

Patrick L. Holland

Professor of Chemistry

Department of Chemistry
University of Rochester
Rochester, NY 14627

phone: 585-273-3092
FAX: 585-276-0205
email: holland@chem.rochester.edu
website: <http://chem.rochester.edu/~plhgrp/>

Professional Positions

University of Rochester

Professor of Chemistry (2010-)
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

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

Editorial Board of *Inorganic Chemistry* (2012-)
Editorial Board of *Journal of Biological Inorganic Chemistry* (2009-)
Awards Co-Chair, ACS Inorganic Division (2010-)
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 numerous panels for NIH and NSF grant review

Research Interests

Synthesis, electronic structure, geometry, and mechanisms of transition-metal complexes with three bonds to the metal. Activation of small molecules, particularly dinitrogen. Organometallic and bioinorganic catalysis.

Publications

h-index = 32.

h-index using papers from Rochester = 24.

Journal Publications from Rochester

84. T. M. Figg, P. L. Holland, T. R. Cundari, "Cooperativity Between Low-Valent Iron and Potassium Promoters in Dinitrogen Fixation," submitted.
83. M. M. Rodriguez, B. D. Stubbert, W. W. Brennessel, E. Bill, P. L. Holland, "Synthesis, Structure, and Spectroscopy of an Iron(I)-Sulfide Complex," submitted.
82. M. P. McLaughlin, S. Peña, T. M. Payne, J. Sudhamsu, E. Bill, A. E. Ensign, B. R. Crane, P. L. Holland, "Azurin as a protein scaffold for a low-coordinate non-heme iron site with a small-molecule binding pocket," submitted.
81. 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 Crystallographically Defined, Three-Coordinate Terminal Hydride Complex of Iron(I)," submitted.
80. 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," submitted.
79. K. Grubel, P. L. Holland, "New iron-sulfur clusters help hydrogenases tolerate oxygen," *Angew. Chem. Int. Ed.* **2012**, *51*, in press. (Highlight)
78. 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*, in press. (Chosen as a "Hot Paper")
77. 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**, in press. (Special Issue on Cooperative & Redox Non-Innocent Ligands in Directing Open-Shell Organometallic Reactivity)
76. 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*, in press. (Special Issue on Fluorine in Organometallic Chemistry)
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, "N₂ 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.
62. R. E. Cowley, P. L. Holland, "C-H activation by a terminal imidoiron(III) complex to form a cyclopentadienyliron(II) product," *Inorg. Chim. Acta* **2011**, *369*, 40-44. (Special Issue for Robert G. Bergman)
61. S. S. Rocks, W. W. Brennessel, T. E. Machonkin, P. L. Holland, "Solution and

Structural Characterization of Iron(II) Complexes with Ortho-Halogenated Phenolates: Insights into Potential Substrate Binding Modes in Hydroquinone Dioxygenases," *Inorg. Chem.* **2010**, *49*, 10914-10929.

