

# Robert C. Scarrow - *Curriculum Vitae*

Chair and Professor of Chemistry  
Haverford College  
Haverford, PA 19041

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## Professional Preparation

Oberlin College	Chemistry major (highest honors) A. B., 1980
University of California, Berkeley	Inorganic Chemistry, Ph. D., 1985 advisor Kenneth N. Raymond
University of Minnesota	Postdoctoral Associate 1985 – 1988 of Lawrence Que, Jr.

## Professional Appointments

2002 - Professor of Chemistry, Haverford College

1995 - 2002 Associate Professor of Chemistry, Haverford College.

1988 - 1995 Assistant Professor of Chemistry, Haverford College.

1997&2001 Visiting Scientist (one month each year) at Fox Chase Cancer Center, Philadelphia, working in laboratory of Dr. Eileen Jaffe.

1995 - 1996 Visiting Scientist in the Department of Chemistry, University of California, Berkeley, working in laboratory of Dr. Judith Klinman.

1985 - 1988 National Institutes of Health (1985) and American Cancer Society (1986-1988) Postdoctoral Fellow with Prof. Lawrence Que, Jr., Department of Chemistry, University of Minnesota.

1980 - 1983 National Science Foundation Graduate Fellow at the University of California, Berkeley.

## Current Research: Structure and reactivity of metalloprotein active sites.

Synthetic chemical models of the role of metal ions in the oxygenation and hydrolytic reactions catalyzed by metalloenzymes. Role of hydrogen-bonds in modulating reactivity of transition metal coordination complexes. Coordination chemistry of ligands containing guanidine and guanylurea functional groups.

**Courses taught at Haverford College:**

- Chem 100 and/or 101: General Chemistry (most years, 1989 - 2010)
- Chem 111: Chemical Structure and Bonding (2010; part of a new sequence replacing traditional General and Organic Chemistry courses).
- Chem 301 and/or 302: Laboratory in Chemical Structure and Reactivity (about every other year)
- Chem 312: Laboratory in Nuclear Magnetic Resonance Spectroscopy (2006–08)
- Chem 320: Concepts in Inorganic Chemistry (about every other year)
- Chem 351: Bioinorganic Chemistry (almost every year)
- Chem 352: Topics in Biophysical Chemistry (1993, 1996, 2000, 2001, 2004)
- Chem 358: Topics in Environmental Chemistry (2008, 2012)
- Chem 365: Research in Bioinorganic Chemistry (tutorial) (every year).
- ENVS 397: Senior Seminar in Environmental Studies (2012)
- Enzyme Reaction Mechanisms (1993 - 1997)

**Administrative Responsibilities at Haverford College**

- Chair, Department of Chemistry (2000 – 02, 2013 – 14)
- Director, Koshland Integrated Natural Science Center, 2010 – 13
- Chair, Tri-college (Swarthmore, Bryn Mawr, Haverford) Environmental Studies Working Group, 2010 – 11.
- Co-chair, Haverford College Environmental Studies Working Group, 2009 – 10.
- Chair, Institutional Review Board for Human Subject Research, 2004 – 10.
- Elected to Academic Council (tenure and promotions committee), 2005 – 08.
- Chair, ad hoc committees for hiring a tenure-track Assistant Professor of Biology (three searches between 1998 and 2004)
- Representative to Center for Environmental Deans and Directors (CEDD), a national organization promoting environmental education (2008 – 11)
- Coordinator for Concentrations in Biochemistry and Biophysics (1994 – 95, 1996 – 97, 2006 – 08, 2009 – 10).
- Webmaster for departmental web site (<http://www.haverford.edu/chemistry>), 1998 – 2014.

### Service to the Wider Scholarly Community

Reviewer (of typically one or more articles per year) for each of the following journals: *Inorganic Chemistry*, *Journal of the American Chemical Society*, *Biochemistry* and *Journal of Biological Inorganic Chemistry*.

Member of American Chemical Society (ACS) and Society for Biological Inorganic Chemistry (SBIC).

Chemistry Department reviewer for Dickinson (2001) and Gettysburg (2003) Colleges and for Santa Clara University (2014).

