

Julia A. Kovacs

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Educational Background:

<u>Institution</u>	<u>Degree</u>	<u>Dates</u>
Michigan State University	BS	9/77-6/81
Harvard University	Ph.D.	9/81-8/86

Employment Record:

University of Washington	Professor	9/01–present
University of Washington	Associate Professor	9/94–9/01
University of Washington	Assistant Professor	9/88-9/94
University of California, Berkeley	Postdoctoral Research Associate (Robert Bergman)	9/86-8/88
Harvard University	Teaching Asst./Research Asst. (Richard H. Holm)	9/81-8/86
Ball Corporation	Summer Intern, Chemist	6/80-8/80
Michigan State University	Research Assistant (Bruce Averill)	6/78-5/80, 9/80-8/81

Professional or Governmental Service Activities

Chair ACS Division of Inorganic Chemistry (2020)
Chair-Elect ACS Division of Inorganic Chemistry (2019)
Series Editor for the Royal Society of Chemistry's Metallobiology Series, (2/17 -present)
Ad Hoc committee member, advisory to the Provost of Harvard University (5/2014)
Member of SSRL Review Panel, Palo Alto, CA, (May 2014-present)
Member of NIH Special Study Section (May 2013)
Plenary speaker, BC Inorganic Discussion Group, Squamish, BC (May 11-13, 2012)
Plenary speaker, International Conference on Biological Inorganic Chemistry, 2011
Saunders Endowed Lectureship, 2011
Elected Executive Committee Member at Large, ACS Division of Inorg. Chemistry (1/1/12–2015)
Editorial Board of "BioInorganic Reaction Mechanisms" (11/10– 12/13)
Editorial Advisory Board of "Inorganic Chemistry" (1/1/09–12/31/12)
Elected Council member of the Society for Biological Inorganic Chemistry (7/08-7/12)
Chair of the "Metals in Biology" Gordon Research Conference (2008)
Chair of the Bioinorganic subdivision of the ACS Division of Inorganic Chemistry (2007)
Vice-Chair of the "Metals in Biology" Gordon Research Conference (2007)

Professional or Governmental Service Activities (cont.)

Member of the organizing committee for the 15th International Conference on Biological Inorganic Chemistry (ICBIC), Vancouver, B. C. (August, 2011)
 Vice-Chair-Elect for the "Metals in Biology" Gordon Research Conference (2006)
 Ad Hoc Member of NIH Macromolecular Structure and Function (MSF-A) Study Section (Feb, 2005)
 Organizer and Chair of the "Non-heme Iron Chemistry in Biology" symposium at the 227th ACS Meeting in Anaheim, March 2004.
 Editorial Advisory Board of "Journal of Biological Inorganic Chemistry" (1/1/04–12/31/07)
 Session Chair for "Nitrogenase Mimetic Chemistry" session at the "Metal Ions in Biology" Gordon Conference, Ventura, CA (Jan, 2004)
 Ad Hoc Member of NIH Metallobiochemistry (BMT) Study Section (Oct, 2003)
 Organizer of the first Ronald Breslow Award Symposium, held at the 225th ACS meeting in New Orleans, March 2003
 Ad Hoc Member of NIH Metallobiochemistry (BMT) Study Section (Oct, 2002)
 Elected Councilor of the American Chemical Society's Division of Inorganic Chemistry (02–04)
 Discussion Leader for the "Model Compounds and Metalloenzyme Mimics" Session at the Gordon Research Conference, Graduate Research Seminar in Bioinorganic Chemistry, January, 2000
 Member of the Board of "Expert Analysts" for *ChemTracts–Inorganic Chemistry* (98– 01).
 Member of the Board of Editors for *Inorganic Chemistry* (1/97- 1/00).
 Member of NIH Metallobiochemistry (BMT) Study Section (10/96–9/99)
 Ad Hoc Member of NIH Metallobiochemistry (BMT) Study Section (Oct, 1995).
 Alternate member of Hanford Advisory Board (6/94–12/94).
 American Chemical Society, Divisions of Inorganic Chemistry and Bioinorganic Chemistry.
 Reviewer for ACS Journals (JACS, Science, Nature, Inorganic Chemistry, Polyhedron, Chem. Rev., J. Inorg. Biochem.)
 Organizer/Moderator of 1990 Pauling Award Symposium
 Member of the ACS, Inorganic Division, Nominations and Symposia Planning Committee (1991/1992)
 Chairman of Inorganic Chemistry for the 47th Northwest Regional ACS Meeting in Missoula, Montana, June 17-19, 1992.

Research Grants or Contracts:***Present:***

National Institutes of Health (PI) (# RO1 GM123062-01A) "Understanding How Thiolates Promote Dioxygen Chemistry"	(4/1/18- 3/31/22)	\$1,674,000 /4 years
National Science Foundation (PI) (CHE-1664682) "Understanding the Mechanism of Mn-Promoted H ₂ O Oxidation"	(7/15/17- 6/30/20)	\$ 449,841/3 years
National Institutes of Health (PI) (#RO1 GM123062-01-S1) "Admin Supplement to purchase a Low Temperature Stopped-Flow Instrument"	(6/15/18- 6/14/19)	\$ 89,800 /1 year

Proposals Withdrawn Due to Procurement of Funds***From a Different Agency:***

National Institutes of Health (PI) (# R01 GM125792-01) "Small Molecule Chemistry Aimed at Understanding the Mechanism of Photosynthetic H ₂ O Oxidation"—large overlap with funded NSF	(9/5/17- 9/4/21)	\$1,191,343//4 years
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Research Grants or Contracts: (cont.)***Past Attempts:***

NSF MRI (PI)	(9/1/18- 8/31/19)	\$476,970/1 year
National Institutes of Health (PI) (# RO1 GM123062-01)	(4/1/17- 3/31/22)	\$2,433,478/5 years
“Understanding How Thiolates Promote Dioxygen Chemistry”		
National Institutes of Health (PI) (# RO1 GM45881-23A1)	(4/1/16- 3/31/21)	\$2,451,485/5 years
“Structure's Influence on Reactivity in Metalloenzymes”		
NSF fellowship graduate student Alexandra Downing	(9/1/18 -8/31/21)	\$138, 000/3 years
DOD NDSEG fellowship graduate student Alexandra Downing	(9/1/18- 8/31/22)	\$329,227/4 years
National Institutes of Health (PI) (# RO1 GM45881-23)	(8/1/15- 7/31/20)	\$2,328,942/5 years
“Structure's Influence on Reactivity in Metalloenzymes”		

Past Funded:

