

*Curriculum Vitae of*

**Kyle M. Lancaster, Ph.D.**

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**Appointments**

Cornell University, Department of Chemistry and Chemical Biology (CCB)	<i>Ithaca, NY</i>
Professor	July 1 <sup>st</sup> , 2022–
Associate Professor	July 1 <sup>st</sup> , 2018–June 30 <sup>th</sup> , 2022
Assistant Professor	July 1 <sup>st</sup> , 2012–June 30 <sup>th</sup> , 2018
Postdoctoral Associate (supervised by Serena DeBeer) and Visiting Lecturer	2010–2012

**Education**

California Institute of Technology	<i>Pasadena, CA</i>
Ph.D., Chemistry (supervised by Harry B. Gray and John H. Richards) “ <i>Outer-Sphere Effects on the Copper Sites of Pseudomonas aeruginosa Azurins.</i> ”	October 1, 2010
Pomona College	<i>Claremont, CA</i>
B.A., Molecular Biology with Distinction, <i>magna cum laude</i>	May 15, 2005

**Honors and Awards**

Morgan Chia-Wen Sze and Bobbi Josephine Hernandez Distinguished Teaching Prize (Cornell A&S)	2022
National Fresenius Award – Phi Lambda Upsilon	2019
Kavli Fellow – National Academy of Sciences	2018
Dreyfus Foundation Postdoctoral Program in Environmental Chemistry Mentor	2018
Paul Saltman Award (Gordon Research Conferences, Metals in Biology)	2018
Alfred P. Sloan Research Fellowship	2017
National Science Foundation CAREER Award	2015
Department of Energy Office of Science Early Career Award	2015
<i>Forbes</i> 30 Under 30: Science and Health	2013
John Stauffer Scholarship for Academic Merit (Pomona College)	2005
Walter Bertsch Prize in Molecular Biology (Pomona College)	2005
NSF Graduate Research Fellowship	2005
Phi Beta Kappa	2005
Barry Goldwater Scholarship	2004
Pfizer Summer Undergraduate Research Fellowship	2004

**Professional Memberships**

Society of Biological Inorganic Chemistry	2011–Present
Danish Chemical Society	2010–Present
American Chemical Society	2006–Present
Sigma Xi	2004–Present

## Professional Activities

NSLS-II Proposal Review Panel (Spectroscopy)	2019–2022
Vice-Chair, Metallocofactors Gordon Research Conference	Elected 2018, Summer 2022 (Chair 2024)
Kavli Frontiers of Science Chinese-American Symposium	October 2018
DOE Nitrogen Activation Workshop	October 2016
NSF INFEWS Nitrogen Cycle Workshop	November 2015
Cornell High Energy Synchrotron Source User Executive Committee	June 2015–June 2018
Cottrell Scholars Collaborative New Faculty Workshop	August 2012
Cottrell Scholars Collaborative Teaching Study	August 2012–August 2013
Cornell Chemistry Biology Interface Training Grant – Mentor	June 2012–Present
Reviewer for <i>Science</i> , <i>PNAS</i> , <i>JACS</i> , <i>Nature Chem.</i> , <i>Joule</i> , <i>Chem. Sci.</i> , <i>Inorg. Chem.</i> , <i>Sci. Rep.</i> , <i>J. Biol. Inorg. Chem.</i> , <i>J. Inorg. Bioch.</i> , and <i>Dalton Trans.</i>	
Reviewer for the ACS PRF, NSF, DOE BES, SSRL, NSLS-II	

## Independent Publications (h-Index: 37; i10-Index: 78; Google Scholar Data)

- 87) Karsch, C. M.; North, S. C.; DiMucci, I. M.; Iliescu, A.; Vojáčková, P.; Khazanov, T.; Liang-Zheng, S.; Cundari, T. R.; **Lancaster, K. M.**; Betley, T. A.\* Nitrene Transfer from a Sterically Confined Copper Nitrenoid Dipyrrin Complex. (Under revision).
- 86) Kong, R. Y.\*; Parry, J. B.; Anello, G. R.; Ong, M. E.; **Lancaster, K. M.\*** Accelerating  $\sigma$ -bond Metathesis at Sn(II) Centers. (Under revision).
- 85) Senthil, S.; Kwon, S.; Kong, R. Y.; MacMillan, S. N.; Zatsepin, P.; Gau, M. R.; Carroll, P. J.; Baik, M.-H.\*; **Lancaster, K. M.\***; Mindiola, D. J. Tellurolate: An Effective Te-Atom Transfer Reagent to Prepare the Triad of Group 5 Metals Bis(telluridos.) (Under revision).
- 84) Bollmeyer, M. M.; Coleman, R. E.; Majer, S. H.; **Lancaster, K. M.\*** Outer Coordination Sphere Influences on Cofactor Maturation and Substrate Oxidation by Cytochrome P460. *Chem. Sci.* **2023**, *14*, 8925–304.
- Highlighted as a *Chem. Sci.* “Pick of the Week.”
- 83) Bollmeyer, M. M.; Coleman, R. E.; Majer, S. H.; Ferrao, S. D.; **Lancaster, K. M.\*** Cytochrome P460 Cofactor Maturation Proceeds via Peroxide- Dependent Post-Translational Modification. *J. Am. Chem. Soc.* **2023**, *145*, 14404–14416.
- 82) DiMucci, I. M.; Titus, C. J.; Nordlund, D. N.; Bour, J. R.; Chong, E.; Grigas, D. P.; Hu, C.-H.; Kosobokov, M. D.; Martin, C. D.; Mirica, L. M.; Nebra, N. ; Vicic, D. A.; Yorks, L. L.; Yruegas, S.; MacMillan, S. N.\*; Shearer, J.\*; **Lancaster, K. M.\*** Scrutinizing Formally Ni<sup>IV</sup> Centers through the Lenses of Core Spectroscopy, Molecular Orbital Theory, and Valence Bond Theory. *Chem. Sci.* **2023**, *14*, 6915–6929.
- 81) Azbell, T. J.; Pitt, T. A.; Bollmeyer, M. M.; Cong, C.; **Lancaster, K. M.**; Milner, P. J.\* Ionothermal Synthesis of Metal-Organic Frameworks Using Low-Melting Metal Salt Precursors. *Angew. Chem. Int. Ed.* **2023**, *62*, e202218252.
- 80) Shearer, J.\*; Vasiliauskas, D.; **Lancaster, K. M.\*** Bonding and the Role of Electrostatics in Driving C–C Bond Formation in High Valent Organocopper Compounds. *Chem. Commun.* **2023**, *59*, 98–101.
- 79) Dey, A.; Albert, T.; Kong, R. Y.; MacMillan, S. N.; Moënné-Loccoz, P.\*; **Lancaster, K. M.\***; Goldberg, D. P.\* Direct Reduction of NO to N<sub>2</sub>O by a Mononuclear Nonheme Thiolate Ligated Iron(II) Complex via Formation of a Metastable {FeNO}<sup>7</sup> Complex. *Inorg. Chem.* **2022**, *61*, 14909–14917.
- 78) Kayser, A. K.; Wolczanski, P. T.\*; Cundari, T. R.; Bollmeyer, M. M.; **Lancaster, K. M.**; MacMillan, S. N. TEMPO Coordination and Reactivity in Group 6; Pseudo-Pentagonal Planar ( $\eta^2$ -TEMPO)<sub>2</sub>CrX (X = Cl, TEMPO). *Chem. Commun.* **2022**, *58*, 9818–9821.