Member of Proposal Review Panels:

- National Synchrotron Light Source Spectroscopy Proposal Study Panel (2000-2002).
- NSF Graduate Fellowship program (1998 - 2000)
- NIH Academic Research Enhancement Awards (1995)
- NSF Research Experiences for Undergraduates (REU) program (1993)

Ad hoc proposal reviewer for National Science Foundation, Research Corporation, Petroleum Research Fund and other funding agencies.

Member of doctoral thesis committee for inorganic chemistry student at U. Delaware (2012 – 2015).

### Individual Research Grants

National Synchrotron Light Source (U.S. Department of Energy): General User beam time grants #96-X-1246, 5125, 4741, 4340 and 4294: “X-ray Absorption Spectroscopy of Catalytic Metal Centers in Novel Porous Materials”, “EXAFS Studies of Manganese Lipoxygenase and Related Enzymes”, “XAS Studies of Porphobilinogen Synthase and Neurocuprein”, and “XAS of Metalloprotein Model Systems that Bind and Activate Dioxygen and/or Nitric Oxide.” 78 days of X-ray beam time, 2000 - 2006.

Andrew W. Mellon Foundation: New Directions Fellowship for Teacher-Scholars. “Change in research and teaching toward synthetic and physical inorganic coordination chemistry.” 2002-2003. Sabbatical salary support (1 sem.) + \$5,000.

Anonymous foundation grant to Haverford College: “Interdisciplinary Studies of Structure and Reactivity of Proteins.” 1997 - 1998. \$95,000.

National Synchrotron Light Source (U.S. Department of Energy): General User beam time grants #96-X-1246, #3046 and #3412: “X-ray Absorption Spectroscopy of Porphobilinogen Synthase, Neurocuprein and Lipoxygenase”; “X-ray Absorption Spectroscopy of Nitrile Hydratase and Inorganic Model Complexes” and “X-ray

Absorption Spectroscopy of Metallo-imprinted Polymer Hosts”. 66 days of X-ray beam time, 1992 - 1999.

National Science Foundation: Research Opportunity Award, as extension to National Science Foundation Grant DMB89-11632 to Dr. Judith Klinman, University of California, Berkeley. 1995 - 1996. \$15,000. (Support for sabbatical leave).

National Institutes of Health: Academic Research Enhancement Award, grant 1R15GM51045-01. “Structure and Reactivity of Iron(II) in Lipxygenase.” 1994 - 1998. \$103,000.

### **Collaborative Research Grants**

“Acquisition of an LC/MS System to Support the Integrated Teaching and Research Program at Haverford College.” NSF grant # 0420620, \$235,953, 2004 – 2005 (co-PI with four other faculty members from Chemistry Department).

National Institutes of Health (subcontract from University of Kansas): grant 1 RO1 GM 58680-01 (P.I.: Andrew S. Borovik). “Catalytic Metallo-Biomimetic Sites in Porous Hosts.” Subcontract is for X-ray spectroscopy. 1999 - 2003. \$41,946 (amount of sub-contract).

“Interdisciplinary Studies of Structure and Reactivity of Proteins”. Grant from Anonymous Foundation to Haverford College. 1997- 1998. \$200,000. (co-PI with Rob Fairman of Biology Department).

### **Grants to Support Student Learning and Scholarship**

Member of writing and grant administration committees for Howard Hughes Medical Institute’s Undergraduate Biological Sciences Education Program. 2000 – 04. \$1,700,000.

Lead proposal writer and faculty contact for the following grants to Haverford College to support student research and scholarship:

- Arnold and Mabel Beckman Foundation: Beckman Scholars program at Haverford College. 1999 – 2001: \$52,800 and 2005 – 08: \$76,000.
- Merck Foundation: Merck/AAAS Undergraduate Science Research Program. 1996 – 99. \$60,000.
- Merck Foundation: Merck/UNCF Undergraduate Research Science Scholarship Award. 2001 - 02. \$25,000.