60. R. E. Cowley, N. J. DeYonker, N. A. Eckert, T. R. Cundari, S. DeBeer, E. Bill, X. Ottenwaelder, C. Flaschenriem, P. L. Holland, "Three-Coordinate Terminal Imidoiron(III) Complexes: Structure, Spectroscopy, and Mechanism of Formation," *Inorg. Chem.* **2010**, *49*, 6172-6187.
59. P. L. Holland, "Metal-Dioxygen and Metal-Dinitrogen Complexes: Where Are The Electrons?" *Dalton Trans.* **2010**, *39*, 5415-5425. (Perspective)
58. T. E. Machonkin, P. L. Holland, K. N. Smith, J. S. Liberman, A. Dinescu, T. R. Cundari, S. S. Rocks, "Determination of the Active Site of *Sphingomonas chlorophenolica* 2,6-dichloro-*p*-hydroquinone dioxygenase (PcpA)," *J. Biol. Inorg. Chem.* **2010**, *15*, 291-301.
57. D. J. Mindiola, P. L. Holland, T. H. Warren, "Complexes of Bulky Beta-Diketimate Ligands: Introduction," *Inorg. Synth.* **2010**, *35*, 1-4.
56. M. S. Varonka, T. H. Warren, T. R. Dugan, R. E. Cowley, P. L. Holland, "Beta-Diketimate Precursors $\text{HL}^{\text{Me,Me}_3}$ and $\text{TIL}^{\text{Me,Me}_3}$," *Inorg. Synth.* **2010**, *35*, 4-8.
55. D. Adhikari, B. L. Tran, F. J. Zuno-Cruz, G. Sanchez Cabrera, D. J. Mindiola, K. P. Chiang, R. E. Cowley, T. R. Dugan, P. L. Holland, "Beta-Diketimate Precursors $\text{L}^{\text{Me,iPr}_2}\text{H}$, $[\text{L}^{\text{Me,iPr}_2}\text{Li}]_x$, and $[\text{L}^{\text{tBu,iPr}_2}\text{K}]_x$," *Inorg. Synth.* **2010**, *35*, 8-13.
54. R. E. Cowley, K. P. Chiang, P. L. Holland, D. Adhikari, F. J. Zuno-Cruz, G. Sanchez Cabrera, D. J. Mindiola, "Beta-Diketimate Precursors $\text{L}^{\text{tBu,iPr}_2}\text{H}$ and $\text{L}^{\text{tBu,iPr}_2}\text{Li}(\text{THF})$," *Inorg. Synth.* **2010**, *35*, 13-19.
53. B. D. Stubbert, P. L. Holland, D. Adhikari, D. J. Mindiola, "Iron 2,4-Bis-(2,6-diisopropylphenylimido)pentyl Chloride Dimer," *Inorg. Synth.* **2010**, *35*, 38-41.
52. K. P. Chiang, P. L. Holland, D. Adhikari, D. J. Mindiola, "Iron 2,2,6-6-Tetramethyl-3,5-bis-(2,6-diisopropylphenylimido)heptyl Chloride," *Inorg. Synth.* **2010**, *35*, 41-43.
51. K. Ding, P. L. Holland, D. Adhikari, D. J. Mindiola, "Cobalt 2,2,6-6-Tetramethyl-3,5-bis-(2,6-diisopropylphenylimido)heptyl Chloride," *Inorg. Synth.* **2010**, *35*, 43-45.
50. M. M. Melzer, E. Kogut, M. S. Varonka, S. Wiese, T. H. Warren, S. Rocks, P. L. Holland, "Beta-Diketimate Supported Nickel(II) and Nickel(I) Complexes of $\text{L}^{\text{Me,Me}_3}$," *Inorg. Synth.* **2010**, *35*, 45-48.
49. T. R. Dugan, P. L. Holland, S. Wiese, T. H. Warren, "Nickel 2,4-Bis-(2,6-diisopropylphenylimido)pentyl Chloride Dimer," *Inorg. Synth.* **2010**, *35*, 48-50.
48. Y. M. Badiei, T. H. Warren, K. P. Chiang, P. L. Holland, "Bis[Copper 2,4-Bis-(2,4,6-trimethylphenylimido)pentyl] Toluene," *Inorg. Synth.* **2010**, *35*, 50-53.
47. P. L. Holland, M. M. Melzer, T. H. Warren, "Copper 2,4-Bis-(2,6-diisopropylphenylimido)pentyl Chloride," *Inorg. Synth.* **2010**, *35*, 54-55.
46. K. Ding, T. R. Dugan, W. W. Brennessel, P. L. Holland, "Synthesis, Properties, and