- 77) Hosseininasab, V.; DiMucci, I. M.; Ghosh, P.; Bertke, J. A.; Chandrasekharan, S.; Titus, C. J.; Nordlund, D.; Freed, J. H.; **Lancaster, K. M.\***; Warren, T. H.\* Lewis Acid-Assisted Reduction of Nitrite to Nitric and Nitrous Oxide via the Elusive Nitrite Radical Dianion. *Nature Chem.* **2022**, *14*, 1265–1269.
- 76) Roy M. D.; Trenerry, M. J.; Thakuri, B.; MacMillan, S. N.; Liptak, M. D.; **Lancaster, K. M.**, Berry, J. F.\* Electronic Structure of Ru<sub>2</sub><sup>6+</sup> Complexes with Electron-Rich Anilinopyridinate Ligands. *Inorg. Chem.* **2022**, *61*, 3443–3457.
- 75) Pokhriyal, D.; Heins, S. P.; Sifri, R. J.; Gentekos, D. T.; Coleman, R. E.; Wolczanski, P. T.\*; Cundari, T. R.; Fors, B. P.\*; **Lancaster, K. M.**; MacMillan, S. N. Reversible C–C Bond Formation, Halide Abstraction, and Electromers in Complexes of Iron Containing Redox Non-Innocent Pyridine-Imine Ligands. *Inorg. Chem.* **2021**, *60*, 18662–18673.
- 74) Nava, M.; Zhang, S.; Pastore, K. S.; Feng, X.; **Lancaster, K. M.**, Nocera, D. G.\*; Cummins, C. C.\* Lithium Superoxide Encapsulated in a Benzoquinone Anion Matrix. *Proc. Natl. Acad. Sci. U.S.A.* **2021**, *118*, e201939211.
- 73) Kim, J.; Moisanu, C. M.; Gannett, C.; Halder, A.; Fuentes-Rivera, J. J.; Majer, S. H.; **Lancaster, K. M.**; Forse, A. C.; Abruña, H. D.; Milner, P. J.\* Conjugated Microporous Polymers via Solvent-Free Ionothermal Cyclotrimerization of Methyl Ketones. *Chem. Mat.* **2021**, *33*, 8334–8342.
- 72) Dey, A.; Gordon, J. B.; Albert, T.; Sabuncu, S.; Siegler, M. A.; MacMillan, S. N.; **Lancaster, K. M.\***; Moënné-Loccoz,\* Goldberg, D. P.\* A Nonheme Mononuclear {FeNO}<sup>7</sup> Complex that Produces N<sub>2</sub>O in the Absence of an Exogenous Reductant. *Angew. Chem. Int. Ed.* **2021**, *133*, 21728–21734.
- 71) Liu, J.; Bollmeyer, M. M.; Kim, Y.; Xiao, D.; MacMillan, S. N.; Chen, Q.; Leng, X.; Kim, S. H.\*; Zhao, L.\*; **Lancaster, K. M.\***; Deng, L.\* An Isolable Mononuclear Palladium(I) Amido Complex. *J. Am. Chem. Soc.* **2021**, *143*, 10751–10759.
- 70) Zhang, Y.; Su, D.; Dzikovski, B.; Majer, S. H.; Coleman, R.; Chandrasekaran, S.; Fenwick, M. K.; Crane, B. R.; **Lancaster, K. M.**; Freed, J. H.; Lin, H.\* Dph3 Enables Aerobic Diphthamide Biosynthesis by Donating One Iron Atom to Transform a [3Fe–4S] to a [4Fe–4S] Cluster in Dph1–Dph2. *J. Am. Chem. Soc.* **2021**, *143*, 9314–9319.
- 69) Stein, L. Y.\*; Klotz, M. G.; **Lancaster, K. M.**; Nicol, G. W.; Qin, W.; Schleper, C.; Stahl, D.; Ward, B. B.; Yoon, S. Comment on “A Critical Review on Nitrous Oxide Production by Ammonia-Oxidizing Archaea” by Lan Wu, Xueming Chen, Wei Wei, Yiwen Liu, Dongbo Wang, and Bing-Jie Ni. *Environ. Sci. Technol.* **2021** *55*, 797–798.
- 68) Coleman, R. E.; **Lancaster, K. M.\*** Heme P460: A (Cross) Link to Nitric Oxide. *Acc. Chem. Res.* **2020**, *12*, 2925–2935.
- 67) Nagelski, A. L.; Fataftha, M. S.; Bollmeyer, M. M.; McWilliams, S. F.; MacMillan, S. N.; Mercado, B. Q.; **Lancaster, K. M.\***, Holland, P. L.\* The Influences of Carbon Donor Ligands on Biomimetic Multi-Iron Complexes for N<sub>2</sub> Reduction. *Chem. Sci.* **2020**, *11*, 12710–12720.
- 66) DiMucci, I. M.; MacMillan, S. N.; Walroth, R. C.\*; **Lancaster, K. M.\*** Scrutinizing “Ligand Bands” via Polarized Single-Crystal X-ray Absorption Spectra of Copper(I) and Copper(II) bis-2,2'-Bipyridine Species. *Inorg. Chem.* **2020**, *59*, 13416–13426.
- 65) Reinholdt, A.; Pividori, D.; Laughlin, A. L.; DiMucci, I. M.; MacMillan, S. N.; Jafari, M. G.; Gau, M.; Carroll, P. J.; Krzystek, J.; Ozarowski, A.; Telser, J.\*; **Lancaster, K. M.\***; Meyer, K.; Mindiola, D. J.\* A Mononuclear and High-Spin Tetrahedral Ti<sup>III</sup> Complex. *Inorg. Chem.* **2020**, *59*, 17834–17850.
- Highlighted as an *Inorg. Chem.* “Featured Article.”
- 64) He, X.; Looker, B. G.; Dinh, K. T.; Stubbs, A. W.; Chen, T.-Y.; Meyer, R. J.; Serna, P.; Román-Leshkov, Y.; **Lancaster, K. M.**; Dincă, M.\* Cerium(IV) Enhances the Catalytic Oxidation Activity of Single-Site Cu Active Sites in MOFs. *ACS Catalysis* **2020**, *10*, 7820–7825.

- 63) Shreiber, S. T.; DiMucci, I. M.; Khrizanforov, M. N.; Titus, C. J.; Nordlund, D.; Dudkina, Y.; Cramer, R. E.; Budnikova, Y.; **Lancaster, K. M.\***; Vicic, D. A.\* [(MeCN)Ni(CF<sub>3</sub>)<sub>3</sub>]<sup>-</sup> and [Ni(CF<sub>3</sub>)<sub>4</sub>]<sup>2-</sup>: Foundations Towards the Development of Trifluoromethylations at Unsupported Nickel. *Inorg. Chem.* **2020**, *59*, 9143–9151.
- 62) Wu, T.; MacMillan, S. N.; Rajabimoghadam, K.; Siegler, M. A.; **Lancaster, K. M.\***; Garcia-Bosch, I.\* Structure, Spectroscopy, and Reactivity of a Mononuclear Copper Hydroxide Complex in Three Molecular Oxidation States. *J. Am. Chem. Soc.* **2020**, *28*, 12265–12276.
- 61) Coleman, R. E.; Vilbert, A. C.; **Lancaster, K. M.\*** The Heme-Lys Cross-link in Cytochrome P460 Promotes Catalysis by Enforcing Secondary Coordination Sphere Architecture. *Biochemistry* **2020**, *59*, 2289–2298.
- 60) Goodwin, C. A. P.; Réant, B. L. L.; Vettese, G. F.; Kragoskow, J. G. C.; Giansiracusa, M. J.; DiMucci, I. M.; **Lancaster, K. M.\***; Sproules, S.\*; Mills, D. P.\* Heteroleptic Samarium(III) Chalcogenide Complexes: Opportunities for Giant Exchange Coupling in Bridging σ- and π-radical Lanthanide Dichalcogenides. *Inorg. Chem.* **2020**, *59*, 7571–7583.
- 59) Ferousi, C. M.; Majer, S. H.; DiMucci, I. M.; **Lancaster, K. M.\*** Biological and Bio-Inspired Inorganic N–N Bond Forming Reactions, *Chem. Rev.* **2020**, *12*, 5252–5307.
- 58) Rathnayaka, S. C.; Islam, S. M.; DiMucci, I. M.; MacMillan, S. N.; **Lancaster, K. M.\***; Mankad, N. P. Probing the Electronic and Mechanistic Roles of the μ<sub>4</sub>-Sulfur Atom in a Synthetic Cu<sub>2</sub> Model System. *Chem. Sci.* **2020**, *11*, 3441–3447.
- Highlighted as a *Chem. Sci.* “Pick of the Week.”
- 57) Carsch, K. M., Lukens, J. T., DiMucci, I. M., Iovan, D. A., Li, A., Zheng, S. L., **Lancaster, K. M.\***, Betley, T. A.\* Electronic Structures and Reactivity Profiles of Aryl Nitrenoid-Bridged Dicopper Complexes. *J. Am. Chem. Soc.* **2020**, *142*, 2264–2276.
- 56) Dong, Y.; Lukens, J. T.; Clarke, R. M.; Zheng, S.-L.; **Lancaster, K. M.\***; Betley, T. A.\* Synthesis, Characterization, and C–H Amination Reactivity of Nickel Iminyl Complexes. *Chem. Sci.* **2020**, *11*, 1260–1268.
- 55) DiMucci, I. M.; Lukens, J. T.; Chatterjee, S.; Carsch, K. M.; Titus, C. J.; Lee, S. J.; Nordlund, D.; Betley, T. A.; MacMillan, S. N.; **Lancaster, K. M.\*** The Myth of d<sup>8</sup> Copper(III), *J. Am. Chem. Soc.* **2019**, *141*, 18508–18520.
- Highlighted in *Chemical and Engineering News* and *Nature Reviews Chemistry*.
- 54) Gordon, J. B.; Vilbert, A. C.; DiMucci, I. M.; MacMillan, S. N.; **Lancaster, K. M.\***; Moënné-Loccoz, P.\*; Goldberg, D. P.\* Activation of Dioxygen by a Mononuclear Nonheme Iron Complex: Sequential Peroxo, Oxo, and Hydroxo Intermediates. *J. Am. Chem. Soc.* **2019**, *141*, 17533–17547.
- 53) MacLeod, K. C.; DiMucci, I. M.; Zovinka, E. P.; McWilliams, S. F.; Mercado, B. Q.; **Lancaster, K. M.\***; Holland, P. L.\* Masked Radicals: Iron Complexes of Trityl, Benzophenone, and Phenylacetylene. *Organometallics* **2019**, *38*, 4224–4232.
- 52) Dempsey, J. L.\*; **Lancaster, K. M.\*** Celebrating the Year of the Periodic Table: Emerging Investigators in Inorganic Chemistry. *Inorg. Chem.* **2019**, *58*, 10433–10435.
- Editorial for journal issue guest edited by J.L.D. and K.M.L.
- 51) Dunn, P. L.; Chatterjee, S.; MacMillan, S. N.; Pearce, A. J.; **Lancaster, K. M.\***; Tonks, I. A.\* The 4-Electron Cleavage of a N=N Double Bond by a Trimetallic TiNi<sub>2</sub> Complex. *Inorg. Chem.* **2019**, *58*, 11762–11772.
- 50) Carsch, K. M.; DiMucci, I. M.; Iovan, D. A.; Li, A.; Zheng, S.-L.; Titus, C. J.; Lee, S. J.; Nordlund, D.; **Lancaster, K. M.\***; Betley, T. A.\* Isolation of a Copper-Supported Triplet Nitrene Complex Pertinent to Copper–Catalyzed Amination. *Science* **2019**, *365*, 1138–1143.