National Science Foundation, Division of Undergraduate Education, grant 8951132. "Modern Electrochemistry Instrumentation for an Undergraduate Laboratory Course." 1989 - 1991. \$15,810.

### **Refereed Scientific Publications**

(Haverford College undergraduates are underlined)

1. "Trigonal Bi- and Monopyramidal Cobalt(II) Complexes of a Novel Guanidine-Based Tripodal Ligand." Searls, C. E.; Kleespies, S. T.; Eppright, M. L.; Schwartz, S. C.; Yap, G. P. A.; Scarrow, R. C. *Inorg. Chem.*, **2010**, *49*, 11261–11263.
2. "Identification of the Dinuclear and Tetranuclear Air-Oxidized Products Derived from Labile Phenolate-Bridged Dimanganese(II) Pyridyl-Chelate Compounds." Larsen, F. B.; Boisen, A.; Berry, K. J.; Moubaraki, B.; Murray, K. S.; McKee, V.; Scarrow, R. C.; McKenzie, C. J. *Eur. J. Inorg. Chem.* **2006**, *2006*, 3841–3852.
3. "Development of porous materials for heterogeneous catalysis: kinetic resolution of epoxides." Welbes, L. L.; Scarrow, R. C.; Borovik, A. S. *Chem. Commun.*, **2004**, 2544-2545.
4. "How does cyanide inhibit superoxide reductase? Insight from synthetic Fe<sup>III</sup>N<sub>4</sub>S model complexes." Shearer, J.; Fitch, S. B.; Kaminsky, W.; Benedict, J.; Scarrow, R. C.; Kovacs, J. A. *Proc. Natl. Acad. Sci. U.S.A.* **2003**, *100*, 3671-3676.
5. "A dihydroxo-bridged Fe(II)-Fe(III) complex: A new member of the diiron diamond core family." Egdal, R. K.; Hazell, A.; Larsen, F. B.; McKenzie, C. J.; Scarrow, R. C. *J. Am. Chem. Soc.* **2003**, *125*, 32-33.
6. "Synthetic Models For the Cysteinate–Ligated Non–Heme Iron Enzyme Superoxide Reductase: Observation and Structural Characterization by XAS of an Fe<sup>III</sup>-OOH Intermediate." Shearer, J.; Scarrow, R. C.; Kovacs, J. A. *J. Am. Chem. Soc.* **2002**, *124*, 11709-11717.
7. "The First Example of a Nitrile Hydratase Model Complex that Reversibly Binds Nitriles." Shearer, J.; Jackson, H. L.; Schweitzer, D.; Rittenberg, D. K.; Leavy, T. M.; Kaminsky, W.; Scarrow, R. C.; Kovacs, J. A. *J. Am. Chem. Soc.* **2002**, *124*, 11417-11428.
8. "Probing the Structure of Immobilized Metal Sites in Porous Organic Hosts by X-ray Absorption Spectroscopy." Padden, K. M.; Krebs, J. F.; Trafford, K. T., Yap, G. P. A.; Rheingold, A. H.; Borovik, A. S.; Scarrow, R. C. *Chem. Mater.* **2001**, *13*, 4305-4313.
9. "Immobilized Metal Complexes in Porous Organic Hosts: Development of a Material for the Selective and Reversible Binding of Nitric Oxide." Padden, K.

