CA) - October 2015
Pacifichem (Honolulu, HI) - December 2015
National ACS Meeting (San Diego, CA) - March 2016
Metallocofactors Gordon Conference (Easton, MA) - June 2016
Telluride Conference on Small Molecule Activation (Telluride, CO) - June 2016
International Conference on Coordination Chemistry (Brest, France) - July 2016
National ACS Meeting (Philadelphia, TA) - August 2016
SABIC Frontiers in Inorganic Chemistry (Kolkata, India) - January 2017
ECOST: Control over Spin States in Technology and Biochemistry (Lisbon, Portugal) - March 2017
National ACS Meeting (San Francisco, CA) - April 2017
Boston Regional Inorganic Colloquium (Boston, MA) - Feburary 2018
National ACS Meeting (New Orleans, LA) - March 2018
Blavatnik Science Symposium (New York, NY) - June 2018

Lectures at Meetings/Conferences (Contributed)

National ACS Meeting (Chicago, IL) - August 2001
Inorganic Discussion Weekend (Waterloo, ON) - October 2001
National ACS Meeting (Boston, MA) - August 2002
Organometallic Chemistry Gordon Conference (Newport, RI) - July 2003
National ACS Meeting (New York, NY) - September 2003
NSF Inorganic Workshop (Sedona, AZ) - June 2004
Northeast Regional ACS Meeting (Rochester, NY) - November 2004
Beta-Diketiminates Symposium, National ACS Meeting (Washington, DC) - August 2005
International Meeting of the IMBG (Autrans, France) - September 2006

International Conference on Biological Inorganic Chemistry, ICBIC (Vienna, Austria) - July 2007
International Conference on Biological Inorganic Chemistry, ICBIC (Vancouver, Canada) - August 2011
National ACS Meeting (San Francisco, CA) - August 2014
EuCheMS Inorganic Chemistry Conference (Copenhagen, Denmark) – July 2017

Research Trainees

Doctoral

Name	Degree/Year	Most Recent Known Position
Nathan Eckert	Ph.D. 2005	Pilot Plant Manager, Shepherd Chemical Co., Cincinnati, OH
Javier Vela	Ph.D. 2005	Associate Professor, Iowa State U., Ames, IA
Ying Yu	Ph.D. 2007	Master's program in Information Systems
Keying Ding	Ph.D. 2009	Assistant Professor, Middle Tennessee State Univ.
Sara Rocks	Ph.D. 2009	Assistant Professor, Utah Valley U., Orem, UT
Matthew McLaughlin	Ph.D. 2011	Postdoctoral, Villanova Univ., Villanova, PA
Ryan Cowley	Ph.D. 2011	Research Chemist, ThermoFisher, Sunnyvale, CA
Karen Chiang	Ph.D. 2011	Lecturer, U. San Diego, San Diego, CA
Thomas Dugan	Ph.D. 2012	Sr. Research Chemist, Evonik, Allentown, PA
Meghan (Clark) Rodriguez	Ph.D. 2012	Adjunct Professor, Monroe Community College, Rochester, NY
Zhiji Han	Ph.D. 2014	Postdoctoral, Caltech (T. Agapie)
Sarina Bellows	Ph.D. 2014	Signa Chemistry, Rochester, NY
Chi Chen	Ph.D. 2016	Catalytic Innovations, Adamsville, RI
Megan Reesbeck	Ph.D. 2016	Horace Mann School, New York, NY
Nicholas Arnet	Ph.D. 2016	Postdoctoral, Texas A&M (M. Darensbourg)
Sean McWilliams	current student	Expected completion 2018
Daniel DeRosha	current student	Expected completion 2018
Gannon Connor	current student	Expected completion 2019
Daniel Kim	current student	Expected completion 2019-20
Dongyoung Kim	current student	Expected completion 2019-20
Samuel Bhutto	current student	Expected completion 2021-22
Alexandra Nagelski	current student	Expected completion 2021-22
Jeremy Weber	current student	Expected completion 2021-22
Conner Wilson	current student	Expected completion 2021-22

Master's

Name	Degree/Year	Most Recent Known Position
Elizabeth Gregory	M.S. 2004	Laboratory Manager, SUNY Brockport

Travis Hebden	M.S. 2005	Engineer, Intel Corp., Portland, OR
Liwei Zhu	M.S. 2007	Senior Associate, Discover Financial Services, Chicago, IL
Tawana Robinson	M.S. 2008	Baylor Genome Sequencing Center, Waco, TX
Wenwen Yao	M.S. 2011	Ph.D. student in environmental engineering, Worcester Polytechnic Inst.
Malik Al-Afyouni	M.S. 2013	Postdoc, Ohio State U. (C. Turró)
Anna Brosnahan	M.S. 2016	Analyst, Dean & Co., Vienna, VA