- Reactivity of Diketiminato-Supported Cobalt Fluoride Complexes," *Organometallics* **2009**, *28*, 6650-6656.
45. K. Ding, F. Zannat, J. C. Morris, W. W. Brennessel, P. L. Holland, "Coordination of *N*-Methylpyrrolidone to Iron(II)," *J. Organomet. Chem.* **2009**, *694*, 4204-4208.
 44. K. Ding, W. W. Brennessel, P. L. Holland, "Three-Coordinate and Four-Coordinate Cobalt Hydride Complexes That React with Dinitrogen," *J. Am. Chem. Soc.* **2009**, *131*, 10804-10805. (featured in Research Highlights, July 31, 2009 issue of *Nature Chemistry*, and in *JACS Select* #9)
 43. T. R. Dugan, P. L. Holland, "New Routes to Low-Coordinate Iron Hydride Complexes: The Binuclear Oxidative Addition of H₂," *J. Organomet. Chem.* **2009**, *694*, 2825-2830. (Special issue on "Organometallics for Energy Conversion")
 42. K. Ding, A. R. Pierpont, W. W. Brennessel, G. Lukat-Rodgers, K. R. Rodgers, T. R. Cundari, P. L. Holland, "Cobalt-Dinitrogen Complexes With Weakened N-N Bonds," *J. Am. Chem. Soc.* **2009**, *131*, 9471-9472.
 41. K. P. Chiang, P. M. Barrett, F. Ding, J. M. Smith, S. Kingsley, W. W. Brennessel, M. M. Clark, R. J. Lachicotte, P. L. Holland, "Ligand Dependence of Binding to Three-Coordinate Fe(II) Complexes," *Inorg. Chem.* **2009**, *48*, 5106-5116.
 40. R. E. Cowley, E. Bill, F. Neese, W. W. Brennessel, P. L. Holland, "Iron(II) Complexes With Redox-Active Tetrazene (RNNNR) Ligands," *Inorg. Chem.* **2009**, *48*, 4828-4836.
 39. A. R. Sadique, W. W. Brennessel, P. L. Holland, "A diketiminato-bound diiron complex with a bridging carbonate ligand," *Acta Cryst. C* **2009**, *65*, m174-m176.
 38. M. M. Clark, W. W. Brennessel, P. L. Holland, "Bis(η^2 -pentamethylcyclopentadienyl)cobalt(II), *Acta Cryst. E* **2009**, *65*, m391.
 37. R. E. Cowley, N. A. Eckert, J. E. Elhaik, P. L. Holland, "Catalytic nitrene transfer from an imidoiron(III) complex to form carbodiimides and isocyanates," *Chem. Commun.* **2009**, 1760-1762.
 36. P. L. Holland, "Nitrogen Fixation," in *McGraw-Hill Yearbook of Science & Technology*, McGraw-Hill, New York, **2009**, pp. 255-256.
 35. S. S. Rocks, W. W. Brennessel, T. E. Machonkin, P. L. Holland, "Solid State and Proton NMR Characterization of an Iron(II) Complex of a Tridentate, Facially Coordinating N,N,O Donor Ligand," *Inorg. Chim. Acta* **2009**, *362*, 1387-1390.
 34. S. Stoian, J. M. Smith, P. L. Holland, E. Münck, E. L. Bominaar, "Mössbauer, EPR, and theoretical study of a high-spin, four-coordinate Fe(II) diketiminato complex," *Inorg. Chem.* **2008**, *47*, 8687-8695.
 33. P. L. Holland, "Electronic Structure and Reactivity of Three-Coordinate Iron Complexes," *Acc. Chem. Res.* **2008**, *41*, 905-914.
 32. Y. Yu, A. R. Sadique, J. M. Smith, T. R. Dugan, R. E. Cowley, W. W. Brennessel, C. J. Flaschenriem, E. Bill, T. R. Cundari, P. L. Holland, "The Reactivity Patterns of Low-Coordinate Iron Hydride Complexes," *J. Am. Chem. Soc.* **2008**, *130*, 6624-6638.