- M.; Krebs, J. F.; MacBeth, C. E.; Scarrow, R. C.; Borovik, A. S. *J. Am. Chem. Soc.* **2001**, *123*, 1072-1079.
10. "Porphobilinogen synthase from pea: expression from an artificial gene, kinetic characterization, and novel implications for subunit interactions." Kervinen, J.; Dunbrack, R. L., Jr.; Litwin, S.; Martins, J.; Scarrow, R. C.; Volin, M.; Yeung, A. T.; Yoon, E.; Jaffe, E. K. *Biochemistry* **2000**, *39*, 9018-9029.
  11. "Protonation of porphyrin in iron-free cytochrome c: Identification of monocation free base porphyrin, a charge analogue of ferric heme." Zentko, S.; Scarrow, R. C.; Wright, W. W.; Vanderkooi, J. M. *Biospectroscopy* **1999**, *5*, 141-150.
  12. "X-ray Spectroscopy of Nitric Oxide Binding to Iron in Inactive Nitrile Hydratase and a Synthetic Model Compound." Scarrow, R. C.; Strickler, B. S.; Ellison, J. J.; Shoner, S. C.; Kovacs, J. A.; Cummings, J. G.; Nelson, M. J. *J. Am. Chem. Soc.* **1998**, *120*, 9237-9245.
  13. "Nitrile Hydratase from *Rhodococcus rhodochromus* J1 Contains a Non-Corrin Cobalt Ion with Two Sulfur Ligands." Brennan, B. A.; Alms, G.; Nelson, M. J.; Durney, L. T.; Scarrow, R. C. *J. Am. Chem. Soc.* **1996**, *115*, 9194-9195.
  14. "X-ray Spectroscopy of Nitrile Hydratase at pH 7 and 9." Scarrow, R. C.; Brennan, B. A.; Cummings, J. G.; Jin, H.; Duong, D. J.; Kindt, J. T.; Nelson, M. J. *Biochemistry* **1996**, *35*, 10078-10088.
  15. "Circular Dichroism and X-ray Spectroscopies of *Azotobacter vinelandii* Nitrogenase Iron Protein: MgATP and MgADP Induced Protein Conformational Changes Affecting the [4Fe-4S] Cluster and Characterization of a [2Fe-2S] Form." Seefeldt, L. C.; Ryle, M. J.; Lanzilotta, W. N.; Scarrow, R. C.; Jensen, G. M. *J. Biol. Chem.* **1996**, *271*, 1551-1557.
  16. "Structure and Kinetics of Formation of Catechol Complexes of Ferric Soybean Lipoxygenase-1." Nelson, M. J.; Brennan, B. A.; Chase, D. B.; Cowling, R. A.; Grove, G. N.; Scarrow, R. C. *Biochemistry* **1995**, *34*, 15219-15229.
  17. "X-ray Spectroscopy of the Iron Site in Soybean Lipoxygenase-1: Changes in Coordination upon Oxidation or Addition of Methanol." Scarrow, R. C.; Trimitsis, M. G.; Buck, C. P.; Grove, G. N.; Cowling, R. A.; Nelson, M. J. *Biochemistry* **1994**, *33*, 15023-15035.
  18. "EXAFS studies of uteroferrin and its anion complexes." True, A. E.; Scarrow, R. C.; Randall, C. R.; Holz, R. C.; Que, L., Jr. *J. Am. Chem. Soc.* **1993**, *115*, 4246-4255.
  19. "A novel iron-sulfur center in nitrile hydratase from *Brevibacterium* sp." Nelson, M. J.; Jin, H.; Turner, I. M., Jr.; Grove, G.; Scarrow, R. C.; Brennan, B. A.; Que, L., Jr. *J. Am. Chem. Soc.* **1991**, *113*, 7072-7073.