UW Bridge Funds (Provosts + Dean's office)	(6/4/15-4/30/16)	\$100,000
UW Transitional Support Program (ADVANCE + Chem Dept Chair matching)	(1/1/16-6/14/16)	\$40,000
National Institutes of Health (PI) (# RO1 GM45881-22S1)	(6/25/15- 7/31/16)	\$81,495
National Institutes of Health (PI) (# RO1 GM45881-22)	(8/1/11- 7/31/15)	\$995,419/4 years
“Structure's Influence on Reactivity in Metalloenzymes”		
DAAD Graduate Study Scholarship for grad student Julian Rees to work with Collaborator, Serena DeBeer, Max Planck Institute for Energy Conversion	(10/1/14-9/30/15)	\$14,000/1 year
UW Bridge Funds (Provosts office)	(1/4/11-8/1/11)	\$100,000/8 mo.
NIH NIGMS ARRA SIRM Supplement (#RO1GM45881-18S1)	(4/15/10- 3/31/11)	\$137,980/1 year
National Institutes of Health (PI) (# RO1 GM45881-18)	(4/1/06- 3/31/10)	\$1,297,875/4 years
“Structure's Influence on Reactivity in Metalloenzymes”		
NSF (co-PI) (CHE-0840520)	(11/09)	\$290,000/1 year
“Purchase of an X –ray diffractometer”		
NIH Shared Instrumentation Grant (co-PI) (# S10 RR023656-01)	(5/1/08- 4/30/09)	\$273,281 /1 year
“A High Field Mossbauer Instrument”		
NIH High End Instrumentation Grant Program (#S10 RR023065-01) (Co-PI, Robinson (PI))	(4/1/07- 3/31/08)	\$1,040,735/1 year
“Electron Paramagnetic Resonance (EPR)/Q-Band ENDOR Spectrometer”		
National Institutes of Health (PI) (#RO1 GM45881-16-S1)	(8/9/07)	\$23,230/1 year
“Supplement to Purchase Vac Atmospheres Dry Box”		
National Institutes of Health (PI) (# RO1 GM45881-15-S2)	(4/1/06- 3/31/07)	\$51,221/1 year
supplement to “Structure's Influence on Reactivity in Metalloenzymes;” minority student Alokolaro		

Research Grants or Contracts: (cont.)

National Institutes of Health (# F31 GM73583-01) Fellowship for Priscilla Lugo-Mas"	(10/1/04- 9/30/06)	\$63,666/2 years
National Institutes of Health (# RO1 GM45881-14-S2) supplement for minority student Alokolaro	(4/1/04- 3/31/06)	\$102,442/2 years
National Institutes of Health (# RO1 GM45881-12-S1) supplement for minority student Lugo-Mas	(10/1/03- 3/31/04)	\$20,813
National Institutes of Health (PI) (# RO1 GM45881-14) "Structure's Influence on Reactivity in Metalloenzymes"	(4/1/02- 3/31/06)	\$1,183,037/4 years
National Institutes of Health (PI) (# RO1 GM45881-11) "Structure's Influence on Reactivity in Metalloenzymes"	(4/1/98- 3/31/02)	\$921,472/4 years
Environmental Protection Agency fellowship for grad student Jason Shearer	(1/1/01-6/30/02)	\$17,000
National Institutes of Health (PI) (#1 RO1 GM45881-05) "H ⁺ Transfer and CH ₄ Formation in Metalloenzyme Models"	(6/95-6/98)	\$447,044/3 years
National Institutes of Health (PI) (#1 RO1 GM45881-01A1) "Modeling the Structure and Reactivity of Ni-Hydrogenases"	(2/92-2/95)	\$305,799/3 years
University of Washington GSRF	(3/89)	\$10,596/1 year
Petroleum Research Fund (#22562-G5)	(3/90)	\$18,000/2 years

Research publications:

74. Poon, P. C. Y.; Dedushko, M. A.; Sun, X.; Yang, G.; Toledo, S.; Hayes, E. C.; Johansen, A. L.; Piquette, M. C.; Rees, J. A.; Stoll, S.; *Rybak-Akimova, E.; *Kovacs, J. A. "How Metal Ion Lewis Acidity and Steric Properties Influence the Barrier to Dioxygen Binding, Peroxo O-O Bond Cleavage, and Reactivity." *J. Am. Chem. Soc.* **2019**, *141*, 15046-15057. <https://pubs.acs.org/doi/10.1021/jacs.9b04729>.
73. Dedushko, M.; Schweitzer, D.; Blakely, M. N.; Swartz, R. D.; Kaminsky, W.; *Kovacs, J. A. "Geometric and Electronic Structure of a Crystallographically Characterized Thiolate-Ligated Binuclear Peroxo-Bridged Cobalt(III) Complex" *J. Biol. Inorg. Chem.* **2019**, *24*, 919-926. <https://doi.org/10.1007/s00775-019-01686-x>.
72. Coggins, M. K.; Poon, P. C. Y.; *Kovacs, J. A. "Crystallographic Characterization of an Alkoxide-Ligated Mn(III)-Alkyl Peroxo Complex and Comparison with the Corresponding Thiolate-Derivative." to be submitted to *Inorg. Chem.* **2019**.
71. Blakely, M. N.; Dedushko, M.; Poon, P. C. Y.; Villar-Acevedo, G.; *Kovacs, J. A. "Formation of a Reactive, Alkyl Thiolate-Ligated Fe^{III}-Superoxo Intermediate Derived from Dioxygen." *J. Am. Chem. Soc.* **2019**, *141*, 1867-1870. <https://pubs.acs.org/doi/10.1021/jacs.8b12670>
70. Leipzig, B. K.; Rees, J.; Kawalska, J. K.; Theisen, R. M.; Kavcic, Matjaz; Chau Yan Poon, P.; Kaminsky, W.; DeBeer, S.; Bill, E.; *Kovacs, J. A. "How Do Ring Size and π -Donating