- 49) Muok, A. R.; Deng, Y.; Gumerov, V. M.; Chong, J. E.; DeRosa, J. R.; Kurniyati, K.; Coleman, R. E.; **Lancaster, K. M.**; Li, C.; Zhulin, I. B.; Crane, B. R. A Di-Iron Protein Recruited as an Fe(II) and Oxygen Sensor for Bacterial Chemotaxis Functions by Stabilizing an Iron-Peroxy Species. *Proc. Natl. Acad. Sci. U.S.A.* **2019**, *116*, 14955–14960.
- 48) Moore, J. T.#; Chatterjee, S.#; Tarrago, M.#; Clouston, L. J.; Sproules, S.; Bill, E.; Bernales, V.; Gagliardi, L.; Ye, S.\*; **Lancaster, K. M.\***; Lu, C. C. Enhanced Fe-centered Redox Flexibility in Fe-Ti Heterobimetallic Complexes. *Inorg. Chem.* **2019**, *58*, 11762–11772.
- 47) Confer, A. M.; Vilbert, A. C.; Dey, A.; **Lancaster, K. M.\***; Goldberg, D. P.\* A Mononuclear, Nonheme Fe<sup>II</sup>-Piloty's Acid (PhSO<sub>2</sub>NHOH) Adduct: An Intermediate in the Production of {FeNO}<sup>7/8</sup> Complexes from Piloty's Acid. *J. Am. Chem. Soc.* **2019**, *141*, 7046–7055.
- 46) Reinholdt, A.#; Majer, S. H.#; Gelardi, R. M.; MacMillan, S. N.; Hill, A. F.; Wendt, O. F.; **Lancaster, K. M.\***; Bendix, J.\* An Approach to Carbide-Centered Cluster Complexes. *Inorg. Chem.* **2019**, *58*, 4812–4819.
- 45) **Lancaster, K. M.\*** Editorial Overview: Emergent Lessons from the Elements of Life. *Curr. Opin. Chem. Biol.* **2019**, *49*, A4–A5.
- Editorial for journal issue guest edited by K.M.L.
- 44) Lukens, J. T.#; DiMucci, I. M.#; Kurogi, T.; Mindiola, D. J.; **Lancaster, K. M.\*** Scrutinizing Metal-Ligand Covalency and Redox Non-Innocence Via Nitrogen K-edge X-ray Absorption Spectroscopy. *Chem. Sci.* **2019**, *10*, 5044–5055.
- 43) Smith, M. A.; Majer, S. H.; Vilbert, A. C. **Lancaster, K. M.\*** Controlling a Burn: Outer-Sphere Gating of Hydroxylamine Oxidation by a Distal Base in Cytochrome P460. *Chem. Sci.* **2019**, *10*, 3756–3764.
- Highlighted as a *Chem. Sci.* “Pick of the Week.”
- 42) Gordon, J. B.; Vilbert, A. C.; Siegler, M. A.; **Lancaster, K. M.\***; Möenne-Loccoz, P.\*; Goldberg, D. P.\* A Nonheme Thiolate-Ligated Cobalt Superoxo Complex: Synthesis and Spectroscopic Characterization, Computational Studies, and Hydrogen Atom Abstraction Reactivity. *J. Am. Chem. Soc.* **2019**, *141*, 3641–3653.
- 41) Leguto, A. J.#; Smith, M. A.#; Morgada, M. N.; Zitare, U. A.; Murgida, D. H.; **Lancaster, K. M.\***, Vila, A. J. Dramatic Electronic Perturbations of Cu<sub>A</sub> Centers via Subtle Geometric Changes. *J. Am. Chem. Soc.* **2019**, *141*, 1373–1381.
- 40) Roy, L.; Al-Afyouni, M. H.; DeRoshia, D. E.; Mondal, B.; DiMucci, I. M.; **Lancaster, K. M.**, Shearer, J.; Bill, E.; Brennessel, W. W.; Neese, F.; Ye, S.\*; Holland, P. L.\* Reduction of CO<sub>2</sub> by a Masked Two-Coordinate Cobalt(I) Complex and Characterization of a Proposed Oxodicobalt(II) Intermediate. *Chem. Sci.* **2019**, *10*, 918–929.
- 39) Hulley, E. B.; Heins, S. P.; Wolczanski, P. T.\*; **Lancaster, K. M.**; Lobkovsky, E. B. Azaallyl-derived Ring Formation Via Redox Coupling in First Row Transition Metals. *Polyhedron* **2019**, *158*, 225–233.
- Invited contribution to W. D. Jones birthday issue.
- 38) Siu, J. C.; Sauer, G. S.; Saha, A.; Macey, R. L.; Fu, N.; Chauviré, T.; **Lancaster, K. M.\***; Lin, S.\* Electrochemical Azidooxidation of Alkenes Mediated by a TEMPO–N<sub>3</sub> Charge-Transfer Complex. *J. Am. Chem. Soc.* **2018**, *140*, 12511–12520.
- 37) Dey, A.; Confer, A. M.; Vilbert, A. C.; Möenne-Loccoz, P.\*; **Lancaster, K. M.\***, Goldberg, D. P.\* A Nonheme Sulfur-Ligated {FeNO}<sup>6</sup> Complex and Comparison with Redox-Interconvertible {FeNO}<sup>7</sup> and {FeNO}<sup>8</sup> Analogues. *Angew. Chem. Int. Ed.* **2018**, *57*, 13465–13469.
- 36) **Lancaster, K. M.\*** Revving Up an Artificial Metalloenzyme. *Science*, **2018**, *361*, 1071–1072.
- Commentary on *Science*, **2018**, *361*, 1098–1101.
- 35) Cook, B. J.; Di Francesco, G. N.; Ferreira, R. B.; Lukens, J. T.; Silberstein, K. E.; Keegan, B. C.; Catalano, V. J.; **Lancaster, K. M.\***; Shearer, J. M.\*; Murray, L. J.\* Chalcogen Impact on Covalency within

Molecular  $[\text{Cu}_3(\mu_3\text{-E})]^{3+}$  Clusters (E = O, S, Se): A Synthetic, Spectroscopic, and Computational Study. *Inorg. Chem.* **2018**, *57*, 11382–11392.