20. "Iron(III) coordination chemistry of linear dihydroxyserine compounds derived from enterobactin." Scarrow, R. C.; Ecker, D. J.; Ng, C.; Liu, S.; Raymond, K. N. *Inorg. Chem.* **1991**, *30*, 900-906.
21. "A nuclear magnetic resonance study of ligands coordinated to iron in reduced uteroferrin and several of its oxoanion complexes." Scarrow, R. C.; Pyrz, J. W.; Que, L., Jr. *J. Am. Chem. Soc.* **1990**, *112*, 657-665.
22. "X-ray absorption spectroscopic studies of the sulfide complexes of hemerythrin." Maroney, M. J.; Scarrow, R. C.; Que, L., Jr.; Roe, A. L.; Lukat, G. S.; Kurtz, D. M., Jr. *Inorg. Chem.* **1989**, *28*, 1342-1348.
23. "Active sites of binuclear iron-oxo proteins." Que, L., Jr.; Scarrow, R. C. in "Metal Clusters in Proteins"; L. Que, Jr., Ed. **1988**; Vol. 372; pp 152-178.
24. "Synthesis of N-alkyl-3-hydroxy-2(1H)-pyridinones and coordination complexes with iron(III)." Scarrow, R. C.; Raymond, K. N. *Inorg. Chem.* **1988**, *27*, 4140-4149.
25. "Ferric ion sequestering agents. 16. Two dihydroxamic acid derivatives of EDTA and DTPA." Turowski, P. T.; Rodgers, S. J.; Scarrow, R. C.; Raymond, K. N. *Inorg. Chem.* **1988**, *27*, 474-481.
26. "Preparation of hydroxypyridonates as chelating agents for iron and their pharmacological use." Raymond, K. N.; Scarrow, R. C.; White, D. L. **1 Sep 1987**, 55 pp. Avail. NTIS Order No. PAT-APPL-6-796815.
27. "EXAFS studies of binuclear iron proteins: hemerythrin and ribonucleotide reductase." Scarrow, R. C.; Maroney, M. J.; Palmer, S. M.; Que, L., Jr.; Roe, A. L.; Salowe, S. P.; Stubbe, J. *J. Am. Chem. Soc.* **1987**, *109*, 7857-7864.
28. "Probing coordination environments of binuclear iron proteins such as hemerythrin and ribonucleotide reductase by EXAFS spectroscopy." Scarrow, R. C.; Que, L., Jr. *Recl. Trav. Chim. Pays Bas* **1987**, *106*, 254.
29. "EXAFS studies of the B2 subunit of the ribonucleotide reductase from E. coli." Scarrow, R. C.; Maroney, M. J.; Palmer, S. M.; Que, L., Jr.; Salowe, S. P.; Stubbe, J. *J. Am. Chem. Soc.* **1986**, *108*, 6832-6834.
30. "Ferric ion sequestering agents. 14. 1-Hydroxy-2(1H)-pyridinone complexes: properties and structure of a novel Fe-Fe dimer." Scarrow, R. C.; White, D. L.; Raymond, K. N. *J. Am. Chem. Soc.* **1985**, *107*, 6540-6546.
31. "Ferric ion sequestering agents. 13. Synthesis, structures, and thermodynamics of complexation of Co(III) and Fe(III) tris complexes of several chelating hydroxypyridinones." Scarrow, R. C.; Riley, P. E.; Abu-Dari, K.; White, D. L.; Raymond, K. N. *Inorg. Chem.* **1985**, *24*, 954-967.

32. "sym-Triphenylcyclopropenylium hexabromotellurate (IV), (C<sub>21</sub>H<sub>15</sub>)<sub>2</sub>[TeBr<sub>6</sub>]." Borgias, B. A.; Scarrow, R. C.; Seidler, M. D.; Weiner, W. P. *Acta Crystallogr., Sect. C* **1985**, *41*, 476-479.

### **Other noteworthy activities at Haverford College**

- Participant in NSF-sponsored Math Science Partnership of Greater Philadelphia (2004 - 07); received funding for developing and introducing curricular innovations to Chemistry 100/101 (General Chemistry).
- Participant in HHMI-supported Faculty Development Courses in Bioinformatics (2000 - 02) and Statistics in the Sciences (2004 - 05).
- Worked with departmental colleagues to design new teaching and research laboratory space in the Koshland Integrated Natural Sciences Center, and as department chair coordinated the move to new facilities in the summer of 2001.

### **Undergraduate students mentored since class of 1995**

(and subsequent career paths)

1995-2013: 35 students, 25 of whom have pursued graduate study: 11 to Ph.D. or M.S. in Chemistry or Biochemistry, 3 to Engineering, 1 to Philosophy of Science, 8 to M.D. programs, 5 to other health graduate programs, 2 to J.D. (law) programs.

2014 - Toan Nguyen (resident advisor, NYU Abu Dhabi program)  
Dedo Okyere (M.P.H. program at U. Texas, Houston)

2013 - Jolie Krooks (M.D. program, Florida Atlantic U.)  
Sumin Park (M.D. program, Quinnipiac U.)

