Katlyn Kelli Meier, Ph.D.

Tenure-track Assistant Professor

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EDUCATION AND TRAINING

Stanford University Stanford, CA
Postdoctoral Research Fellow
July 2015-June 2018 (NIH Ruth L. Kirschstein National Research Service Award Postdoc Fellow)
July 2018-July 2019 (Postdoc in Physical Bioinorganic Chemistry)

Carnegie Mellon University Pittsburgh, PA
Doctor of Philosophy in Chemistry
August 2010-May 2015
Cumulative GPA: 4.00

University of Pittsburgh & Carnegie Mellon University Pittsburgh, PA
Molecular Biophysics and Structural Biology
August 2009-Transferred to the CMU Chemistry PhD program in Fall 2010

Allegheny College Meadville, PA
Bachelor of Science Degree in Physics
Minor: Philosophy
August 2005-May 2009

PERSONAL NARRATIVE

I am a tenure-track Assistant Professor in the Department of Chemistry at the University of Miami. My road to this point hasn't been a straight path. From my Physics and Philosophy undergraduate training to a year in a Molecular Biophysics & Structural Biology Ph.D. program, to a Ph.D. program in Physical Chemistry at Carnegie Mellon University, I have been motivated to seek opportunities that excite and challenge me. My doctoral thesis focused on characterizing synthetic, biomimetic, and biological complexes that are involved in oxygen activation. This training enabled me to gain expertise in physical, spectroscopic techniques that few other researchers in my field have (i.e., high-field Mössbauer spectroscopy and its correlation to electron paramagnetic resonance).

My success and achievements opened the door for me to pursue a postdoc in the Solomon Lab at Stanford University, where I was an NIH NRSA F32 postdoctoral fellow. During this period, I collaborated closely with the lab of Dr. Carolyn Bertozzi as well as an industry partner on projects aimed at defining the O2-dependent reaction mechanisms of copper enzymes. In my postdoc, it was important to me that I build upon my expertise and that I surround myself with excellent scientists. While a postdoc, I grew to value having a close network of friends and mentors who I could always count on for their knowledge, honesty, and loyalty. I firmly believe that nurturing and investing in these relationships gave me a sense of security and allowed me to be creative in terms of the risks I felt I could take.

I joined the University of Miami in Fall 2019. I chose to pursue a career in academia because I want the freedom and independence to pursue challenging problems that interest me and that will lead to tangible improvements for others. Something I felt was missing from my previous research experiences was a connection between my research and the real world. I enjoy digging into a problem to understand its innards and turning this into a solution that will have a real impact. This, in a nutshell, is what attracted me to projects with downstream translational potential.

My group's research focuses on understanding the roles of metals, particularly iron and copper, in neurodegenerative disease, facilitating protein-protein interactions that impact drug metabolism, and in anti-oxidant production. My group utilizes metal-centric spectroscopies to characterize metal-protein and metal-enzyme interactions at the molecular level. This insight is then correlated with characterization of protein secondary and quaternary structures, *in vivo* model systems (through collaboration), and *in silico* models, with the ultimate goal being to utilize our insights to guide the design of more effective and site-selective therapeutic agents/inhibitors. Our interdisciplinary approach employs a number of spectroscopic techniques including far-UV, near-UV and UV/Visible/near infrared absorption and CD, fluorescence, Electron Paramagnetic Resonance (EPR) spectroscopy, and variable temperature, variable field Mössbauer spectroscopy. While often used in isolation, the combination of these techniques provides a comprehensive understanding of global and local electronic and structural changes associated with the PPIs by spanning a wide range of energy scales that, in turn, probe conformational changes at various length scales.

PROFESSIONAL/ RESEARCH EXPERIENCE

Assistant Professor — Coral Gables, FL
University of Miami, Department of Chemistry — August 2019-present

Research in the Meier lab takes place at the interface of physical, inorganic, and biological chemistries and utilizes a range of spectroscopic and computational techniques to define the role(s) of metals (copper, heme, and non-heme iron) in the biological systems. More specifically, my research program focuses the roles of these metals as contributors to neurodegenerative disease progression, drug metabolism, and cellular stress response. Our work combines insight into the electronic and geometric structures of metalloproteins, their influence on protein-protein interactions, and their associated mechanistic roles in pathogenesis. Students in my group gain expertise in construct design, protein expression and purification, spectroscopic techniques (CD, EPR, Mössbauer, stopped-flow, etc.), and Density Functional Theory calculations. My lab also collaborates with several groups. These include but are not limited to: (i) the Zhai Lab (Cellular & Molecular Pharmacology, MSOM) to correlate our in vitro work on the huntingtin protein with in vivo Drosophila disease models, (ii) the Shafaat Lab (UCLA) on Fe_3S_4 and $NiFe_3S_4$ clusters, (iii) the Makhlynets Lab (Baylor University) on EPR measurement and characterization of dimanganese systems, (iv) the Snee Lab (UIC) on EPR measurement and characterization of Mn_4Te_4CdSe cluster seeded quantum dots.

- Frost Junior Research Award – January 2020 – January 2021
- University of Miami Clinical & Translational Science Institute KL2 Scholar – February 2021 – January 2023
- National Science Foundation CAREER Award (CHE, Chemistry of Life Processes) – July 2022 (5 yr)
- One-time Funding Opportunity for Junior Faculty Sponsored by the Office of the Vice Provost for Research + Scholarship (OVPRS) – April 2023 – May 31, 2023
- Four publications to date.
- Additional manuscripts: one manuscript submitted, one near submission, and one in preparation.