31. R. E. Cowley, J. Elhaik, N. A. Eckert, W. W. Brennessel, E. Bill, P. L. Holland, "A bridging hexazene (RNNNNNR) ligand from reductive coupling of azides," *J. Am. Chem. Soc.* **2008**, *130*, 6074-6075. (featured in Science Concentrates, April 28, 2008 issue of *Chem. Eng. News*)
30. A. R. Sadique, W. W. Brennessel, P. L. Holland, "Reduction of CO₂ to CO using Low-Coordinate Iron: Formation of a Four-Coordinate Iron Dicarbonyl Complex and a Bridging Carbonate Complex," *Inorg. Chem.* **2008**, *47*, 784-786.
29. N. S. Lees, R. L. McNaughton, W. Vargas Gregory, P. L. Holland, B. M. Hoffman, "ENDOR Characterization of a Synthetic Diiron Hydrazido Complex as a Model for Nitrogenase Intermediates," *J. Am. Chem. Soc.* **2008**, *130*, 546-555.
28. A. R. Sadique, E. A. Gregory, W. W. Brennessel, P. L. Holland, "Mechanistic Insight into N=N Cleavage by a Low-Coordinate Iron(II) Hydride Complex," *J. Am. Chem. Soc.* **2007**, *129*, 8112-8121. (Editor's Choice in *Science*, June 22, 2007)
27. J. Vela, L. Zhu, C. J. Flaschenriem, W. W. Brennessel, R. J. Lachicotte, P. L. Holland, "Macrocyclic Binucleating β -Diketiminato Ligands and their Lithium, Aluminum, and Zinc Complexes," *Organometallics* **2007**, *26*, 3416-3423.
26. Y. Yu, W. W. Brennessel, P. L. Holland, "Borane B-C Bond Cleavage by a Low-Coordinate Iron Hydride Complex and N-N Bond Cleavage by the Hydridoborate Product," *Organometallics* **2007**, *26*, 3217-3226.
25. J. Vela, J. Cirera, J. M. Smith, R. J. Lachicotte, C. J. Flaschenriem, S. Alvarez, P. L. Holland, "Quantitative Geometric Descriptions of the Belt Iron Atoms of the Iron-Molybdenum Cofactor of Nitrogenase and Synthetic Iron(II) Model Complexes," *Inorg. Chem.* **2007**, *46*, 60-71.
24. N. A. Eckert, S. Vaddadi, S. Stoian, C. J. Flaschenriem, T. R. Cundari, P. L. Holland, "Coordination Number Dependence of Reactivity in an Imidoiron(III) Complex," *Angew. Chem., Int. Ed. Engl.* **2006**, *45*, 6868-6871.
23. T. J. Hebden, C. J. Flaschenriem, P. L. Holland, "A Dinucleating Ligand Related to the β -Diketiminates," *Dalton Trans.* **2006**, 3855-3857.
22. S. Stoian, J. Vela, J. M. Smith, A. R. Sadique, P. L. Holland, E. Münck, E. L. Bominaar, "Mössbauer and Computational Study of an N₂-Bridged Diiron Diketiminato Complex: Parallel Alignment of the Iron Spins by Direct Antiferromagnetic Exchange with Activated Dinitrogen," *J. Am. Chem. Soc.* **2006**, *128*, 10181-10192.
21. Y. Yu, J. M. Smith, C. J. Flaschenriem, P. L. Holland, "Binding Affinity of Alkynes and Alkenes to Low-Coordinate Iron," *Inorg. Chem.* **2006**, *45*, 5742-5751 (featured on cover of July 24, 2006 issue of *Inorg. Chem.*).
20. J. Vela, S. Vaddadi, S. Kingsley, C. J. Flaschenriem, R. J. Lachicotte, T. R. Cundari, P. L. Holland, "Bidentate Coordination of Pyrazolate in Low-Coordinate Iron(II) and Nickel(II) Complexes," *Angew. Chem., Int. Ed. Engl.* **2006**, *45*, 1607-1611.
19. J. M. Smith, A. R. Sadique, T. R. Cundari, K. R. Rodgers, G. Lukat-Rodgers, R. J. Lachicotte, C. J. Flaschenriem, J. Vela, P. L. Holland, "Studies of Low-Coordinate Iron Dinitrogen Complexes," *J. Am. Chem. Soc.* **2006**, *128*, 756-769.