2012 – Jeffrey Schneider (M.D./Ph.D. program, New York U.)  
Kevin D'Aquilla (Res. Tech., U. of Pennsylvania)

2011 - Sarina Schwartz (M.S., Chemistry, New York U.; biotech industry)  
Kayleigh Herrick-Reynolds (Res. Asst., Memorial Sloan-Kettering C. C.)  
Jonathan Witt (Ph. D. program, Chemistry, Vanderbilt U.)  
Andrew Mumma (unknown)

2010 – Cassandra Searls (advertising copywriter)

2008 – Scott Kleespies (Ph. D. program, Chemistry, U. Minnesota)  
Jeffrey Suell (teaching science at private high school)  
Kris Brower (software developer)

2007 – Ike Nwaneshiudu (Ph.D., Chem. Engineering, U. Washington)  
Atum Buo (graduate program in Molecular Medicine, U. MD, Baltimore)



- Matthew Eppright (D.D.S., New York U.)  
 Tim Arling (M.D., U. Maryland)
- 2006 – Joshua Mertz (Ph.D., Chemistry, Northwestern U.)  
 Lauren Monhait (V.M.D., Tufts)  
 Sachiko Yoneyama (M.P.H., U. Michigan)
- 2005 – Lisa Paschall [Ammirati] (M.A., Philosophy of Science, U. Cal. San Diego;  
 high school teaching)  
 Sarah Riehl (M.D., Wayne State U)
- 2004 – Jonathan Hull (Ph.D., Chemistry, Yale; now at Brookhaven Nat'l. Lab.)  
 Anne Zorn (J. D., Minnesota; Associate at Faegre and Benson, LLP)
- 2002 – Tanya Leavy (Ph.D., Chemistry, U. Cal. Berkeley; Scientific Advisor  
 Darby & Darby [intellectual law firm]),  
 Nicolle Ginsberg [Block] (M.D. & resident in family med., U. N. Carolina)  
 Bryce Dickinson (Ph.D., Civil and Environ. Eng., Duke U.)
- 2001 – Brian Kim (M.D., U. Washington; resident in dermatology, U. Penn.)
- 1999 – Matthew Sazinsky (Ph.D., Chemistry, M.I.T.; Asst. Prof. Pomona C.)  
 Jessica Shapiro[-Ebert] (Ph. D., Biochemistry, Stanford)
- 1998 – Katharine Trafford (M.Chem.E., U. Penn.; British Petroleum)  
 David Levine (M.S., Biochemistry, Washington U.; J.D., New York U.;  
 now Associate with Paul, Weiss, Rifkind, Wharton & Garrison LLP)  
 Brenda Fishman (Bryn Mawr) (M.D., U. Colorado)
- 1997 - Brent Strickler (Ph.D., Chemistry, Illinois; Scientist, MZA Associates)
- 1995 - Reza Ghiladi (Ph.D., Chemistry, Johns Hopkins U.; Asst. Prof. NCSU)  
 Lewellyn Durney (information specialist)]

### **Student Presentations since 1999** (by mentored students)

(Haverford College undergraduates are underlined; \* = presenting author)

1. J. A. Krooks,\* J. A. Schneider, G. P. A. Yap, R. C. Scarrow “Isothiocyanato Co(II) and Cu(II) complexes of a four coordinate tripodal ligand (FCTL) with a conformable binding pocket.” Poster presentation *244<sup>th</sup> National Meeting of the American Chemical Society*, Philadelphia, PA, August 22, 2012.
2. K. T. D'Aquilla,\* K. M. Herrick-Reynolds, G. P. Yap, R. C. Scarrow “Structural comparisons of DIG<sub>2</sub>tren and DIG<sub>3</sub>tren complexes with nickel(II).” Poster presentation *243<sup>rd</sup> National Meeting of the American Chemical Society*, San Diego, CA, March 25, 2012.
3. J. A. Schneider,\* S. C. Schwartz, G. P. Yap, R. C. Scarrow “Anion binding in cobalt complexes with a tripodal, triguanidine ligand.” Poster presentation *243<sup>rd</sup>*

*National Meeting of the American Chemical Society*, San Diego, CA, March 25, 2012.