Postdoctoral

Name	Time in Group	Most Recent Known Position
Jeremy Smith	2000-2003	Associate Professor, Indiana U.
Savariraj Kingsley	2002-2003	Scientist, ChemRoutes Corp., Edmonton, Canada
Wilda Vargas-Gregory	2004-2005	Adjunct Professor, POPAC Nursing School, Mayaguez, PR
Jérôme Elhaïk	2005-2006	Free-lance translator, France
Azwana Sadique	2004-2007	Adjunct faculty, Monroe Community College, Rochester, NY
Bryan Stubbert	2006-2007	Senior Chemist, Dow Corp., Midland, MI
Benjamin Dible	2006-2009, 2010	Patent Analyst, Sanofi, Bridgewater, NJ
Aydin Kavara	2010-2011	Research Scientist, Jordi Labs, Kalamazoo, MI
P. M. Gurubasavaraj	2010-2011	Assistant Professor, Rani Chennamma University, India
William McNamara	2010-2012	Assistant Professor, William & Mary College
Katarzyna Grubel	2011-2014	Postdoctoral, Pacific Northwest National Laboratory, Richland, WA
Simon Bonyhady	2013-2015	Chemist, Chemtura Corp., Naugatuck, CT
Richard Lewis	2013-2015	Technical Reviewer, FDA, Washington, DC
Cory MacLeod	2012-2016	Senior Chemist, Chemtura Corp., Naugatuck, CT
Ilija Coric	2013-2016	Group Leader, Univ. Zürich
Daniel Broere	2016-2018	Assistant Professor, U. of Utrecht
Amy Speelman	2016-	Currently in group
Kazimer Skubi	2017-	Currently in group

Undergraduate Theses

Name	Degree/Year	Most Recent Known Position
Emily Bones	B.S. 2001	Education Resource Associate, American Assoc. of Chem. Teachers (American Chem. Soc.), Washington, DC
Lanyn Perez	B.S. 2002	Graduate student, U. Maryland (Biology)

Nicole Ketterer	B.S. 2003	Research Scientist, Chevron, Richmond, CA
Travis Hebden	B.S. 2004	Engineer, Intel, Portland, OR
Benjamin Gilston	B.S. 2005	Postdoctoral, Vanderbilt (Chemistry, W. Chazin)
Pamela Barrett	B.S. 2006	Postdoctoral, U. Washington (Civil and Environmental Engineering)
Amanda Mack	B.S. 2008	Teaching Fellow, Phillips Academy, Andover, MA
Matthew Golder	B.S. 2010	Postdoctoral, MIT (Chemistry, J. Johnson)
Ethan Kaplan	B.A. 2010	Associate, PricewaterhouseCoopers, New York, NY
Jonathan Goldberg	B.S. 2012	Graduate student, U. Washington (M. Heinekey & K. Goldberg)
Maxwell Hecht	B.S. 2013	Chemist, Jordi Labs, Mansfield, MA
Emma Brennan-Wydra	B.S. 2015	Unknown
Bechir-Auguste Pierre	B.S. 2015	Consultant, Bain & Company
David Minoli	B.S. 2016	Chemistry Teacher, Los Angeles
Emily Silva	B.S. 2017	teacher in WorldTeach, Ecuador
Mackenzie Adelberg	B.S. 2017	Unknown

Course Teaching (Rochester)

Chemistry 131 ("General Chemistry"): 2012
Chemistry 211 (“Inorganic Chemistry”): 2002-2004
Chemistry 234 (“Advanced Synthetic Techniques”): 2007-2010
Chemistry 411 (“Advanced Inorganic Chemistry”): 2000-2004
Chemistry 412 (“Inorganic Spectroscopy”): 2002-2004
Chemistry 414 (“Bioinorganic Chemistry”): 2005-2009
Chemistry 415 ("Group Theory"): 2010-2011
Chemistry 421 ("Basic Organometallic Chemistry"): 2011-2012
Chemistry 422 ("Advanced Organometallic Chemistry"): 2012
Chemistry 424 ("Inorganic Spectroscopy"): 2009

Course Teaching (Yale)

Chemistry 457/557 ("Modern Coordination Chemistry"): 2013, 2014
Chemistry 554 ("Bioinorganic Chemistry"): 2015, 2018
Chemistry 161 ("University General Chemistry"): 2015, 2016, 2017, 2018
Chemistry 555 ("Inorganic Mechanisms"): 2016

Other Pedagogy:

- Short course on Organometallic Chemistry (Eastman Kodak Co.): 2002
- created website for sharing group exercises on inorganic chemistry: http://chem.rochester.edu/~plhgrp/iicf/
- invited talk in national symposium for VIPEr (Virtual Inorganic Pedagogical Electronic Resource), April 2008.
- B. A. Reisner, J. L. Stewart, B. S. Williams, L. A. Goj, P. L. Holland, H. J. Eppley, A. R. Johnson, "Virtual Inorganic Pedagogical Electronic Resource Learning Objects in Organometallic Chemistry," *J. Chem. Educ.* **2012**, *89*, 185-187.
- leader for presentation on "Writing Effective Workshop Problems" at Rochester Cluster of Leadership in Education, January 2013.
- National Academies Education Short Course, May 2015.
- led discussion on active learning methods in large classes, Yale Center for Teaching & Learning, April 2016.
- Yale Center for Teaching and Learning Faculty Forum "How Faculty are Using Technology to Meet Pedagogical Goals," October 2017.
- Panelist for "How to Make Your Fellowship Application Stand Out," Graduate Writing Lab at Yale, April 2018.