18. N. A. Eckert, A. Dinescu, T. R. Cundari, P. L. Holland, "A T-Shaped Three-Coordinate Nickel(I) Carbonyl Complex and the Geometric Preferences of Three-Coordinate d^9 Complexes," *Inorg. Chem.* **2005**, *44*, 7702-7704.
17. N. A. Eckert, S. Stoian, J. M. Smith, E. L. Bominaar, E. Münck, P. L. Holland, "Synthesis, Structure, and Spectroscopy of an Oxodiiron(II) Complex," *J. Am. Chem. Soc.* **2005**, *127*, 9344-9345.
16. S. Stoian, Y. Yu, J. M. Smith, P. L. Holland, E. L. Bominaar, E. Münck, "Mössbauer, EPR and Crystallographic Characterization of a High-Spin Fe(I) Diketimate Complex with Orbital Degeneracy," *Inorg. Chem.* **2005**, *44*, 4915-4922.
15. J. Vela, J. M. Smith, Y. Yu, N. A. Ketterer, C. J. Flaschenriem, R. J. Lachicotte, P. L. Holland, "Synthesis and Reactivity of Low-Coordinate Iron(II) Fluoride Complexes and Their Use in the Catalytic Hydrodefluorination of Fluorocarbons," *J. Am. Chem. Soc.* **2005**, *127*, 7857-7870.
14. E. A. Gregory, R. J. Lachicotte, P. L. Holland, "A Cationic Three-Coordinate Iron(II) Complex and the Reaction of β -Diketimate with Ethyl Diazoacetate," *Organometallics* **2005**, *24*, 1803-1805.
13. P. L. Holland, "Low-Coordinate Iron Complexes as Synthetic Models of Nitrogenase," *Can. J. Chem.* **2005**, *83*, 296-301. (Special Issue on "40 Years of Nitrogen Fixation")
12. J. Vela, S. Vaddadi, T. R. Cundari, J. M. Smith, E. A. Gregory, R. J. Lachicotte, C. J. Flaschenriem, P. L. Holland, "Reversible Beta-Hydrogen Elimination of Three-Coordinate Iron(II) Alkyl Complexes: Mechanistic and Thermodynamic Studies," *Organometallics* **2004**, *23*, 5226-5239.
11. N. A. Eckert, J. M. Smith, R. J. Lachicotte, P. L. Holland, "Low-Coordinate Fe(II) Amido Complexes of β -Diketimates: Synthesis, Structure and Reactivity," *Inorg. Chem.* **2004**, *43*, 3306-3321.
10. J. Vela, S. Stoian, C. Flaschenriem, E. Münck, P. L. Holland, "A Sulfido-Bridged Diiron(II) Compound and Its Reactions with Nitrogenase-Relevant Substrates," *J. Am. Chem. Soc.* **2004**, *126*, 4522-4523. (featured in Science Concentrates, April 19, 2004 issue of *Chem. Eng. News*)
9. P. L. Holland, "Nitrogen Fixation," In *Comprehensive Coordination Chemistry 2* (McCleverty, J., Meyer, T. J., Eds.); Vol. 8; Elsevier: Oxford, **2004**, pp. 569-599.
8. J. M. Smith, R. J. Lachicotte, P. L. Holland, "N=N Bond Cleavage by a Low-Coordinate Iron(II) Hydride Complex," *J. Am. Chem. Soc.* **2003**, *125*, 15752-15753.
7. N. A. Eckert, E. M. Bones, R. J. Lachicotte, P. L. Holland, "Nickel Complexes of Bulky β -Diketimate Ligands," *Inorg. Chem.* **2003**, *42*, 1720-1725.
6. P. L. Holland, T. R. Cundari, L. L. Perez, N. A. Eckert, R. J. Lachicotte, "Electronically Unsaturated Three-Coordinate Chloride and Methyl Complexes of Iron, Cobalt, and Nickel," *J. Am. Chem. Soc.* **2002**, *124*, 14416-14424.
5. J. Vela, J. M. Smith, R. J. Lachicotte, P. L. Holland, "Alkyl group isomerisation in three-coordinate iron(II) complexes," *Chem. Commun.* **2002**, 2886-2887.

4. J. M. Smith, R. J. Lachicotte, P. L. Holland, "Three-coordinate, 12-electron organometallic complexes of iron(II) supported by a bulky β -diketiminato ligand: synthesis and insertion of CO to give square pyramidal complexes," *Organometallics* **2002**, *21*, 4808-4814.
3. H. Andres, E. L. Bominaar, J. M. Smith, N. A. Eckert, P. L. Holland, E. Münck, "Planar Three-Coordinate High-Spin Fe(II) Complexes with Large Orbital Angular Moments: Mössbauer, Electron Paramagnetic Resonance, and Electronic Structure Studies," *J. Am. Chem. Soc.* **2002**, *124*, 3012-3025.
2. J. M. Smith, R. J. Lachicotte, K. A. Pittard, T. R. Cundari, G. Lukat-Rodgers, K. R. Rodgers, P. L. Holland, "Stepwise Reduction of Dinitrogen Bond Order by a Low-Coordinate Iron Complex," *J. Am. Chem. Soc.* **2001**, *123*, 9222-9223.
1. J. M. Smith, R. J. Lachicotte, P. L. Holland, "Tuning metal coordination number by ancillary ligand steric effects: synthesis of a three-coordinate iron(II) complex," *Chem. Commun.* **2001**, 1542-1543.