- Thiolate Ligands Affect Redox-Active, α -Imino-N-heterocycle Ligand Activation?" *Inorg. Chem.* **2018**, *57*, 1935-1949. <https://pubs.acs.org/doi/10.1021/acs.inorgchem.7b02748>
69. Acevedo-Villar, G.; Lugo-Mas, P.; Blakely, M. N.; Rees, J. A.; Ganas, A. S.; Hanada, E. M.; Kaminsky, W.; *Kovacs, J. A. "Metal-Assisted Oxygen Atom Addition to an Fe(III)-Thiolate" *J. Am. Chem. Soc.* **2017**, *139*, 119-129. <http://pubs.acs.org/doi/abs/10.1021/jacs.6b03512>
68. Rees, J. A.; Bjornsson, R.; Kawalska, J. K.; Lima, F. A.; Schlesier, J.; Sippel, D.; Weyhermuller, T.; *Einsle, O.; *Kovacs, J. A.; *DeBeer, S. "Comparative Electronic Structures of Nitrogenase FeMoco and FeVco" *Dalton. Trans.* **2017**, *46*, 2445-2455. <http://pubs.rsc.org/en/content/articlepdf/2017/dt/c7dt00128b>
67. Kowalska, J. K.; Nayyar, B.; Rees, J. A.; Schiewer, C. E.; Lee, S. C.; Kovacs, J. A.; Meyer, F.; Weyhermuller, T.; Otero, E.; DeBeer, S. "Iron L-edge X-ray Absorption and Magnetic Circular Dichroism Studies of Molecular Iron Complexes with Relevance to the FeMoco and FeVco Active Sites of Nitrogenase" *Inorg. Chem.* **2017**, *56*, 8147-8158. <http://pubs.acs.org/doi/abs/10.1021/acs.inorgchem.7b00852>
66. *Kovacs, J. A. "Tuning the Relative Stability and Reactivity of Manganese Dioxygen and Peroxo Intermediates via Systematic Ligand Modification" *Acc. Chem. Res.* **2015**, *48*, 2744-2753. <http://pubs.acs.org/doi/abs/10.1021/acs.accounts.5b00260>
65. Rees, J. A.; Martin-Diaconescu, V.; *Kovacs, J. A.; *DeBeer, S. "X-ray Absorption and Emission Study of Dioxygen Activation by a Small-Molecule Manganese Complex" *Inorg. Chem.* **2015**, *54*, 6410-6422. <http://pubs.acs.org/doi/abs/10.1021/acs.inorgchem.5b00699>
64. Brines, L. M.; Coggins, M. K.; Poon, P. C. Y.; Toledo, S.; Kaminsky, W.; Kirk, M. L.; *Kovacs, J. A. "A Water-Soluble Fe(II)-H₂O Complex with a Weak O-H Bond Transfers a Hydrogen Atom via an Observable Monomeric Fe(III)-OH." *J. Am. Chem. Soc.* **2015**, *137*, 2253-2264. <http://dx.doi.org/10.1021/ja5068405>
63. Coggins, M. K.; Brines, L. M.; *Kovacs, J. A. "Synthesis and Structural Characterization of a Series of Mn(III)-OR Complexes, Including a Water-Soluble Mn(III)-OH that Promotes Aerobic Hydrogen Atom Transfer." *Inorg. Chem.* **2013**, *52*, 12383-12393. <http://dx.doi.org/10.1021/ic401234t>
62. Coggins, M. K.; Toledo, S.; *Kovacs, J. A. "Isolation and Characterization of an Unsupported, Hydroxo-Bridged Iron(III,III)(μ -OH)₂ Diamond Core Derived from Dioxygen," *Inorg. Chem.* **2013**, *52*, 13325-13331. <http://dx.doi.org/10.1021/ic4010906>
61. Coggins, M. K.; Sun, X.; Kwak, Y.; *Solomon, E. I.; *Rybak-Akimova, E.; *Kovacs, J. A. "Characterization of Metastable Intermediates Formed in the Reaction Between a Mn(II) Complex and Dioxygen, Including a Crystallographic Structure of a Binuclear Mn(III)-Peroxo Species," *J. Am. Chem. Soc.* **2013**, *135*, 5631-5640 <http://dx.doi.org/10.1021/ja311166u>. Highlighted on a JACS/IC virtual issue as "a significant recent publication."
60. Coggins, M. K.; Martin-Diaconescu, V.; DeBeer, S.; *Kovacs, J. A. "Correlation Between Structural, Spectroscopic, and Reactivity Properties Within a Series of Structurally Analogous Metastable Manganese(III)-Alkylperoxo Complexes," *J. Am. Chem. Soc.* **2013**, *135*, 4260-4272. <http://dx.doi.org/10.1021/ja308915x>
59. Coggins, M. K.; Toledo, S.; Shaffer, E.; Kaminsky, W.; Shearer, J.; *Kovacs, J. A. "Characterization and Dioxygen Reactivity of a New Series of Coordinatively Unsaturated Thiolate-Ligated Manganese(II) Complexes," *Inorg. Chem.* **2012**, *51*, 6633-6644. <http://dx.doi.org/10.1021/ic300192q>