- 34) **Lancaster, K. M.\*** Sizing Up a Supercharged Ferryl. *Proc. Natl. Acad. Sci. U.S.A.* **2018**, *115*, 4532–4534.  
• Commentary on *Proc. Natl. Acad. Sci. U.S.A.* **2018**, *115*, 4565–4570.
- 33) Broere, D. L. J.\*; Mercado, B. Q.; Bill, E.; **Lancaster, K. M.**; Sproules, S.; Holland, P. L.\* Alkali Cation Effects on Redox-Active Formazanate Ligands in Iron Chemistry. *Inorg. Chem.* **2018**, *57*, 9580–9591.  
• Forum article.
- 32) Broere, D. L. J.\*; Mercado, B. Q.; Lukens, J. T.; Vilbert, A. C.; Banerjee, G.; Lant, H. M. C.; Lee, S. H.; Bill, E.; Sproules, S.\*; **Lancaster, K. M.\***; Holland, P. L.\* Reversible Ligand-Centered Reduction in Low-Coordinate Iron Formazanate Complexes. *Chem. Eur. J.* **2018**, *24*, 9417–9425.
- 31) Bloom, A. J.\*; **Lancaster, K. M.** A Manganese-Dependent, High-Efficiency Pathway for Plant Photorespiration? *Nature Plants* **2018**, *4*, 414–422.
- 30) Goodwin, C. A. P.; Réant, B. L. L.; Kragoskow, J. G. C.; DiMucci, I. M.; **Lancaster, K. M.\***; Mills, D. P.\*; Sproules, S.\* Heteroleptic Samarium(III) Halide Complexes Probed by Fluorescence-Detected  $L_3$ -edge X-ray Absorption Spectroscopy. *Dalton Trans.* **2018**, *47*, 10613–10625.
- 29) Bren, K. L.; Bullock, R. M.; Chen, J. G.\*; Crooks, R. M.\*; Darendbourg, M. Y.; Hoffman, B. M.; Janik, M. J.; Jones, A. K.; Kanatzidis, M. G.; King, P. W.; **Lancaster, K. M.**; Lyman, S. V.; Pfromm, P. H.; Schrock, R. R.; Seefeldt, L. C.\*; Schneider, W. F.; Thompson, M. E. Beyond Fossil-Fuel Driven Nitrogen Transformations. *Science* **360**, p.eaar6611.  
• Article mandated by DOE BES following October 2016 Nitrogen Activation Workshop.
- 28) Dong, M.; Kathiresan, V.; Fenwick, M. K.; Torelli, A. T.; Zhang, Y.; Caranto, J. D.; Dzikovski, B.; Sharma, A.; **Lancaster, K. M.**; Freed, J. H.; Ealick, S. E.\*; Hoffman, B. M.\*; Lin, H.\* Organometallic and Radical Intermediates Reveal Mechanism of Diphthamide Biosynthesis. *Science*, **2018**, *359*, 1247–1250.
- 27) **Lancaster, K. M.\***; Caranto, J. D.; Majer, S. H.; Smith, M. A. Alternative Bioenergy: Updates to and Challenges in Nitrification Metalloenzymology. *Joule* **2018**, *2*, 421–441.
- 26) Smith, M. A.; **Lancaster, K. M.\*** The Eponymous Cofactors in Cytochrome P460s from Ammonia-Oxidizing Bacteria Are Iron Porphyrinoids Whose Macrocycles Are Dibasic. *Biochemistry*, **2018** *57*, 334–343.  
• Article featured in "Future of Biochemistry" special issue.
- 25) Agnew, D. W.; DiMucci, I. M.; Arroyave, A.; Gembicky, M.; Moore, C. E.; MacMillan, S. N.; Rheingold, A. E.; **Lancaster, K. M.**; Figueroa, J.S.\* Crystalline Coordination Networks of Zero-Valent Metal Centers: Formation of a 3-Dimensional Ni(0) Framework with m-Terphenyl Diisocyanides. *J. Am. Chem. Soc.* **2017**, *139*, 17257–17260.
- 24) Vilbert, A. C.; Caranto, J. D.; **Lancaster, K. M.\*** Influences of the Heme-Lysine Crosslink in Cytochrome P460 Over Redox Catalysis and Nitric Oxide Sensitivity. *Chem. Sci.* **2018** *9*, 368–379.
- 23) Wilding, M. J. T.; Iovan, D. A.; Wrobel, A. T.; Lukens, J. T. MacMillan, S. N.; **Lancaster, K. M.**; Betley, T. A.\* Direct Comparison of C–H Bond Amination Efficacy Through Manipulation of Nitrogen-Valence Centered Redox: Imido versus Iminyl. *J. Am. Chem. Soc.*, **2017**, *139*, 14757–14766.
- 22) Walroth, R. C.; Miles, K. C.; Lukens, J. T.; MacMillan, S. N.; Stahl, S. S.\*; **Lancaster, K. M.\*** Electronic Structural Analysis of Copper(II)–TEMPO/ABNO Complexes Provides Evidence for Copper(I)–Oxoammonium Character. *J. Am. Chem. Soc.* **2017**, *139*, 13507–13517.
- 21) Obanda, A.; Martinez, K.; Schmehl, R. H.; Mague, J. T.; Rubtsov, I. V.; MacMillan, S. N.; **Lancaster, K. M.**; Sproules, S.; Donahue, J. P.\* Expanding the Scope of Ligand Substitution from  $[\text{M}(\text{S}_2\text{C}_2\text{Ph}_2)_2]$  (M = Ni<sup>2+</sup>, Pd<sup>2+</sup>, Pt<sup>2+</sup>) to Afford New Heteroleptic Dithiolene Complexes. *Inorg. Chem.* **2017** *56*, 10257–10267.

- 20) Caranto, J. D.; **Lancaster, K. M.\*** Nitric Oxide is an Obligate Bacterial Nitrification Intermediate Produced by Hydroxylamine Oxidoreductase. *Proc. Natl. Acad. Sci. U.S.A.*, **2017**, *114*, 8217–8222.
- F1000 Recommended, discussed in numerous periodicals including *American Agriculturist*, *Chemical and Engineering News*, and *Albany Times Union*.
- 19) MacMillan, S. N.; **Lancaster, K. M.\*** X-ray Spectroscopic Interrogation of Transition Metal-Mediated Homogeneous Catalysis: Primer and Case Studies. *ACS Catalysis*, **2017**, *7*, 1776–1791.
- Invited perspective article.
- 18) Caranto, J. D.; Vilbert, A. C.; **Lancaster, K. M.\*** *Nitrosomonas europaea* Cytochrome P460 Is a Direct Link between Nitrification and Nitrous Oxide Emission. *Proc. Natl. Acad. Sci. U.S.A.*, **2016**, *113*, 14704–14709.
- Featured on journal cover, highlighted in *Proc. Natl. Acad. Sci. U.S.A.* **2016**, *113*, 14474–14476.
- 17) Ferrando-Soria, J.; Magee, S. A.; Chiesa, A.; Carretta, S.; Santini, P.; Vitorica-Yrezabal, I. J.; Tuna, F.; Whitehead, G. F. S.; Sproules, S.; **Lancaster, K. M.**; Barra, A.-L.; Timco, G. A.; McInnes, E. J. L.; Winpenny, R. E. P.\* Switchable Interaction in Molecular Double Qubits. *Chem.* **2016**, *1*, 727–752.
- 16) Varela-Álvarez, A.; Yang, T.; Jennings, H.; Kornecki, K. P.; MacMillan, S. N.; **Lancaster, K. M.**; Mack, J. B. C.; DuBois, J.; Berry, J. F.\*; Musaev, D. G.\* Rh<sub>2</sub>(II,III) Catalysts with Chelating Carboxylate and Carboxamidate Supports: Electronic Structure and Nitrene Transfer Reactivity. *J. Am. Chem. Soc.* **2016**, *138*, 2327–2341.
- 15) Walroth, R. C.; Lukens, J. T.; MacMillan, S. N.; Finkelstein, K. D.; **Lancaster, K. M.\*** Spectroscopic Evidence for a 3d<sup>10</sup> Ground State Electronic Configuration and Ligand Field Inversion in [Cu(CF<sub>3</sub>)<sub>4</sub>]<sup>1-</sup>. *J. Am. Chem. Soc.* **2016**, *138*, 1922–1931.
- 14) Corcos, A. R.; Villanueva, O.; Walroth, R. C.; Sharma, S. K.; **Lancaster, K. M.\***; MacBeth, C. E.\*; Berry, J. F.\* Oxygen Activation by Co(II) and a Redox Non-Innocent Ligand: Spectroscopic Characterization of a Radical–Co(II)–Superoxide Complex with Divergent Catalytic Reactivity. *J. Am. Chem. Soc.* **2016**, *138*, 1796–1799.
- 13) Hulley, E. B.; Williams, V. A.; Hirsekorn, K. F.; Wolczanski, P. T.\*; **Lancaster, K. M.\***; Lobkovsky, E. B. Application of <sup>93</sup>Nb NMR Spectroscopy to (silox)<sub>3</sub>Nb(X<sub>n</sub>/L<sub>m</sub>) Complexes (silox = <sup>t</sup>Bu<sub>3</sub>SiO): Where Does (silox)<sub>3</sub>Nb(NN)Nb(silox)<sub>3</sub> Appear? *Polyhedron*, **2016**, *103*, 105–114.
- Invited contribution to M. H. Chisholm birthday issue.
- 12) Zeng, T.; **Lancaster, K. M.**; Ananth, N.; Hoffmann, R.\* Anomalous Orbital Admixture in Ammine Complexes. *J. Organomet. Chem.* **2015**, *792*, 6–12.
- Invited contribution to D. M. P. Mingos birthday issue.
- 11) Walroth, R. C.; Uebler, J. W. H.; **Lancaster, K. M.\*** Probing Cu<sup>I</sup> in Homogeneous Catalysis Using High-Energy-Resolution Fluorescence-Detected X-ray Absorption Spectroscopy. *Chem. Commun.* **2015**, *51*, 9864–9867.
- 10) Yao, S.; Martin-Diaconescu, V.; Infante, I.; **Lancaster, K. M.**; Götz, A. W.; DeBeer, S.; Berry, J. F.\* Electronic Structure of Ni<sub>2</sub>E<sub>2</sub> Complexes (E = S, Se, Te) and a Global Analysis of M<sub>2</sub>E<sub>2</sub> Compounds: A Case for Quantized E<sub>2</sub><sup>n-</sup> Oxidation Levels with n = 2, 3, or 4. *J. Am. Chem. Soc.* **2015**, *137*, 4993–5011.
- 9) Morsing, T. J.; MacMillan, S. N.; Uebler, J. W. H.; Brock-Nannestad, T.; Bendix, J.; **Lancaster, K. M.\*** Stabilizing Coordinated Radicals via Metal–Ligand Covalency: A Structural, Spectroscopic, and Theoretical Investigation of Group 9 Tris(Dithiolene) Complexes. *Inorg. Chem.* **2015**, *54*, 3660–3669.
- 8) MacMillan, S. N.; Walroth, R. C.; Perry, D. M.; Morsing, T. J.; **Lancaster, K. M.\*** Ligand-Sensitive but Not -Diagnostic: Evaluating Cr Valence-to-Core X-ray Emission Spectroscopy as a Probe of Inner-Sphere Coordination. *Inorg. Chem.* **2015**, *54*, 205–214.