Publications from Minnesota (Postdoctoral)

15. B. A. Jazdzewski, A. M. Reynolds, P. L. Holland, V. G. Young, S. Kaderli, A. D. Zuberbühler, W. B. Tolman, "Copper(I)-phenolate complexes as models of the reduced active site of galactose oxidase: synthesis, characterization, and O₂ reactivity," *J. Biol. Inorg. Chem.* **2003**, *8*, 381-393.
14. D. J. E. Spencer, A. M. Reynolds, P. L. Holland, B. A. Jazdzewski, C. D. Toia, L. Le Pape, S. Yokota, Y. Tachi, S. Itoh, W. B. Tolman, "Copper Chemistry of β -Diketiminato Ligands: Monomer/Dimer Equilibria and a New Class of Bis(μ -oxo)dicopper Compounds," *Inorg. Chem.* **2002**, *41*, 6307-6321.
13. A. Chowdhury, L. A. Peteanu, P. L. Holland, W. B. Tolman, "The Electronic Properties of a Model Active Site for Blue Copper Proteins as Probed by Stark Spectroscopy," *J. Phys. Chem. B* **2002**, *106*, 3007-3012.
12. D. J. E. Spencer, N. W. Aboeella, A. M. Reynolds, P. L. Holland, W. B. Tolman, " β -Diketiminato Ligand Backbone Structural Effects on Cu(I)/O₂ Reactivity: Unique Copper-Superoxo and Bis(μ -oxo) Complexes," *J. Am. Chem. Soc.* **2002**, *124*, 2108-2109.
11. B. A. Jazdzewski, P. L. Holland, M. Pink, V. G. Young, Jr., D. J. E. Spencer, W. B. Tolman, "Three-Coordinate Copper(II)-Phenolate Complexes," *Inorg. Chem.* **2001**, *40*, 6097-6107.
10. D. W. Randall, S. DeBeer, P. L. Holland, B. Hedman, K. O. Hodgson, W. B. Tolman, E. I. Solomon, "Spectroscopic and Electronic Structure Studies of Blue Copper Model Complexes. 2. Comparison of 3- and 4-Coordinate Cu(II) Thiolate Complexes and Fungal Laccase," *J. Am. Chem. Soc.* **2000**, *122*, 11632-11648.
9. E. Meggers, P. L. Holland, W. B. Tolman, F. E. Romesberg, P. G. Schultz, "A Novel Copper-Mediated DNA Base Pair," *J. Am. Chem. Soc.* **2000**, *122*, 10714-10715.
8. B. M. T. Lam, J. A. Halfen, V. G. Young, Jr., J. R. Hagadorn, P. L. Holland, A. Lledós, L. Cucurull-Sánchez, J. J. Novoa, S. Alvarez, W. B. Tolman, "Ligand

- Macrocycle Structural Effects on Copper-Dioxygen Reactivity," *Inorg. Chem.* **2000**, *39*, 4059-4072.
7. P. L. Holland, W. B. Tolman, "A Structural Model of the Type 1 Copper Protein Active Site: N₂S(thiolate)S(thioether) Ligation in a Cu(II) Complex," *J. Am. Chem. Soc.* **2000**, *122*, 6331-6332.
 6. P. L. Holland, C. J. Cramer, E. C. Wilkinson, S. Mahapatra, K. R. Rodgers, S. Itoh, M. Taki, S. Fukuzumi, L. Que, Jr., W. B. Tolman, "Resonance Raman Spectroscopy as a Probe of the Bis(μ -oxo)dicopper Core," *J. Am. Chem. Soc.* **2000**, *122*, 792-802.
 5. S. Itoh, M. Taki, H. Nakao, P. L. Holland, W. B. Tolman, L. Que, Jr., S. Fukuzumi, "Aliphatic Hydroxylation by a Bis(μ -oxo)dicopper Complex," *Angew. Chem. Int. Ed.* **2000**, *39*, 398-400.
 4. P. L. Holland, W. B. Tolman, "Three-Coordinate Cu(II) Complexes: Structural Models of Trigonal-Planar Type 1 Copper Protein Active Sites," *J. Am. Chem. Soc.* **1999**, *121*, 7270-7271.
 3. P. L. Holland, W. B. Tolman, "Dioxygen Activation by Copper Sites: Stability and Reactivity of Peroxo- and Bis(μ -oxo)dicopper Cores," *Coord. Chem. Rev.* **1999**, *190-192*, 855-869.
 2. J. Cahoy, P. L. Holland, W. B. Tolman, "Experimental Studies of the Interconversion of Peroxo- and Bis(μ -oxo)dicopper Complexes," *Inorg. Chem.* **1999**, *38*, 2161-2168.
 1. P. L. Holland, K. R. Rodgers, W. B. Tolman, "Is the Bis(μ -oxo)dicopper Core Capable of Hydroxylating an Arene?" *Angew. Chem. Int. Ed.* **1999**, *38*, 1139-1142.