4. K. A. A. Clark,\* R. C. Scarrow. “Guanylurea Sulfate complex with copper(II).” Poster presentation *238<sup>th</sup> National Meeting of the American Chemical Society*, Philadelphia, August 2008.
5. S. T. Kleespies,\* R. C. Scarrow. “Synthesis and Metal-Coordination of a Tripodal Guanidine Ligand.” Poster presentation *238<sup>th</sup> National Meeting of the American Chemical Society*, Philadelphia, August 2008.
6. K. Clark,\*, R. C. Scarrow. “Cimetidine, Guanylurea Sulfate, and Cyanoguanidine Complexes with Several Transition Metals.” Poster presentation *Fourth Annual Undergraduate Science Research Symposium*, Ursinus College, November 2007.
7. B. W. Dickinson,\* C. J. McKenzie, R. C. Scarrow. “The structure and reactivity of Lipoxygenase reactive site models.” Poster presentation *223<sup>rd</sup> National Meeting of the American Chemical Society*, Orlando, April 2002.
8. T. M. Leavy,\* R. C. Scarrow. “Exafs studies to elucidate the dioxygen binding properties of Co(II) complexes.” Poster presentation *223<sup>rd</sup> National Meeting of the American Chemical Society*, Orlando, April 2002.
9. N. Ginsberg\*, R. C. Scarrow, E. K. Jaffe. X-ray absorption studies of zinc-binding by porphobilinogen synthase. Poster presentation *223<sup>rd</sup> National Meeting of the American Chemical Society*, Orlando, April 2002.
10. B. Kim\*, R. C. Scarrow. “Lipoxygenase Inhibition By Hydroxypyridinone Fe(III) Chelators.” Oral presentation. *National Conference on Undergraduate Research*, Lexington, KY, March 2001.
11. M. H. Sazinsky\*, J. Ehrenfeld, E. K. Jaffe, and R. C. Scarrow\*. “The Determination of Zn(II) Ligation in the Active Site of Mammalian Porphobilinogen Synthase by X-ray Absorption Spectroscopy.” Poster presentation. *Enzyme Mechanisms Conference*. Napa, California. January 1999.

### **Conference Presentations since 1999**

(Haverford College undergraduates are underlined; \* = presenting author)

1. R. C. Scarrow\*, J. A. Schneider, Sarina C. Schwartz, Sumin Park, T. M. Nguyen “Anion binding by cobalt complexes of an H-bond donor triguanidine ligand”. Oral presentation, 250th American Chemical Society National Meeting, Boston, Massachusetts, August 2015.
2. R. C. Scarrow\*, S. C. Schwartz, J. A. Schneider, T. Nguyen, S. D. Pineda, J. A. Yellets “Temperature-Dependent Binding to a Cobalt Complex of a Tripodal,