- 7) Jayarathne, U.; Chandrasekharan, P.; Green, A. F.; Mague, J. T.; DeBeer, S.; **Lancaster, K. M.**; Sproules, S.\*; Donahue, J.\* P. X-ray Absorption Spectroscopy Systematics at the Tungsten L-Edge. *Inorg. Chem.* **2014**, *53*, 8230–8241.
- 6) **Lancaster, K. M.\*** Copper Protein Variants: “Type Zero” Sites in *Encyclopedia of Inorganic and Bioinorganic Chemistry*, John Wiley & Sons, Hoboken, 2014.
  - Invited contribution.
- 5) Kornecki, K. P.; Briones, J. F.; Boyarskihk, V.; Fullilove, F.; Autschbach, J.; Schrote, K. E.; **Lancaster, K. M.**; Davies, H. M. L.\*; Berry, J. F.\* Direct Spectroscopic Characterization of a Transitory Dirhodium Donor/Acceptor Carbene Complex. *Science* **2013**, *342*, 351–354.
- 4) Williams, V. A.; Hulley, E. B.; Wolczanski, P. T.\*; **Lancaster, K. M.**; Lobkovsky, E. B. Exploring the Limits of Redox Non-Innocence: Pseudo Square Planar [ $\{\kappa^4\text{-Me}_2\text{C}(\text{CH}_2\text{N}=\text{CHpy})_2\}\text{Ni}\}^n$  ( $n = 2+, 1+, 0, -1, -2$ ) Favor Ni(II). *Chem. Sci.* **2013**, *4*, 3636–3648.
- 3) Palmer, J. H.\*; **Lancaster, K. M.\*** Molecular Redox: Revisiting the Electronic Structures of the Group 9 Metallocorrols. *Inorg. Chem.* **2012**, *51*, 12473–12482.
- 2) Warren, J. J.; **Lancaster, K. M.\***; Richards, J. H.\*; Gray, H. B.\* Inner- and Outer-Sphere Metal Coordination in Blue Copper Proteins. *J. Inorg. Biochem.* **2012**, *115*, 119–126.
  - Invited contribution to Hans Freeman memorial issue.
- 1) **Lancaster, K. M.\*** Biological Outer Sphere Coordination. *Struct. Bond.* **2012**, *142*, 119–153.
  - Invited contribution to Carl Johan Ballhausen memorial issue.

### Prior, Supervised Publications

- 22) Neu, H. M.; Quesne, M. G.; Yang, T.; Prokop-Prigge, K. A.; Lancaster, K. M.; Donohoe, J.; DeBeer, S.; de Visser, S. P.; Goldberg, D. P. Dramatic Influence of an Anionic Donor on the Oxygen-Atom-Transfer Reactivity of an Mn(V)–Oxo Complex. *Chem. Eur. J.* **2014**, *20*, 14584–14588.
- 21) Pollock, C. J.; **Lancaster, K. M.**; Finkelstein, K. D.; DeBeer, S. Study of Iron Dimers Reveals Angular Dependence of Valence-to-Core X-ray Emission Spectra. *Inorg. Chem.* **2014**, *53*, 10378–10385.
- 20) Pollock, C. J.; Tan, L. L.; Zhang, W.; **Lancaster, K. M.**; DeBeer, S. Light Atom Influences on the Electronic Structures of Iron-Sulfur Clusters. *Inorg. Chem.* **2014**, *53*, 2591–2597.
- 19) Yan, Y.; Keating, C.; Chandrasekharan, P.; Jayarathne, U.; Mague, J. T.; DeBeer, S.; **Lancaster, K. M.**; Sproules, S.; Rubtsov, I. G.; Donahue, J. P. Ancillary Ligand Effects upon Dithiolene Redox Noninnocence in Tungsten Bis(dithiolene) Complexes. *Inorg. Chem.* **2013**, *52*, 6743–6751.
- 18) **Lancaster, K. M.**; Hu, Y.; Bergmann, U.; Ribbe, M. W.; DeBeer, S. X-ray Spectroscopic Observation of an Interstitial Carbide in NiFeN-Bound FeMoco Precursor. *J. Am. Chem. Soc.* **2013**, *135*, 610–612.
- 17) Kropp, H.; King, A. E.; Khusniyarov, M. M.; Heinemann, F. W.; **Lancaster, K. M.**; DeBeer, S.; Bill, E.; Meyer, K. Manganese Nitride Complexes in Oxidation States III, IV, and V: Synthesis and Electronic Structure. *J. Am. Chem. Soc.* **2012**, *134*, 15538–15544.
- 16) **Lancaster, K. M.**; Zaballa, M. E.; Sproules, S.; Sundararajan, M.; DeBeer, S.; Richards, J. H.; Vila, A. J.; Neese, F. N.; Gray, H. B. Outer-Sphere Contributions to the Electronic Structure of Type Zero Copper Proteins. *J. Am. Chem. Soc.* **2012**, *134*, 8241–8253.
- 15) Yao, S. A.; **Lancaster, K. M.**; DeBeer, S.; Berry, J. F. Characterization and Reactivity of a Selenium-Selenium Half Bond: A New Chemical Paradigm for the Chalcogens. *Chem. Eur. J.* **2012**, *18*, 9179–9183.
- 14) Potapov, A.; **Lancaster, K. M.**; Richards, J. H.; Gray, H. B.; Goldfarb, D. Spin Delocalization over the Type Zero Copper Site. *Inorg. Chem.* **2012**, *51*, 4066–4075.