Publications from Berkeley (Graduate Student)

6. P. L. Holland, R. A. Andersen, R. G. Bergman, "Application of the *E-C* Approach to Understanding the Bond Energies of Late-Metal Complexes: An Alternative to $p\pi/d\pi$ Repulsion," *Comments Inorg. Chem.* **1999**, *21*, 115-129.
5. P. L. Holland, R. A. Andersen, R. G. Bergman, "Cyclopentadienyl and Imide Ligand Transfer From Zirconium to Iridium: Can Early-Metal Imido Compounds Be Used as Imide Transfer Reagents?" *Organometallics* **1998**, *17*, 433-437.
4. J. T. Golden, T. H. Peterson, P. L. Holland, R. G. Bergman, R. A. Andersen, "Adduct Formation and Single and Double Deprotonation of Cp*(PMe₃)Ir(H)₂ with Main Group Metal Alkyls and Aryls: Synthesis and Structure of Three Novel Ir-Al and Ir-Mg Heterobimetallics," *J. Am. Chem. Soc.* **1998**, *120*, 223-224.
3. P. L. Holland, R. A. Andersen, R. G. Bergman, J. Huang, S. P. Nolan, "Monomeric Cyclopentadienylnickel Methoxo and Amido Complexes: Synthesis, Characterization, Reactivity, and Use for Exploring the Relationship Between H-X and M-X Bond Energies," *J. Am. Chem. Soc.* **1997**, *119*, 12800-12814.
2. P. L. Holland, M. E. Smith, R. A. Andersen, R. G. Bergman, "X-ray Crystal Structures of Cp*Ni(PEt₃)X. Understanding Distortions and Trans Influences in Cyclopentadienyl Complexes," *J. Am. Chem. Soc.* **1997**, *119*, 12815-12823.

1. P. L. Holland, R. A. Andersen, R. G. Bergman, "Synthesis, Characterization, and Reactivity of Dimeric Amidonickel Complexes," *J. Am. Chem. Soc.* **1996**, *118*, 1092-1104.

Funding

Current Research Funding

- "Enabling Nitrogen Reduction Catalysis through Surface Immobilization"
United States-Israel Binational Science Foundation, 2009541, \$164,000 total
co-PIs: Chaim Sukenik (Bar Ilan University) and Patrick Holland
10/11-9/15
- "Low-Coordinate Synthetic Models for Nitrogenase Activity"
National Institutes of Health, R01 GM065313, \$1,211,567
PI: Patrick Holland
6/10-4/14
- "RUI: The Sources of Substrate Specificity in Hydroquinone Dioxygenases"
National Science Foundation, CHE-0951999, \$25,778 subcontract
PI: Timothy Machonkin
4/10-4/13
- "Nitrene Transfer Reactions with Iron Complexes"
National Science Foundation, CHE-0911314, \$430,000
PI: Patrick Holland, co-PI: Brian Edelbach (Monroe Community College)
8/09-7/12
- "High-Spin Cobalt Hydrides for Catalysis"
Department of Energy, DE-FG-02-09ER16089, \$670,000
PI: Patrick Holland
9/09-8/12
- "Modular Nanoscale and Biomimetic Assemblies for Photocatalytic Hydrogen Generation"
Department of Energy, DE-FG02-09ER16121, \$1,680,000
co-PIs: Kara Bren, Richard Eisenberg, Patrick Holland, Todd Krauss
9/09-9/12

Past Research Funding

- "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
- "Sloan Research Fellowship"

- A. P. Sloan Foundation, BR-4293, \$40,000
9/03-8/06
- “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

- “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-Mississauga (Mississauga, 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. Catharines, 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
Humboldt University - Berlin (Berlin, Germany) - May 2012
Friedrich Alexander University - Erlangen-Nürnberg - June 2012

Lectures at Meetings/Conferences (Invited)

Bergman Symposium (Berkeley, CA) – June 2002
Nitrogen Fixation Gordon Conference (New London, NH) – June 2002
International Conference on Coordination 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
 Pacificchem (Honolulu, HI) - December 2010
 Metal Hydrides Workshop (Oxford, England) - March 2012
 Iron Symposium (Regensburg, Germany) - June 2012
 Inorganic Chemistry Gordon Conference (Biddeford, ME) - June 2012