58. Coggins, M. K.; *Kovacs, J. A. "Structural and Spectroscopic Characterization of Metastable Thiolate-Ligated Manganese(III)-Alkylperoxo Species," *J. Am. Chem. Soc.* **2011**, *133*, 12470-12473. <http://dx.doi.org/10.1021/ja205520u> .
57. Swartz, R. D.; Coggins, M. K.; Kaminsky, W.; *Kovacs, J. A. "Nitrile Hydration by Thiolate- and Alkoxide-Ligated Co-NHase Analogues. Isolation of Co(III)-Amidate and Co(III)-Iminol Intermediates," *J. Am. Chem. Soc.* **2011**, *133*, 3954-3963. <http://dx.doi.org/10.1021/ja108749f>
56. Villar-Acevedo, G.; Nam, E.; Fitch, S.; Benedict, J.; Freudenthal, J.; Kaminsky, W.; *Kovacs, J. A. "Influence of Thiolate Ligands on Reductive N-O Bond Activation. Probing the O₂⁻ Binding Site of a Biomimetic SOR Analogue, and Examining the Proton-Dependent Reduction of Nitrite," *J. Am. Chem. Soc.* **2011**, *133*, 1419-1427. <http://dx.doi.org/10.1021/ja107551u> . Highlighted on "JACS Select" website as a "recent significant publication."
55. Sun, N.; Dey, A.; Villar-Acevedo, G.; *Kovacs, J. A. *Darensbourg, M. Y.; *Hodgson, K. O.; *Hedman, B.; *Solomon, E. I. "S K-edge XAS and DFT Studies of High and Low Spin {FeNO}⁷ Thiolate Complexes: Exchange Stabilization of Electron Delocalization in {FeNO}⁷ and {FeO₂}⁸," *Inorg. Chem.* **2011**, *50*, 427-436.
54. Nam, E.; Alokolaro, P. E.; Swartz, R. D.; Gleaves, M. C.; Pikul, J. and *Kovacs, J. A. "An Investigation of the Mechanism of Formation of a Thiolate-Ligated Fe(III)-OOH," *Inorg. Chem.* **2011**, *50*, 1592-1602. <http://dx.doi.org/10.1021/ic101776m>
53. Lugo-Mas, P.; Taylor, W.; Schweitzer, W.; Theisen, R. M.; Xu, L.; Shearer, J.; Swartz, R. D.; Gleaves, M. C.; DiPasquale, A.; Kaminsky, W.; and *Kovacs, J. A. "Properties of Square-Pyramidal Alkyl-Thiolate Fe(III)-Complexes, Including an Analogue of the Unmodified Form of Nitrile Hydratase," *Inorg. Chem.* **2008**, *47*, 11228 – 11236.
52. Brines, L. M.; Villar-Acevedo, G.; Kitagawa, T.; Swartz, R. D.; Lugo-Mas, P.; Kaminsky, W.; Benedict, J. B.; and *Kovacs, J. A. "Comparison of Structurally-Related Alkoxide, Amine, and Thiolate-Ligated M^{II} (M= Fe, Co) Complexes: the Influence of Thiolates on the Properties of Biologically Relevant Metal Complexes," *Inorg. Chim. Acta.* **2008** 361, 1070-1078. (*special issue in honor of Ed Solomon*).
51. Brines, L. M.; Shearer, J.; Fender, J. K.; Schweitzer, D.; Shoner, S. C.; Barnhart, D.; Kaminsky, W.; Lovell, S.; *Kovacs, J. A. "Periodic Trends within a Series of Five Coordinate, Thiolate-Ligated [M^{II}(S^{Me2}N₄(tren))] ⁺ (M = Mn, Fe, Co, Ni, Cu, Zn) Complexes, Including a Rare Example of a Cu(II)-Thiolate" *Inorg. Chem.* **2007**, *46*, 9267-9277.
50. *Kovacs, J. A.; Brines, L. M. "Understanding How the Cysteinate Contributes to the Function of the Non-Heme Iron Enzyme Superoxide Reductase" *Acc. Chem. Res.* **2007**, *40*, 501-509.
49. Brines, L. M.; *Kovacs, J. A. "Understanding the Mechanism of Superoxide Reductase (SOR)," *Eur. J. Inorg. Chem.* **2007**, 29-38. (*invited "Microreview"*).
48. Kitagawa, T.; Dey, A.; Lugo-Mas, P.; *Solomon, E. I.; *Kovacs, J. A. "A Functional Model for the Cysteinate-Ligated Non-Heme Iron Enzyme Superoxide Reductase (SOR)," *J. Am. Chem. Soc.* **2006**, *128*, 14448-14449.
47. Lugo-Mas, P.; Dey, A.; Xu, L.; Davin, S. D.; Benedict, J.; Kaminsky, W.; *Hodgson, K. O.; *Hedman, B.; *Solomon, E. I.; *Kovacs, J. A. "How Does Single Oxygen Atom Addition Affect the Properties of an Fe-Nitrile Hydratase Analogue? The Compensatory Role of the Unmodified Thiolate," *J. Am. Chem. Soc.* **2006**, *128*, 11211-11221.
46. Dey, A.; Chow, M.; Taniguchi, K.; Lugo-Mas, P.; Davin, S. D.; Maeda, M.; *Kovacs, J. A.; *Odaka, M.; *Hedman, B.; *Hodgson, K. O.; *Solomon, E. I. "S K-edge XAS and DFT

Calculations on Nitrile Hydratase: Geometric and Electronic Structure of the Non-Heme Iron Active Site," *J. Am. Chem. Soc.* **2006**, *128*, 533-541.

45. Kennepohl, P.; Neese, F.; Schweitzer, D.; Jackson, H. L.; *Kovacs, J. A.; *Solomon, E. I. "Spectroscopy of Non-Heme Iron Thiolate Complexes: Insight into the Electronic Structure of the Low-Spin Active Site of Nitrile Hydratase " *Inorg. Chem.* **2005**, *44*, 1826-1836.

Research publications: (cont.)

44. Theisen, R. M.; *Kovacs, J. A. "The Role of Protons in Superoxide Reduction by a Superoxide Reductase Analogue. " *Inorg. Chem.* **2005**, *44*, 1169-1171.
43. Theisen, R. M.; Shearer, J.; Kaminsky W.; *Kovacs, J. A. "Steric and Electronic Control Over the Reactivity of a Thiolate–Ligated Fe(II) Complex with Dioxygen and Superoxide. Reversible μ -oxo Dimer Formation " *Inorg. Chem.* **2004**, *43*, 7682–7690.
42. Chohan, B. S.; Shoner, S. C.; Kovacs, J. A.; Day, R. O.; *Maroney, M. J. "Ligand Oxidations in High–Spin Nickel Thiolate Complexes and Zinc Analogues," *Inorg. Chem.* **2004**, *43*, 7726–7734.
41. Kovacs*, J. A. "Synthetic Analogues of Cysteinate–Ligated Non–Heme Iron, and Non–Corrinoid Cobalt Enzymes" *Chem. Rev.* **2004**, *104*, 825-848. (*special thematic issue on Biomimetic Inorganic Chemistry*)
40. Sarah Fitch, Rose Theisen, Jason Shearer, Terry Kitagawa, *Robert Scarrow, and *Julie A. Kovacs "Understanding the Mechanism of Superoxide Reduction by the Non–Heme Iron Enzyme Superoxide Reductase (SOR) using a Synthetic Analogue Approach" *J. Inorg. Biochem.* **2003**, *96*, 23 (*Proceedings of the 11th International Conf. on Bioinorganic Chemistry*).
39. Shearer, J.; Kaminsky, W.; Kovacs,* J. A. "Chloride Contained in a Cobalt "Claw": $[\text{Co}_3^{\text{II}}(\text{DADIT})_3](\text{Cl})(\text{PF}_6)_2$," *Acta. Cryst.*, *C59*, **2003**, m379-m380.
38. *Kovacs, J. A. "Dioxygen Activation by Non–Heme Fe–Enzymes"; *Science*, **2003**, *299*, 1024–1025 (invited "Perspective").
37. Shearer, J.; Fitch, S. B.; Kaminsky, W.; Scarrow, R. C.; *Kovacs, J. A. "How Does Cyanide Inhibit Superoxide Reductase? Insight from Synthetic $\text{Fe}^{\text{III}}\text{N}_4\text{S}$ Model Complexes"; *Proc. Natl. Acad. of Sci. U.S.A.*, **2003**, *100*, 3671–3676 (special feature issue on Bioinorganic Chemistry).
36. Shearer, J.; *Kovacs, J. A. "Nitrile Hydratase: An Unusual Fe–Containing Hydrolytic Enzyme," in *Encyclopedia of Catalysis*; I. T. Horvath, Ed.; Wiley Interscience: NY, NY, **2003**; Vol. 5; pp 289-297.
35. Shearer, J.; Scarrow, R. C.; and Kovacs*, J. A. "Models For The Non-Heme Cysteinate-Ligated Iron Enzyme Superoxide Reductase: Observation and Structural Characterization By XAS of an $\text{Fe}^{\text{III}}\text{-OOH}$ Intermediate" " *J. Am. Chem. Soc.* **2002**, *124*, 11709–11717.
34. Shearer, S.; Lai, J.; Jacobs, D. L.; and Kovacs*, J. A. "Preparation and Properties of $[\text{Ni}^{\text{II}}(\text{BEES})(\text{Cl})](\text{BPh}_4)$: A Ni^{II} Complex in a Mixed Nitrogen/Thioether Coordination Environment" *Inorg. Chim. Acta.* **2002**, *336*, 61-64.
33. Shearer, J.; Jackson, H. L.; Rittenberg, D.; Leavy, T.; *Scarrow, R. C.; *Kovacs, J. A. " The First Example of a Nitrile Hydratase Model Complex that Reversibly Binds Nitriles." *J. Am. Chem. Soc.* **2002**, *124*, 11417-11428.
32. Schweitzer, D.; Shearer, J.; Rittenberg, D.; Ellison, J. J.; Shoner, S. C.; Loloee, R.; Lovell, S. C.; Barnhart, D. *Kovacs, J. A. "Enhancing Reactivity via Structural Distortion," *Inorg. Chem.* **2002**, *41*, 3128–3136.
31. Shearer, J.; Jackson, H. L.; Schweitzer, D.; Leavy, T. M.; Kaminsky, W.; Scarrow, R. and *Kovacs, J. A. "Examining the Influence of Thiolate Sulfurs on the Reactivity Properties of