- 13) Scarborough, C. C.; **Lancaster, K. M.**; DeBeer, S.; Weyhermüller, T.; Sproules, S.; Wieghardt, K. Experimental Fingerprints for Redox-Active Terpyridine in  $[\text{Cr}(\text{tpy})_2](\text{PF}_6)_n$  ( $n = 3-0$ ), and the Remarkable Electronic Structure of  $[\text{Cr}(\text{tpy})_2]^+$ . *Inorg. Chem.* **2012**, *51*, 3718–3732.
- 12) **Lancaster, K. M.**; Roemelt, M.; Ettenhuber, P.; Hu, Y.; Ribbe, M. W.; Neese, F.; Bergmann, U.; DeBeer, S. X-ray Emission Spectroscopy Evidences Interstitial Carbide in Nitrogenase Iron-Molybdenum Cofactor. *Science* **2011**, *334*, 974–977.
- 11) **Lancaster, K. M.**; Finkelstein, K. D.; DeBeer, S. K $\beta$  X-ray Emission Spectroscopy Offers Unique Chemical Bonding Insights: Revisiting the Electronic Structure of Ferrocene. *Inorg. Chem.* **2011**, *50*, 6767–6774.
- 10) El Nahhas, A.; Consani, C.; Blanco-Rodríguez, A. M.; **Lancaster, K. M.**; Braem, O.; Cannizzo, A.; Towrie, M.; Clark, I. P.; Zális, S.; Chergui, M.; Vlcek, A., Jr. Ultrafast Excited-State Dynamics of Rhenium(I) Photosensitizers  $[\text{Re}(\text{Cl})(\text{CO})_3(\text{N},\text{N})]$  and  $[\text{Re}(\text{imidazole})(\text{CO})_3(\text{N},\text{N})]^+$ : Diimine Effects. *Inorg. Chem.* **2011**, *50*, 2932–2943.
- 9) **Lancaster, K. M.**; Farver, O.; Wherland, S.; Crane, E. J., III; Pecht, I.; Richards, J. H.; Gray, H. B. Electron Transfer Reactivity of Type Zero *Pseudomonas aeruginosa* Azurin. *J. Am. Chem. Soc.* **2011**, *133*, 4865–4873.
- 8) **Lancaster, K. M.**; Sproules, S.; Palmer, J. H.; Richards, J. H.; Gray, H. B. Outer-Sphere Effects on Reduction Potentials of Copper Sites in Proteins: The Curious Case of High Potential Type 2 C112D/M121E *Pseudomonas aeruginosa* Azurin. *J. Am. Chem. Soc.* **2010**, *132*, 14590–14595.
- 7) **Lancaster, K. M.**; Gerken, J. B.; Durrell, A. C.; Palmer, J. H.; Gray, H. B. Electronic Structures, Photophysical Properties, and Electrochemistry of Ruthenium(II)(bpy) $_2$  Pyridylimidazole Complexes. *Coord. Chem. Rev.* **2010**, *254*, 1803–1811.
- 6) **Lancaster, K. M.**; DeBeer S.; Yokoyama, K.; Richards, J. H.; Gray, H. B. Type Zero Copper Proteins. *Nature Chem.* **2009**, *1*, 711–715.
- 5) Palmer, J. H.; Mahammed, A.; **Lancaster, K. M.**; Gross, Z.; Gray, H. B. Structures and Reactivity Patterns of Group 9 Metallocorroles. *Inorg. Chem.* **2009**, *48*, 9308–9315.
- 4) **Lancaster, K. M.**; Yokoyama, K.; Richards, J. H.; Winkler, J. R.; Gray, H. B. High Potential C112D/M121X (X = M, E, H, L) *Pseudomonas aeruginosa* Azurins. *Inorg. Chem.* **2009**, *48*, 1278–1280.
- 3) Davis, C.; Murphy R.; **Lancaster, K. M.**; Devendra G.; Crane, E. J., III. A Mechanistic Comparison of the Pyrococcal NADH Oxidase and Coenzyme A Disulfide Reductase: Two Hyperthermophilic Enzymes That Are Similar but Different. In *Flavins and Flavoproteins*; Nishino, T., Miura, R., Tanokura, M., Eds.; ArchiTECT Inc.: Tokyo, 2005.
- 2) Hummel, C.S.; **Lancaster, K.M.**; Crane, E. J., III Determination of Coenzyme A Levels in *Pyrococcus furiosus* and Other Archaea: Implications for a General Role of Coenzyme A in Thermophiles. *FEMS Microbiol. Lett.* **2005**, *252*, 229–234.
- 1) Harris, D. R.; Ward, D. E.; Feasel, J. T.; **Lancaster, K. M.**; Murphy, R. D.; Mallet, T. C.; Crane, E. J., III. Discovery and Characterization of a Coenzyme A Disulfide Reductase from *Pyrococcus horikoshii*. Implications for the Disulfide Metabolism of Anaerobic Hyperthermophiles. *FEBS J.* **2005**, *272*, 1189–1200.

## Funding

### Current/Pending

- 1) **Department of Energy Office of Science (Pending)**  
 “Electronic Structure/Function Relationships in Heterobimetallic d-block/p-block Catalysts”  
 Support: \$600,000 (total), \$378,462 (direct)  
 Support Period: 09/01/23–08/31/26
- 2) **National Science Foundation (Awarded)**

- “Collaborative Research: Electronic Structure/Function Relationships Underpinning Atom Transfer Reactivity”  
Support: \$366,433 (total), \$246,432 (direct) (to KML), Collaborative with Theodore A. Betley (Harvard)  
Support Period: 07/01/2023–06/30/2026
- 3) **National Science Foundation (Awarded)**  
“Harnessing Pseudo One- and Two-Coordination for Reactivity and Magnetism”  
Support: \$450,000 (total), \$296,473 (direct)  
Support Period: 08/01/2022–07/31/2025
- 4) **National Institutes of Health R35: Maximizing Investigators’ Research Award (Recommended for funding)**  
“Bioinorganic Chemistry of Nitrogen”  
Support: \$1,991,559 (total), \$1,325,000 (direct)  
Support Period: 05/01/2023–4/31/2027
- 5) **National Institutes of Health R35: Maximizing Investigators’ Research Award (Awarded)**  
“Post-Fixation Nitrogen Cycle Metalloenzymology”  
Support: \$1,874,800 (total), \$1,250,000 (direct)  
Support Period: 09/15/2017–09/14/2023 (1-year no-cost extension)  
Supplement Added: \$84,701 to purchase a JASCO J-1500 spectropolarimeter
- 6) **Department of Energy Office of Science (Awarded)**  
“Bioinorganic Chemistry of Nitrification: Structure and Function of Ammonia Monooxygenase”  
Support: \$450,000 (total)  
Support Period: 09/15/20–09/14/24 (1-year no-cost extension, 1-year supplemental cost extension)

#### Completed

- 8) **National Science Foundation**  
“Collaborative Research: Elucidating the Influence of Metal Binding on Electronic/Geometry Structure-Function Relationships in Photorespiration”  
Support: \$445,047 (to KML), Collaborative with Arnold J. Bloom (UC Davis)  
Support Period: 07/01/19–06/30/23 (1-year no-cost extension)
- 7) **National Science Foundation**  
“Collaborative Research: Electronic Structure/Function Relationships in Base Metal Complexes Spanning the Oxo/Oxene and Imide/Nitrene Continuum”  
Support: \$300,000 (to KML), Collaborative with Theodore A. Betley (Harvard)  
Support Period: 07/01/20–06/30/23
- 6) **Department of Energy Early Career Award**  
“Elucidating Biological Energy Transduction from Ammonia”  
Support: \$863,202 (total), \$611,602 (direct)  
(Support includes \$39,280 supplement to purchase a <sup>57</sup>Fe Mössbauer spectrometer)  
Support Period: 07/15/2015–07/14/2020
- 5) **National Science Foundation CAREER**  
“SusChEM: CAREER: High-Resolution X-ray Spectroscopic Studies of Base Metal Catalysis”  
Support: \$561,000 (total), \$359,260 (direct)  
Support Period: 09/01/2015–08/31/2020
- 4) **The Camille and Henry Dreyfus Foundation Postdoctoral Program in Environmental Chemistry**  
“Elucidating, Commandeering, and Impeding Nitrous Oxide Production During Biological Ammonia Oxidation”  
Support: \$120,000 (total, direct)  
Support Period: 12/01/17–11/30/19
- 3) **Alfred P. Sloan Foundation Research Fellowship**  
“Understanding Reactivity via Electronic Structure: Spectroscopic Studies of Transition Metal Mediated Synthetic and Enzymatic Catalysis”

Support: \$60,000 (total, direct)  
Support Period: 09/15/2017–09/14/2019

- 2) **ACS Petroleum Research Fund Doctoral New Investigator**  
“Chemically Targeted X-ray Spectroscopic Studies of Chromium-Catalyzed Ethylene Trimerization Reactions”  
Support: \$110,000 (total, direct)  
Support Period: 09/01/15–08/31/17
- 1) **Cornell University Startup Grant**  
Support: \$650,000 (total)  
Support Period: 07/01/2012–06/30/2015

## Teaching

Instructor, Cornell University

2012–Present

### **Chem 4100 – Inorganic Chemistry (Undergraduate)**

FA 2012 – Enrollment: 55; Instructor Rating: 3.85/5.00; Course Rating: 3.90/5.00

SP 2014 – Enrollment: 94; Instructor Rating: 3.87/5.00; Course Rating: 3.97/5.00

SP 2015 – Enrollment: 56; Instructor Rating: 4.13/5.00; Course Rating: 4.02/5.00

SP 2022 – Enrollment: 46; Instructor Rating: 3.90/5.00; Course Rating: 3.90/5.00

SP 2023 – Enrollment: 41; Instructor Rating: 4.00/5.00; Course Rating: 4.39/5.00

### **Chem 6050 – Advanced Inorganic Chemistry I (Graduate)**

FA 2013 – Enrollment: 14, Instructor Rating: 4.50/5.00; Course Rating: 4.70/5.00

FA 2014 – Enrollment: 15, Instructor Rating: 4.17/5.00; Course Rating: 4.25/5.00

FA 2015 – Enrollment: 27, Instructor Rating: 4.55/5.00; Course Rating: 4.59/5.00

### **Chem 4400 – Bioinorganic Chemistry (Undergraduate/Graduate)**

SP 2020 – Enrollment: 7, Instructor Rating: 5.00/5.00; Course Rating: 5.00/5.00

SP 2016 – Enrollment: 13, Instructor Rating: 4.40/5.00; Course Rating: 4.60/5.00

### **Chem 2070 – General Chemistry I (Undergraduate)**

FA 2016 – Enrollment: 808, Instructor Rating: 3.82/5.00; Course Rating: 3.31/5.00

FA 2017 – Enrollment: 886, Instructor Rating: 3.95/5.00; Course Rating: 3.67/5.00

FA 2018 – Enrollment: 797, Instructor Rating: 3.97/5.00; Course Rating: 3.64/5.00

### **Chem 2090 – Engineering General Chemistry (Undergraduate)**

SP 2021 – Enrollment: 129, Instructor Rating: 3.94/5.00; Course Rating: 3.49/5.00