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

Research Trainees

Doctoral

| Name | Degree/Year | Most Recent Known Position |
|---------------|--------------------|---|
| Nathan Eckert | Ph.D. 2005 | Research Chemist, Shepherd Chemical Co., Cincinnati, OH |
| Javier Vela | Ph.D. 2005 | Assistant Professor, Iowa State U. |
| Ying Yu | Ph.D. 2007 | Master's program in Information Systems |
| Keying Ding | Ph.D. 2009 | Postdoctoral, U. Minnesota (W. Tolman & M. Hillmyer) |
| Sara Rocks | Ph.D. 2009 | Research Chemist, FLSmidth, Salt Lake City, UT |

| | | |
|--------------------------|-----------------------|--|
| Matthew McLaughlin | Ph.D. 2011 | Postdoctoral, U. North Carolina (M. Gagné) |
| Ryan Cowley | Ph.D. 2011 | Postdoctoral, Stanford U. (E. Solomon) |
| Karen Chiang | Ph.D. 2011 | Seeking position in science outreach |
| Thomas Dugan | Ph.D. 2012 | Postdoctoral, Rutgers U. (A. Goldman) |
| Meghan (Clark) Rodriguez | current Ph.D. student | Expected completion 2012 |
| Sarina Bellows | current Ph.D. student | Expected completion 2012-13 |
| Zhiji Han | current Ph.D. student | Expected completion 2013-14 |
| Chi Chen | current Ph.D. student | Expected completion 2014-15 |
| Malik Al-Afyouni | current Ph.D. student | Expected completion 2015-16 |
| Megan Reesbeck | current Ph.D. student | Expected completion 2015-16 |
| Jared Kneebone | current Ph.D. student | Expected completion 2015-16 |
| Nicholas Arnet | current Ph.D. student | Expected completion 2015-16 |

Master's

| Name | Degree/Year | Most Recent Known Position |
|-------------------|-------------|---|
| Elizabeth Gregory | M.S. 2004 | Laboratory Manager, SUNY Brockport |
| Travis Hebden | M.S. 2005 | Postdoctoral, MIT (R. Schrock) |
| Liwei Zhu | M.S. 2007 | Unknown |
| Tawana Robinson | M.S. 2008 | Baylor Genome Sequencing Center, Waco, TX |
| Wenwen Yao | M.S. 2011 | Seeking employment |

Postdoctoral

| Name | Time at Rochester | Most Recent Known Position |
|----------------------|-------------------|--|
| Jeremy Smith | 2000-2003 | Associate Professor, New Mexico St. 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 | Postdoctoral, Caltech (H. Gray) |
| Benjamin Dible | 2006-2009, 2010 | Postdoctoral, U. Pennsylvania (A. Smith) |
| Aydin Kavara | 2010-2011 | Lecturer, Grand Valley State U., Allendale, MI |
| P. M. Gurubasavaraj | 2010-2011 | seeking employment in India |
| William McNamara | 2010- | currently in group |
| Katarzyna Grubel | 2011- | currently in group |

Undergraduate Theses

| Name | Degree/Year | Most Recent Known Position |
|-------------------|--------------------|---|
| Emily Bones | B.S. 2001 | Teacher, St. Johns College High School, Washington, DC |
| Lanyn Perez | B.S. 2002 | Graduate student, U. Maryland (Biology Dept.) |
| Nicole Ketterer | B.S. 2003 | Chemist, Chevron, Richmond, CA |
| Travis Hebden | B.S. 2004 | Postdoctoral, MIT (R. Schrock) |
| Benjamin Gilston | B.S. 2005 | Graduate student, Northwestern Univ. (Chemistry Dept., T. O'Halloran) |
| Pamela Barrett | B.S. 2006 | Graduate student, U. Washington (Oceanography Dept.) |
| Amanda Mack | B.S. 2008 | Teaching Fellow, Phillips Academy, Andover, MA |
| Matthew Golder | B.S. 2010 | Graduate student, Boston U. (Chemistry Dept., R. Jasti) |
| Ethan Kaplan | B.A. 2010 | Internship, Hebrew U., Jerusalem |
| Jonathan Goldberg | Expected 2012 | current student |
| Peter Thayer | Expected 2013 | current student |

Course Teaching & Pedagogy

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-present

Chemistry 424 ("Inorganic Spectroscopy"): 2009-present

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 VIPER Symposium, April 2008