- Triguanidine Ligand” Poster presented at Gordon Research Conference on Metals in Biology, Ventura, CA, January 2015.
3. R. C. Scarrow,\* S. C. Schwartz, J. A. Schneider, S. Park “Solvent-Dependent Anion-Binding to a Metal Complex of a Tripodal, Triguanidine Ligand.” Poster presented at Gordon Research Conference on Metals in Biology, Ventura, CA, January 2013.
  4. R. C. Scarrow\*, K. M. Herrick-Reynolds, S. C. Schwartz, A. D. Mumma, J. A. Schneider “Coordination complexes of a tripodal ligand with hydrogen-bonding guanidine groups.” Talk presented at the *243<sup>rd</sup> National Meeting of the American Chemical Society*, San Diego, CA, March 26, 2012.
  5. R. C. Scarrow\*, S. A. Schwartz, K. Herrick-Reynolds, A. Mumma, M. Kist “Complexes of a Tri-Guanidine Ligand that offers Hydrogen Bonds in the Second Coordination Sphere - or Not.” Poster presented at Gordon Research Conference on Metals in Biology, Ventura, CA, January 2011.
  6. R. C. Scarrow\*, K. A. A. Clark “Coordination complexes of guanylurea ligands.” Poster presented at Gordon Research Conference in Environmental Bioinorganic Chemistry, New Hampshire, July 2008, and at Gordon Research Conference on Metals in Biology, January 2009.
  7. Robert C. Scarrow, Scott T. Kleespies, Katherine A. A. Clark, Jeffrey V. Suell, Matthew L. Eppright, A. S. Borovik, and Douglas R. Powell “Hydrogen-bonding in coordination complexes with ureato and guanidine groups.” Oral presentation at American Chemical Society National Meeting, New Orleans, April 2008.
  8. Robert C. Scarrow\*, Scott T. Kleespies, Katherine A. A. Clark, Jeffrey V. Suell, Matthew L. Eppright “Hydrogen-bonding possibilities for ligands coordinating through neutral guanidine groups.” Poster presented at Gordon Research Conference on Metals in Biology, February 2008.
  9. R. C. Scarrow\*, K. A. A. Clark, Kleespies, S. T., M. L. Eppright, L. E. Monhait, S. B. Riehl, “New Multidentate Ligands with Guanidinium Groups.” Poster presented at Gordon Research Conference in Inorganic Chemistry, Newport, Rhode Island, July 2007.
  10. R. C. Scarrow\*, Matthew Eppright, Candice Joe, Zhao Fang, Lauren Monhait, Sarah Riehl, “Metal Chelation by Guanidium-Containing Ligands”. Poster presented at the Gordon Research Conference on Environmental Bioinorganic Chemistry. Andover, New Hampshire, June 2006.
  11. H-bonding in complexes of chelating ligands with ureayl and guanidinyll functional groups. Robert C. Scarrow\*, Sarah B. Riehl, Lisa A. Paschall, Joshua L. Mertz, Lauren E. Monhait, Jonathan Hull, A. S. Borovik, Douglas R. Powell Poster presentation at the International Conference on Bio-Inorganic Chemistry (ICBIC), Ann Arbor, Michigan, August 2005.

12. R. C. Scarrow\*, "N-coordination and N,O-bridging coordination of metals by N-substituted ureas." Poster presentation at the Environmental Bioinorganic Gordon Conference, Lewiston, Maine, June 2004.
13. R. C. Scarrow\*, D. Powell, A. S. Borovik. "Clusters of Cobalt(II) and a Bidentate Ligand Containing a *tert*-Butylureayl Substituent." Poster presentation at the Inorganic Chemistry Gordon Conference, Newport, Rhode Island, July 2003.
14. R. C. Scarrow\*, J. P. Shapiro, N. Ginsberg, F. B. Larsen, M. Moretnsen, C. J. McKenzie, E. Jaffe, J. Martins. "Utility of Bond-length Distributions and Bond Valence Sums in EXAFS Analyses of Bioinorganic Systems." Poster presentation at the Metals in Biology Gordon Conference, Ventura, California, February 2003.
15. R. C. Scarrow\*. "EXAFS Studies of metalloproteins and the usefulness of model coordination complexes". Presentation for "Bio-Matters: from IR to X-rays" workshop, National Synchrotron Light Source Annual Users meeting, Brookhaven, New York, May 2003.
16. R. C. Scarrow\*. "Basics of Sample Preparation". EXAFS Data Collection and Analysis Course, National Synchrotron Light Source, Brookhaven, New York, September 2002.
17. R. C. Scarrow\*, J. P. Shapiro, N. Ginsberg, E. K. Jaffe, F. B. Larsen, C. J. McKenzie. "Bond Length Distributions from EXAFS of Metalloproteins and Model Complexes." Poster presentation at the 6th European Conference on Bioinorganic Chemistry (EUROBIC-6). Lund, Sweden, July/August 2002.
18. R. C. Scarrow\*, J. P. Shapiro, F. B. Larsen, C. J. McKenzie, K. M. Padden, A. S. Borovik. "Applications of Generalized Radial-Distribution Functions and Bond Valence Sums to EXAFS Analysis." Oral presentation at the 35th International Conference on Coordination Chemistry, Heidelberg, Germany, July 2002.
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