Cysteinate-Ligated Non-Heme Iron Active Sites" *J. Inorg. Biochem.*, **2001**, *86*, 64 (*Proceedings of the 10th International Conf. on Bioinorganic Chemistry*).

30. Shearer, J.; Nehring, J.; Kaminsky, W.; *Kovacs, J. A. "Modeling the Reactivity Properties of Superoxide Reducing Metalloenzymes With a Nitrogen and Sulfur Coordinated Iron Complex." *Inorg. Chem.* **2001**, *40*, 5483-5484.

Research publications: (cont.)

29. Jackson, H. L.; Shoner, S. L.; Cowen, J. A.; Lovell, S.; Barnhart, D.; *Kovacs, J. A. "Probing the Influence of Local Coordination Environment on the Properties of Fe-Type Nitrile Hydratase Model Complexes," *Inorg. Chem.*, **2001**, *40*, 1646–1653.
28. Shearer, J.; Kung, I. Y.; Lovell, S.; *Kovacs, J. A. "Why is There an "Inert" Metal Center in the Active-Site of Nitrile Hydratase? Reactivity and Ligand Dissociation From a Five Coordinate Co(III) Nitrile Hydratase Model." *J. Am. Chem. Soc.* **2001**, *123*, 463–468.
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22. *Scarrow, R. C.; Strickler, B.; Ellison, J. J.; Shoner, S. C.; *Kovacs, J. A.; Cummings, J. G.; *Nelson, M. J., "X-ray Spectroscopy of Nitric Oxide Binding to Iron in Inactive Nitrile Hydratase and a Synthetic Model Compound." *J. Am. Chem. Soc.* **1998**, *120*, 9237–9245.
21. Schweitzer, D.; Ellison, J. J.; Shoner, S. C. ; Lovell, S. ; and *Kovacs, J. A. "A Synthetic Model for the NO-Inactivated Form of Nitrile Hydratase," *J. Am. Chem. Soc.* **1998**, *120*, 10996–10997.
20. Ellison, J. J.; Nienstedt, A.; Shoner, S. C.; Barnhart, D.; Cowen, J. A.; *Kovacs, J. A. "Reactivity of Five-Coordinate Models for the Thiolate-Ligated Fe Site of Nitrile Hydratase," *J. Am. Chem. Soc.* **1998**, *120*, 5691–5700.
19. Cha, M.; Sletten, J.; Critchlow, S.C.; *Kovacs, J.A., "Synthesis and Structure of a Thiolate-Ligated Ni Cluster Which Contains an Unusual Thiolate Bridging Mode and an Exposed Ni Site." *Inorg. Chim. Acta.*, **1997**, *263*, 153–159.
18. Shoner, S.; Humphreys, K. J.; Barnhart, D.; *Kovacs, J.A., "A Model for the Interaction of Alcohol with the Zinc Thiolate Site of Alcohol Dehydrogenase," *Inorg. Chem.* **1995**, *34*, 5933-5934.
17. *Kovacs, J. A.; Shoner, S. C.; Ellison, J. J., "Metal-Carbon Bonds in Nature," *Science* **1995**, *270*, 587-588.

16. Shoner, S.; Barnhart, D.; *Kovacs, J.A., "A Model for the Low-Spin, Non-Heme, Thiolate-Ligated Fe Site of Nitrile Hydratase," *Inorg. Chem.* **1995**, *34*, 4517-4518.
15. Sletten, J.; Kovacs, J.A., "The Structure of a Toroidal, Neutral, Homoleptic Ni(II)-Complex with a Chelate Dithiolate Ligand, Ni₆(SCH₂CH₂CH₂S)₆" *Acta. Chem. Scand.* **1994**, *48*, 929-932.

Research publications: (cont.)