### **AS 1102 – Arts and Sciences Advising Seminar**

FA 2020 – Enrollment: 9

## Mentoring

Current Postdoctoral Scholars

**Richard Y. Kong** (Ph.D. Imperial College, London)

September 2021–Present

- Klarman Postdoctoral Fellow, RSC 2022 Dalton Emerging Investigator Award

Current Graduate Students

**Alexander A. Laughlin** (B.S. and M.S. Chemistry, UCLA)

November 2018–Present

**Robert W. Volland** (B.S. Chemistry and Mathematics, Youngstown State U.)

May 2020–Present

**Mary C. Eaton** (B.S. Chemistry, U. Florida)

November 2021–Present

- NSF Graduate Research Fellow

**Jessica N. Holechek** (B.S. Biochemistry, St. Edward’s University)

November 2021–Present

- NSF Graduate Research Fellow

### Current Undergraduate Students

**Guy R. Anello** August 2022–Present  
(Cornell Chemistry and Chemical Biology, Class of 2024)

**Dylan P. Grigas** August 2022–Present  
(Cornell Chemistry and Chemical Biology, Class of 2024)

**Ryan F. Pinard** May 2023–Present  
(Cornell Chemistry and Chemical Biology, Class of 2025)

### Former Visiting Scholars

**Stephen Sproules** (University of Glasgow) November 2016–April 2017

### Former Postdoctoral Scholars

**Samantha N. MacMillan** (Ph.D. MIT 2013) July 2013–July 2015

- Currently director of the Cornell CCB X-ray Diffraction Facility.

**Katharine E. Silberstein** (Ph. D. Cornell University 2015) August 2015–September 2016

**Jonathan D. Caranto** (Ph.D. UT San Antonio 2013) October 2013–December 2017

- Currently a tenure track assistant professor in Chemistry at the University of Central Florida.

**Sudipta Chatterjee** (Ph.D. IACS – Kolkata 2016) February 2017–January 2019

- Currently a tenure-track assistant professor at BITS-Goa

**Christina Ferousi** (Ph.D. Microbiology, Radboud Universit 2017) May 2018–May 2020

- Camille and Henry Dreyfus Postdoctoral Fellow in Environmental Chemistry

### Former Graduate Students

**Thorbjørn J. Morsing** (Visitor from U. Copenhagen) May 2013–August 2013

**Shannon Oseback Sitler** (M.S.) March 2012–May 2013

**Kaitlin E. Schrote** (M.S.) May 2012–August 2015

**Asa E. Carré-Burritt** (Withdrew without degree) November 2014–October 2015

- NSF Graduate Research Fellow.

**Jacob W. H. Uebler** (M.S.) November 2013–August 2016

- NSF Graduate Research Fellow.

**Richard C. Walrorth** (Ph.D, 2017) November 2012–September 2017

- Simon Bauer Award (2016); Tunis Wentink Thesis Prize (2017). Awarded a NASA Postdoctoral Fellowship to support research at NASA - Ames, Palo Alto, CA.

**Avery C. Vilbert** (Ph.D., 2018) November 2013–May 2018

- Simon Bauer Award (2017), Tunis Wentink Thesis Prize (2018)

**Meghan A. Smith** (Ph.D., 2018) November 2013–July 2018

**James T. Lukens** (Ph.D., 2018) November 2013–October 2018

- NSF Graduate Research Fellowship Honorable Mention

**Benjamin G. Looker** (M.S., 2019) November 2017–August 2019

**Ida M. DiMucci** (Ph.D., 2020) November 2015–Present

• NSF Graduate Research Fellowship Honorable Mention, Howard Neal Wachter Award (2019), Tunis Wentink Thesis Prize (2020), Agnew National Security Fellow (2020). Current a tenure-track Assistant Professor at Bates College.

**Sean H. Majer** (Ph.D., 2021) November 2015–August 2021

• NSF Graduate Research Fellow

**Rachael E. Coleman** (Ph.D., 2021) November 2016–August 2021

**Joseph B. Parry** (Ph.D., 2022) September 2019–May 2022

**L. Perry Hicks** (M.S., 2022) November 2019–September 2022

**Melissa M. Bollmeyer** (Ph.D., 2023) November 2018–August 2023

• NSF Graduate Research Fellow, Tunis Wentink Thesis Prize (2023)

Former Undergraduate Students

**Demetra M. Perry** January 2013–May 2013

(B.S. *Magna Cum Laude*, Cornell Chemistry and Chemical Biology 2013)

**Myung K. (Mike) Jeon** January 2013–May 2013

(B.S. *Magna Cum Laude*, Cornell Chemistry and Chemical Biology 2013)

**Corey J. Kaminsky** May 2013–May 2015

(B.S. *Magna Cum Laude*, Cornell Chemistry and Chemical Biology 2015)

• 2014 Hill Fellowship for Summer Undergraduate Research.

**Haley L. Knox** May 2013–May 2015

(B.S. *Cum Laude*, Cornell Chemistry and Chemical Biology 2015)

• 2014 Einhorn Discovery Grant.

**Mackenzie Sennett** January 2013–May 2015

(B.S., Cornell Biological Sciences 2015)

**Conor M. Jones** July 2015–May 2016

(B.S., Cornell Chemistry and Chemical Biology 2016)

**Sean K. Waterton** May 2015–January 2016

(B.S. Cornell Chemistry and Chemical Biology 2017)

• 2015 Douglas Fellowship for Underrepresented Minority Undergraduate Summer Research.

**Jane Vecca** June 2015–May 2017

(B.S. *Cum Laude* Cornell Chemistry and Chemical Biology 2017)

**Ashley Vincent** May 2015–May 2017

(B.S. *Cum Laude* Cornell Chemistry and Chemical Biology 2017)

• 2015 Douglas Fellowship for Underrepresented Minority Undergraduate Summer Research.

**Walter De Ath Wilding Johnsen** September 2017–Present  
(Cornell Chemistry and Chemical Biology 2018)

**Rebecca E. Nicholson** May 2016–May 2018  
(Cornell Chemistry and Chemical Biology 2018)

**Zhiling "Zach" Zheng** May 2017–May 2019  
(Cornell Chemistry and Chemical Biology 2020)  
• 2017 J. Emery Morris Fellowship for Undergraduate Summer Research, 2018 Darryl Wu Memorial Award

**Silas D. Ferrao** May 2018–May 2019  
(Cornell Human Biology, Health, and Society 2019)

**Viktorija Catalan** November 2019–December 2020  
(Chemistry and Chemical Biology, 2022)

**Matthew E. Ong** May 2022–August 2022  
(Pomona College Molecular Biology, 2024)

### **Institutional Service**

Cornell Graduate School Dean's Task Force on Advisor/Advisee Relations 2022–Present  
CCB Director of Graduate Studies 2020–Present  
Cornell Research Advisory Committee 2019–2022  
CCB Teaching Evaluation Committee 2018–Present  
Chemistry Course Director – Weill Cornell Medicine – Qatar 2018–Present  
Arts & Sciences Admissions 2016–Present  
CHESS User Executive Committee 2015–2018  
• Chair, 2016–2018  
CCB M. Chem. Planning Committee 2014–2015  
CCB Facilities Committee 2013–2017  
• Director of Cornell University Protein Facility  
CCB Seminar Committee 2012–Present  
• Founded the ongoing CCB Graduate and Postdoc Seminar (GPS) series.  
• Organized 2014 Baker Symposium.  
CCB Graduate Advising Committee 2012–Present  
CCB Graduate Admissions Committee 2012–Present  
CCB Student Awards Committee 2012–2016

### **Outside Service**

NSF Grant Review Panel November 2022  
NIH Study Section, Ad Hoc Reviewer November 2022  
Guest editor, *Proc. Natl. Acad. Sci. U.S.A.* 2021  
National Synchrotron Lightsource-II, Spectroscopy Proposal Review Panelist 2019–2022  
Gordon Research Conferences, Metallocofactors GRC, Co-organizer 2018–2024  
• Vice-chair 2022, Chair 2024.  
Editorial Board Member, *Inorganica Chimica Acta* 2018–Present  
Guest Editor, *Inorganic Chemistry*, Forum Issue 2019 2018–2019  
Guest Editor, *Current Opinion in Chemical Biology*, Bioinorganic Section 2018–2019  
NSF Grant Review Panel February 2018  
External Ph.D. examiner, Radboud University Department of Microbiology December 2017  
Symposium Co-organizer for American Chemical Society National Meeting 2017–2018  
• Co-organized INOR symposium “Nitrogen Un-Fixation” at Spring 2018 ACS National