14. Shoner, S. C.; Olmstead, M.; Kovacs, J.A. "Synthesis and Structure of a Water Soluble Five-Coordinate Nickel Alkyl Thiolate Complex," *Inorg. Chem.*, **1994**, *33*, 7-8.
13. "Understanding the Role of Ni in Ni-containing Enzymes," J. A. Kovacs *Advances in Inorganic Biochem*; G.L. Eichhorn and L.G. Marzilli, Eds.; Prentice-Hall: Englewood Cliffs, NJ, **1993**; vol. 9; Chapter 5, pp. 173-201.
12. Cha, M.; Critchlow, S.C.; Gatlin, C.L.; Kovacs, J.A., "Probing the Influence of Local Coordination Environment on Ligand Binding in Ni Hydrogenase Model Complexes" *Inorg. Chem.*, **1993**, *32*, 5868-5877.
11. Cha, M.; Shoner, S. C.; Kovacs, J.A., "Nickel-Promoted Reductive C-S Bond Cleavage: A Reactivity Model for the First Step in the Reaction Promoted by Methyl Coenzyme M Reductase," *Inorg. Chem.*, **1993**, *32*, 1860-1863.
10. Sletten, J.; Kovacs, J.A. "Structure of trans-[dichloro bis(triphenylphosphine)Nickel(II)]. 2CH₂Cl₂," *J. Crystallographic and Spectroscopic Research*, **1993**, *23*, 239-241.
9. Lindahl, P.A.; Kovacs, J.A. "Reactivities and Biological Functions of Iron-Sulfur Clusters," *J. Cluster Sci.*, **1990**, *1*, 29-73.
8. Kovacs, J. A.; Bergman, R. G., "Synthesis and Reactivity of the First Structurally Characterized Heterobimetallic Complex Containing an Unsupported Sulfur Atom Bridge," *J. Am. Chem. Soc.* **1989**, *111*, 1131-1133.
7. Kovacs, J. A.; Bashkin, J. K.; Holm, R. H. "[Fe₂S₂(CO)₆]²⁻ as a Cluster Precursor: Synthesis and Structure of [MoFe₃S₆(CO)₆]²⁻ and Oxidative Decarbonylation to a Persulfide-Bridged MoFe₃S₄ Double Cubane," *Polyhedron* **1987**, *6*, 1145-1156.
6. Carney, M. J.; Kovacs, J. A.; Zhang, Y.-P.; Papaefthymiou, G. C.; Spartalian, K.; Frankel, R. B.; Holm, R. H., "Comparative Electronic Properties of Vanadium-Iron-Sulfur and Molybdenum Iron-Sulfur Clusters Containing Isoelectronic Cubane Type [VFe₃S₄]²⁺ and [MoFe₃S₄]³⁺ Cores," *Inorg. Chem.* **1987**, *26*, 719-724.
5. Kovacs, J. A., Holm, R. H., "Structural Chemistry of Vanadium-Iron-Sulfur Clusters Containing the Cubane-Type [VFe₃S₄]²⁺ Core," *Inorg. Chem.* **1987**, *26*, 711-718.
4. Kovacs, J. A.; Holm, R. H., "Heterometallic Clusters: Synthesis and Reactions of Vanadium-Iron-Sulfur Single- and Double-Cubane Clusters, and the Structure of [V₂Fe₆S₈Cl₄(C₂H₄S₂)₂]⁴⁻," *Inorg. Chem.* **1987**, *26*, 702-711.
3. Kovacs, J. A.; Holm, R. H., "Assembly of Vanadium-Iron-Sulfur Cubane Clusters from Mononuclear and Linear Trinuclear Reactants," *J. Am. Chem. Soc.* **1986**, *108*, 340-341.
2. Bose, K. S.; Lamberty, P. E.; Kovacs, J. A.; Sinn, E.; Averill, B. A., "Synthesis of a New Class of Mo-Fe-S Clusters Containing the MoS₂Fe₂ Unit," *Polyhedron* **1986**, *5*, 393-398.
1. Kovacs, J. A.; Bashkin, J. K.; Holm, R. H., "Persulfide-Bridged Iron- Molybdenum-Sulfur Clusters of Biological Relevance: Two Synthetic Routes and the Structures of Intermediate and Product Clusters," *J. Am. Chem. Soc.* **1985**, *107*, 1784-1786.

Invited Lectures:

“Metals in Biological Chemistry. C-H Activation by Metalloenzymes and Models.” Pacificchem, December, 2020
University of Virginia, April 15, 2020
“Creative Advances in Synthetic and Biological Coordination Chemistry” Symposium at the Philadelphia ACS Meeting, March 2020
Metals in Biology Gordon Research Conference, Ventura CA January 2020
University of Minnesota, November 19, 2019
University of Delaware, October 30, 2019
Johns Hopkins, October 29, 2019
MIT/Harvard, October 2-3, 2019
19th International Conference on Biological Inorganic Chemistry (ICBIC), Interlaken, Switzerland, August, 2019.
“Learning from Nature: Earth Abundant Metals for Oxidation Catalysis” Symposium at the American Chemical Society Meeting, San Diego, August, 2019.
“Bader Award Symposium in honor of Joan Broderick” at the American Chemical Society Meeting, Orlando, April, 2019.
“Memorial Symposium in honor of Elena Rybak-Akimova” at the American Chemical Society Meeting, Orlando, April, 2019.
European Biological Inorganic Chemistry Conference (EuroBIC), Birmingham, England, August 26-30, 2018
University of Tsukuba, Tsukuba, Japan, August 4-5, 2018
“Bioinspired Small Molecule Activation” symposium, 43rd International Conference on Coordination Chemistry (ICCC 2018), Sendai, Japan, July 31–Aug 2, 2018.
Korean Advanced Institute of Science and Technology (KAIST), July 29-30, 2018
Center for Biomimetic Systems, Ewha Women’s University, Seoul, Korea, July 27-28, 2018.
Western Washington University, April 6, 2018.
ACS Inorganic Chemistry Award symposium in honor of Larry Que, at the 253rd American Chemical Society Meeting, San Francisco, CA, April, 2017.
Inorganic Reaction Mechanisms Gordon Conference, March, 2017
Telluride Science Research Center (TSRC) Workshop, *Small Molecule Activation*, June 20 – June 25, 2016, Telluride, CO
“Bader Award Symposium in honor of Edward Solomon” at the 251st American Chemical Society Meeting, San Diego, CA, March, 2016.
“Metal-Oxygen Oxidants in Synthesis and Biology: Beyond Metal-Oxo Species” symposium at the 251st American Chemical Society Meeting, San Diego, CA, March, 2016.
“Dioxygen Activation Chemistry of Metalloenzymes and Models,” symposium at the International Chemical Congress of Pacific Basin Societies, Hawaii, December 16, 2015
Indiana University, February 20, 2015
University of Arizona, April 11, 2013
“Metal Ions in Biology” Gordon Conference, January, 2013
Plenary speaker, BC Inorganic Discussion Group, Squamish, BC (May 11-13, 2012)
Harvard University, April 3, 2012
Saunders Endowed Lecturer, Texas Christian University, Fort Worth, TX (Sept 15-16, 2011)
Plenary speaker at the 15th International Conference on Biological Inorganic Chemistry (ICBIC), Vancouver, BC (August 7 -12, 2011)
University of California at Irvine, March 3, 2011
“Molecular Design in Bioinorganic Chemistry,” symposium at the International Chemical Congress of Pacific Basin Societies, Hawaii, December 10–15, 2010.
14th International Conference on Biological Inorganic Chemistry (ICBIC), Nagoya, Japan (July, 2009)
“Ken Karlin Cotton Award” symposium, 237th American Chemical Society Meeting, Salt Lake City, Utah, March 22-26, 2009.
University of Connecticut, R.T. Major Lecture Series, Oct. 15, 16th, 2008

"International Symposium on Advanced Science and Biotechnology 2008", Osaka, Japan, March 22-23, 2008

"Dioxygen Activation by Metalloenzymes and Models" symposium in Nagoya, Japan, March 19-21, 2008

Tohoku University, Sendai, Japan, March 18, 2008

University of Oregon, February 22, 2008

National Taiwan University, December 17, 2007

International Chemical Conference in Taipei, Dec. 14-16, 2007

UC San Diego, November 9, 2007

Johns Hopkins, October 16, 2007

UC Santa Barbara, May 23, 2007

Texas A & M, April 11, 2007

University of New Mexico, Dec. 1, 2006

Invited Lectures: (cont.)

University of Nevada, November 17, 2006

University of Michigan, November 14, 2006

Michigan State U., Dean George Leroi symposium, Oct. 6, 2006

University of Rochester, September 18, 2006

University of Minnesota, March 2, 2006

University of Arkansas, February 13, 2006

University of Nebraska, January 17, 2006

"Dioxygen Activation Chemistry of Metalloenzymes and Models" symposium at the International Chemical Congress of Pacific Basin Societies meeting, Hawaii, (December, 2005).

UC Berkeley, November 4, 2005

Columbia University, October 20, 2005

Wayne State University, September 22, 2005

12th International Conference on Biological Inorganic Chemistry (ICBIC), Ann Arbor, Michigan (August, 2005)

Western Washington University, May 6 2005

Metal Ions in Biology Gordon Research Conference, January 2005

Purdue University, November 9, 2004

University of California at Davis, October 21, 2004

Inorganic Gordon Conference, July 18, 2004

"Metalloenzymes" symposium at the Joint Regional Meeting of the Northwest and Rocky Mountain Sections of the American Chemical Society, Logan, Utah (June 7, 2004)

"Non-heme Iron Chemistry in Biology" symposium at the 227th American Chemical Society Meeting in Anaheim, March 2004.

Stanford, February 10, 2004

Cal Tech, February 9, 2004

Montana State, November 7, 2003

MIT/Harvard, September 24, 2003

Brandeis, September 23, 2003

11th International Conference on Biological Inorganic Chemistry (ICBIC), Cairns, Australia (July, 2003)

University of Kansas, May 2, 2003

Michigan State University, March 13, 2003

"Women in Inorganic Chemistry" Symposium at the 223rd National Meeting of the American Chemical Society, Orlando (April, 2002)

10th International Conference on Bioinorganic Chemistry (ICBIC), Florence, Italy (August, 2001)

University of Wisconsin, March 2001

Metal Ions in Biology Gordon Conference, January, 2001

"Bioinspired Catalysis" Symposium at the 218th American Chemical Society Meeting, New Orleans, August, 1999.

University of California, Santa Cruz, March, 1998

University of Illinois, Sept 18, 1997
"International Conference on the Molecular Biology of Hydrogenases," France (July 1997;
declined due to childcare)
Inorganic Gordon Conference, July 21, 1996
Metal Ions in Medicine Symposium at the International Chemical Congress of Pacific Basin
Societies, Hawaii, December, 1995
University of California, Berkeley, September, 1995
Nexstar Corporation, Boulder, Colorado, June, 1995
Reed College, March 9, 1995
University of British Columbia, October, 1993
University of Minnesota, May 11, 1993
Indiana University, May 6, 1993
Michigan State University, May 4, 1993
University of Michigan, May 3, 1993
University of South Carolina, April 16, 1993
Emory University, April 15, 1993
University of Georgia, April 14, 1993
Georgia Tech, April 13, 1993
University of Massachusetts, Amherst, February 22, 1993
Johns Hopkins University, February 19, 1993
Harvard, February 18, 1993
Yale University, February 16, 1993
Washington State University, September 21, 1992
Inorganic Gordon Conference, July 27, 1992
Oregon Graduate Center, March 13, 1992
Los Alamos National Laboratory, Los Alamos, New Mexico, June 1991.
Third International Conference on Molecular Biology of Hydrogenases, Portugal, July,
1991
Pacific Conference on Chemistry and Spectroscopy; Bioinorganic Symposium, October,
1988.

University Committees:

Conflict Resolution Committee, special assistance to the Dean of the College of Arts and
Sciences (2014)
UW Department of Biology Chair Search Committee (11/04-2/05)
Faculty Senate (1993-97)

Departmental Service:

Co-organizer, UW Bioinorganic Symposium (June 18, 2013)
Initiated proposal to purchase departmental EPR/ENDOR spectrometer (2008)
Initiated proposal to purchase departmental CCD-equipped X-ray Diffractometer (2007)
Organizer UW mini-Bioinorganic Symposium (May, 2008)
Contributed \$10,000 towards the purchase of a Quantum Design SQUID Magnetometer
(2000)
Contributed \$3,000, plus manpower, towards the upgrade of department/Kwirim's EPR
instrument. (1995)

Departmental Committees:

Academic Personnel Committee (2018–present)
Chair, Faculty Search Committee; *resulted in Velian hire* (2016-2017)
Graduate Student Advising (2010-present)
Chair, Research Services committee (2013-2015)
Chair, Inorganic Search Committee; (2007-2008)
Graduate Admissions Committee, 2007-2013
Research Services committee (2008-2013)

Space committee (2006-2015)
 Academic Personnel Committee (2004–2005)
 Chair’s Advisory Committee (2004-2005)
 Departmental Colloquium Organizer (2004-2007)
 Space Committee (2003-2004)
 Awards committee (2003–2004)
 Research Services (2000–2004)
 Graduate Good Standing/Fellowships (2000–2003)
 Faculty Search Oversight Committee (2000–2001)
 Graduate Student Advising (2000)
 Inorganic Faculty Search Committee (1998–99)
 Inorganic Faculty Search Committee, chair (1997-98)
 Decennial Review Self–Study Working Group 3, chair (1997)
 Graduate Education Committee; Advising/Orientation (1996-99)
 Chair’s Advisory Committee (1996–98)
 Undergraduate Education Committee; Instructional Services (1996)
 Faculty Search Committee, subcommittee chair (1995-96)
 Long Range Planning Committee (1995-1996)
 Undergraduate Education Committee (1993-1995)
 Pauling Award Committee (1990-91)
 Inorganic Search Committee (1989-91)
 Operations Faculty Supervisor, X-Ray Facility Committee (1989-97)
 Graduate Student Recruiting and Advising (1989- 1995)
 Graduate Program Committee (1989-1990)
 Departmental Services Committee (1988-1990)
 Undergraduate Program Committee (1988-1989)