### Oral Presentations

- 102) Invited lecture, Metals in Biology Gordon Research Conference, to be presented January 2024.
- 101) Keynote lecture, 6<sup>th</sup> Symposium on Advanced Biological Inorganic Chemistry, Kolkata, India, to be presented January 2024.
- 100) Invited lecture, Texas A&M University, August 2023
- 99) Invited lecture, Baylor University, August 2023.
- 98) Invited lecture, BITS-Goa, India, to be presented December 2023.
- 97) Invited lecture, 20<sup>th</sup> International Conference on Biological Inorganic Chemistry, Adelaide, Australia, Declined.
- 96) Invited lecture, CANBIC 8, Parry Sound, Ontario, Canada, to be presented May 2023.
- 95) Invited lecture, 264<sup>th</sup> National Meeting of the American Chemical Society, Indianapolis, March 2023.
- 94) Invited lecture, Nitric Oxide Gordon Research Conference, February 2023.
- 93) Discussion Leader, Metals in Biology Gordon Research Conference, January 2023.
- 92) Plenary lecture, Winter Fluorine Conference of the ACS Division of Fluorine Chemistry, January 2023.
- 91) Invited lecture, University of Illinois-Chicago, December 2022.
- 90) Invited lecture, University of Chicago, December 2022.
- 89) Invited lecture, The Ohio State University, November 2022.
- 88) Invited lecture, 263<sup>rd</sup> National Meeting of the American Chemical Society, Chicago, August 2022.
- 87) Invited lecture, Seoul National University, Seoul, Republic of Korea, June 2022.
- 86) Invited lecture, KAIST, Daejeon, Republic of Korea, June 2022.
- 85) Invited lecture, 51<sup>st</sup> KAST International Symposium, Seoul, Republic of Korea, June 2022
- 84) Keynote lecture, VII Latin American Meeting on Biological Inorganic Chemistry, Montevideo, Uruguay, (withdrawn).
- 83) Invited lecture, University of Illinois at Chicago, TBD.
- 82) Invited lecture, Inorganic Chemistry Gordon Research Conference, (withdrawn due to COVID-19).
- 81) Invited lecture, Organometallics Gordon Research Conference, July 2022.
- 80) Invited lecture, Columbia University, September 2021.
- 79) Invited lecture, Fall 2021 National Meeting of the American Chemical Society, presented virtually, August 2021.
- 78) Invited lecture, Indiana University, presented virtually June 2020.
- 77) Invited lecture, North Carolina State University, November 2019.
- 76) Invited lecture, Zhejiang University, October 2019.
- 75) Invited lecture, Shanghai Institute of Organic Chemistry, October 2019.
- 74) Plenary lecture, 6<sup>th</sup> International Conference on Nitrification, Xiamen, China, October, 2019.
- 73) Invited lecture, Lehigh University, September 2019.
- 72) Plenary lecture, 5<sup>th</sup> Plant Biotechnology: Green for Good, Prague, Czech Republic, presented June 2019.
- 71) Invited lecture, Telluride Science Research Center Workshop "Control of Proton and Electron Transfers in Redox Catalysis," July 2019.
- 70) Invited lecture, CANBIC 7, Parry Sound, Ontario, Canada, May 2019.
- 69) Invited lecture, Princeton University, May 2019
- 68) Invited lecture, University of Vermont, April 2019.
- 67) Invited lecture, Washington State University, April 2019.
- 66) Invited lecture, Pacific Northwest National Laboratory, April 2019.
- 65) Invited lecture, SUNY Oswego, April 2019.
- 64) Invited lecture, Inorganic Reaction Mechanisms Gordon Research Conference, March 2019.
- 63) Invited lecture, Texas A&M University, presented March 2019.
- 62) Discussion leader, Bioinorganic Chemistry Gordon Research Seminar, January 2019.
- 61) Invited lecture, International Conference on Porphyrins and Phthalocyanines, Munich, July 2018.

- 60) Invited lecture, North America-Greece-Cyprus Workshop on Paramagnetic Materials, Sparta, June 2018.
- 59) Discussion leader, Metallocofactors Gordon Research Conference, June 2018.
- 58) Paul Saltman Award Lecture, Metals in Biology Gordon Research Conference, January 2018.
- 57) Invited lecture, Radboud University, Nijmegen, The Netherlands, December 2017.
- 56) Invited lecture, Harvard University, October 2017.
- 55) Invited lecture, Massachusetts Institute of Technology, October 2017.
- 54) Invited lecture, Cornell University, to be presented September 2017.
- 53) Invited lecture, Boyce Thompson Institute Symposium, September 2017.
- 52) Invited lecture, Pennsylvania State University, September 2017.
- 51) Invited lecture, 254<sup>th</sup> National Meeting of the American Chemical Society, Washington DC, declined invitation.
- 50) Invited lecture, Telluride Science Research Center Workshop "Control of Proton and Electron Transfers in Redox Catalysis," August 2017.
- 49) Invited lecture, 5<sup>th</sup> International Conference on Nitrification 5, Vienna, Austria, July 2017.
- 48) Invited lecture, CANBIC 6, Parry Sound, Ontario, Canada, May 2017.
- 47) Invited lecture, University of Washington, May 2017.
- 46) Invited lecture, University of California, Davis, May 2017.
- 45) Invited lecture, University of California, Los Angeles, May 2017.
- 44) Invited lecture, University of California, Santa Barbara, May 2017.
- 43) Invited lecture, Stanford University, May 2017.
- 42) Invited lecture, California Institute of Technology, May 2017.
- 41) Invited lecture, University of California, San Diego, April 2017.
- 40) Invited lecture, University of California, Irvine, April 2017.
- 39) Invited lecture, Northwestern University, April 2017.
- 38) Invited lecture, University of Minnesota, April 2017.
- 37) Invited lecture and guest instructor, University of Wisconsin – Madison, March 2017.
- 36) Invited lecture, University of Illinois at Urbana-Champaign, March 2017.
- 35) Invited lecture, Reed College, March 2017.
- 34) Invited lecture, Johns Hopkins University, March 2017.
- 33) Invited lecture, University of Pennsylvania, February 2017.
- 32) Invited lecture, Florida State University, February 2017.
- 31) Invited lecture, University of Florida, February 2017.
- 30) Invited lecture, Michigan State University, February 2017.
- 29) Invited lecture, University of Michigan at Ann Arbor, February 2017.
- 28) Invited lecture, Dartmouth College, February 2017.
- 27) Selected oral presentation, Metals in Biology Gordon Research Conference, January 2017.
- 26) Invited lecture, University of California, Berkeley, January 2017.
- 25) Invited lecture, *Inorganic Chemistry* "Young, Outstanding, and Upcoming" Symposium during SABIC 17, Kolkata, India, January 2017.
- 24) Invited lecture, Department of Energy Nitrogen Activation Workshop, October 2016.
- 23) Invited lecture, Department of Energy Physical Biosciences Principal Investigators Meeting, October 2016.
- 22) Silliman Lecture, Yale University, October 2016.
- 21) Invited lecture, Swarthmore College, October 2016.
- 20) Invited lecture, University of Rochester, October 2016.
- 19) Invited lecture, Columbia University, September 2016.
- 18) Invited lecture, 252<sup>nd</sup> National Meeting of the American Chemical Society, Philadelphia, August 2016.
- 18) Selected oral presentation, Metallocofactors Gordon Research Conference, June 2016.
- 17) Invited lecture, Tulane University, April 2016.
- 16) Invited lecture, University of Nevada – Reno, April 2016.
- 15) Invited lecture, 251<sup>st</sup> National Meeting of the American Chemical Society, San Diego, March 2016.



- 14) Contributed lecture, PACIFICHEM 2015, Honolulu, December 2015.
- 13) Invited lecture, Department of Chemistry, University of Copenhagen. October 2015.
- 12) Contributed lecture, 250<sup>th</sup> National Meeting of the American Chemical Society, Boston, August 2015.
- 11) Invited lecture, CANBIC 5, Parry Sound, Ontario, Canada, May 2015.
- 10) Invited lecture (2), 248<sup>th</sup> National Meeting of the American Chemical Society, San Francisco, August 2014.
- 9) Invited lecture (1), 248<sup>th</sup> National Meeting of the American Chemical Society, San Francisco, August 2014.
- 8) Invited tutorial, International Symposium on Advanced Spectroscopy and Theoretical Modeling of Bioinorganic Systems, Copenhagen, Denmark, June 2014.
- 7) Invited lecture, International Symposium on Advanced Spectroscopy and Theoretical Modeling of Bioinorganic Systems, Copenhagen, Denmark, June 2014.
- 6) Invited lecture, CBI Retreat, Ithaca, NY, April 2014.
- 5) Contributed lecture, 245<sup>th</sup> National Meeting of the American Chemical Society, New Orleans, April 2013.
- 4) Invited lecture, Center for Theoretical and Computational Chemistry, University of Tromsø, Tromsø, Norway, May 2012.
- 3) Invited seminar, IBR-CONICET, University of Rosario, Rosario, Argentina, April 2012
- 2) Contributed lecture, 243<sup>rd</sup> National Meeting of the American Chemical Society, San Diego, March 2012.
- 1) Invited lecture, ICBIC 15, Vancouver, British Columbia, Canada, August 2011.