Courses Taught

<u>Autumn 1988</u> Chem 416	<u>Winter 1989</u> Chem 581	<u>Spring 1989</u> Chem 510	<u>Summer 1989</u>
<u>Autumn 1989</u> Chem 416 Chem 581	<u>Winter 1990</u> Chem 150 C Chem 150 U	<u>Spring 1990</u> Chem 581	<u>Summer 1990</u>
<u>Autumn 1990</u> Chem 416 Chem 581	<u>Winter 1991</u> Chem 150 A Chem 150 C Chem 581	<u>Spring 1991</u> Chem 581	<u>Summer 1991</u> Chem 150 A
<u>Autumn 1991</u> Chem 416	<u>Winter 1992</u> Chem 591	<u>Spring 1992</u> Chem 510	<u>Summer 1992</u>
<u>Autumn 1992</u> Chem 416	<u>Winter 1993</u> Chem 150 A	<u>Spring 1993</u> Chem 164 A	<u>Summer 1993</u> Chem 499A (var)
<u>Autumn 1993</u> Chem 416	<u>Winter 1994</u>	<u>Spring 1994</u> Chem 151 A (5)	<u>Summer 1994</u>
<u>Autumn 1994</u> Chem 416	<u>Winter 1995</u> Chem 150 A	<u>Spring 1995</u> Chem 419	<u>Summer 1995</u>

<u>Autumn 1995</u> Chem 416	<u>Winter 1996</u> Chem 150 A	<u>Spring 1996</u> leave	<u>Summer 1996</u>
<u>Autumn 1996</u> Chem 416	<u>Winter 1997</u> sabbatical leave	<u>Spring 1997</u> Chem 419	<u>Summer 1997</u>
<u>Autumn 1997</u> Chem 416	<u>Winter 1998</u> sabbatical leave	<u>Spring 1998</u> Chem 419/510	<u>Summer 1998</u>
<u>Autumn 1998</u> Chem 312	<u>Winter 1999</u> sabbatical leave	<u>Spring 1999</u> leave	<u>Summer 1999</u>
<u>Courses Taught (cont.)</u>			
<u>Autumn 1999</u> Chem 312	<u>Winter 2000</u> Chem 591	<u>Spring 2000</u> Chem 419	<u>Summer 2000</u>
<u>Autumn 2000</u> Chem 312	<u>Winter 2001</u> Chem 591	<u>Spring 2001</u> Chem 419	<u>Summer 2001</u>
<u>Autumn 2001</u> Chem 312	<u>Winter 2002</u> Chem 591	<u>Spring 2002</u> Chem 419	<u>Summer 2002</u>
<u>Autumn 2002</u> Chem 312	<u>Winter 2003</u> Chem 591	<u>Spring 2003</u> Chem 510	<u>Summer 2003</u>
<u>Autumn 2003</u> Chem 312	<u>Winter 2004</u> Chem 591	<u>Spring 2004</u> Chem 419	<u>Summer 2004</u>
<u>Autumn 2004</u> Chem 416	<u>Winter 2005</u> Chem 591	<u>Spring 2005</u> Chem 510	<u>Summer 2005</u>
<u>Autumn 2005</u> sabbatical leave Chem 590	<u>Winter 2006</u> sabbatical leave Chem 590	<u>Spring 2006</u> sabbatical leave Chem 590 Chem 499	<u>Summer 2006</u>
<u>Autumn 2006</u> Chem 591 Chem 590 Chem 499	<u>Winter 2007</u> Chem 312 Chem 590 Chem 499	<u>Spring 2007</u> Chem 162 Chem 590 Chem 499	<u>Summer 2007</u> Chem 399
<u>Autumn 2007</u> Chem 591 Chem 499	<u>Winter 2008</u> Chem 312 Chem 591 Chem 499	<u>Spring 2008</u> Chem 419/510 Chem 590 Chem 499	<u>Summer 2008</u> Chem 399
<u>Autumn 2008</u> Chem 399 Chem 499	<u>Winter 2009</u> Chem 312 Chem 399	<u>Spring 2009</u> Chem 162 Chem 399	<u>Summer 2009</u> Chem 399
<u>Autumn 2009</u> Chem 399 Chem 499	<u>Winter 2010</u> Chem 312 Chem 399	<u>Spring 2010</u> Chem 317 Chem 399	<u>Summer 2010</u> Chem 317

<u>Autumn 2010</u> Chem 399 Chem 499	<u>Winter 2011</u> Chem 312 Chem 399	<u>Spring 2011</u> Chem 317 Chem 399	<u>Summer 2011</u> Chem 399
<u>Autumn 2011</u> Chem 312 Chem 499	<u>Winter 2012</u> Chem 317 Chem 399	<u>Spring 2012</u> Chem 399	<u>Summer 2012</u> Chem 399
<u>Autumn 2012</u> Chem 312 Chem 499	<u>Winter 2013</u> Chem 317 Chem 399	<u>Spring 2013</u> Chem 399	<u>Summer 2013</u> Chem 312 Chem 399
<u>Courses Taught (cont.)</u>			
<u>Autumn 2013</u> Chem 499	<u>Winter 2014</u> Chem 162 Chem 317 Chem 399	<u>Spring 2014</u> Chem 317 Chem 399	<u>Summer 2014</u> Chem 399
<u>Autumn 2014</u> Chem 312	<u>Winter 2015</u> Chem 317 Chem 399	<u>Spring 2015</u> Chem 317 Chem 399	<u>Summer 2015</u> Chem 399
<u>Autumn 2015</u> Chem 416	<u>Winter 2016</u> sabbatical Chem 399 Chem 499	<u>Spring 2016</u> sabbatical Chem 399 Chem 499	<u>Summer 2016</u> Chem 399 Chem 499
<u>Autumn 2016</u> Chem 416	<u>Winter 2017</u> Chem 317 Chem 399 Chem 499	<u>Spring 2017</u> Chem 317 Chem 399 Chem 499	<u>Summer 2017</u> Chem 312 Chem 399 Chem 499
<u>Autumn 2017</u> Chem 416	<u>Winter 2018</u> Chem 317 Chem 399 Chem 499	<u>Spring 2018</u> Chem 317 Chem 399 Chem 499	<u>Summer 2018</u> Chem 399 Chem 499
<u>Autumn 2018</u> Chem 416	<u>Winter 2019</u> Chem 591	<u>Spring 2019</u> Chem 591	<u>Summer 2019</u>
<u>Autumn 2019</u> Chem 591	<u>Winter 2020</u> Chem 317	<u>Spring 2020</u> Chem 510 Chem 317	<u>Summer 2019</u>