Postdoctoral Research Fellow — Stanford, CA
Stanford University Chemistry Department — July 2015-August 2019

My research in the Solomon lab focused on characterizing copper-containing enzymes involved in biological dioxygen activation with an emphasis on understanding the mechanisms of O_2 activation in systems including the polysaccharide monooxygenases and the formylglycine generating enzyme.

- Ruth L. Kirschstein National Research Service Award (NRSA) - F32 – recipient from July 2015 – July 2018
- Characterized Cu/O_2 reactive species in two enzyme systems – defining new reaction mechanisms.
- Co-authored five publications, including one as lead author on a special topic *Chemical Review* article.

Graduate Student Researcher — Pittsburgh, PA
Carnegie Mellon University Chemistry Department — June 2010-May 2015

My research in the Münck lab focused on characterization of high-valent iron complexes, both enzymatic and synthetic models, proposed for applications in environmental and biomedical chemistry.

- Co-authored a paper on the first biologically relevant Fe^{V}=O complex to be reported in the literature in 2012.
- Published nineteen papers during my doctoral research tenure in the Münck lab (Fall 2010-Summer 2015).
- Thesis committee: Prof. Catalina Achim (chair), Prof. Eckard Münck (advisor), Prof. Emile Bominaar, and Prof. Michael P. Hendrich.

Internship Pittsburgh, PA
University of Pittsburgh School of Medicine, MBSB department Summer 2008/ 2009

- Assisted Dr. Rieko Ishima and post-doctoral fellow Joseph Walsh researching effects on protein structure and backbone dynamics in the presence and absence of alignment medium.
- I was involved in all stages of this research including protein expression, purification, sample preparation, NMR data collection and NMR data analysis and interpretation.
- Research presented at the University of Pittsburgh Summer Undergraduate Research Conference and later published in Fall 2010.

Senior Comprehensive Project Meadville, PA
Allegheny College Physics Department Fall 2008-Spring 2009

- Collaborated with Dr. Doros Petasis in a two-semester long study using electron paramagnetic resonance spectroscopy and UV-Vis spectrophotometry to probe effects of temperature perturbations and solvent additions to spin crossover systems of Prussian Blue analogs with Fe-Ru cores.
- Presented research at the March 2009 APS Conference in Pittsburgh, PA.

FUNDING (current/previous)

- One-Time Funding Opportunity for Junior Faculty: "Defining the role of C99 and C103 in the interaction of copper with the huntingtin protein" K.K.M. as P.I.; $5,000
- "CAREER: Spectroscopic Studies of Functionally Significant Interactions in Iron-dependent Proteins and Enzymes" – funded by the NSF, CHE – Chemistry of Life Processes - Award No. 2144239; K.K.M. as P.I.; $670,000
- The Miami Clinical Translational Science Institute (CTSI) Mentored Translational Research Scholars Program Awards (KL2) for the fiscal years FY2021-2022; 75% protected research time, $65,000; K.K.M as P.I.
- Frost Junior Fellows Program; K.K.M. as P.I. and R. Grace Zhai as co-P.I.; $30,000
- Ruth L. Kirschstein National Research Service Award F32GM116240; K.K.M. as P.I.; $157,290

HONORS AND AWARDS

- Awarded "Lab of the Year" by the University of Miami Biosafety Department - 2023
- Recipient of the One-Time Funding Opportunity for Junior Faculty Sponsored by the Office of the Vice Provost for Research + Scholarship (OVPRS) (April 15, 2023 – May 31, 2023)
- NSF CAREER Awardee – Chemistry of Life Processes (July 2022 – present)
- Miami Clinical & Translational Research Institute KL2 Mentored Translational Research Scholar (February 2021- July 2022)
- Frost Junior Fellow (January 2020-January 2022)
- Recipient, travel award to attend the Gordon Research Conference on Metallocofactors (June 2018)
- Recipient, Ruth L. Kirschstein National Research Service Award (NRSA) - F32 Fellowship for Postdoctoral Scholars (July 2015-July 2018)
- Recipient, GSA/Provost Conference Funding Travel Award (Summer 2014)
- Recipient, GSA/Provost Conference Funding Travel Award (Summer 2013)
- Recipient, Edwin N. Lassettre Fund for Chemistry Graduate Student Travel Award (Summer 2013)
- Recipient, GSA/Provost Conference Funding Travel Award (Summer 2011)
- Jonathan Lee Rusk Memorial Prize for the outstanding senior research project in experimental Physics (2009)
- Member, National Physics Honor Society, Sigma Pi Sigma (2007-2009)
- Member, National Philosophy Honor Society, Phi Sigma Tau (2007-2009)
- Allegheny College Alden Scholar (2006-2009)
- Academic Excellence Achievement Scholarship Recipient (2005-2009)

PROFESSIONAL AND HONORARY ORGANIZATIONS

- Member, US Mössbauer Community; (as PI) Fall 2020 - present
- Member, Clinical Translational Science Institute (CTSI) Connections Group 2020-present
- Member, American Chemical Society; 2010-present; Inorganic Division 2021-present
- Member, South Florida Section of the American Chemical Society; 2021-present

- Member, Association for Women in Science, Palo Alto Chapter; 2017 - 2019
- Member, Women Chemists Committee; 2012, 2014
- Member, National Physics Honor Society, Sigma Pi Sigma; 2007-2009
- Member, National Philosophy Honor Society, Phi Sigma Tau; 2007-2009

MANUSCRIPTS SUBMITTED/ IN PREPARATION

1. Neupane, D.; Meier, K.K. "Multiple Copper Ions Bind to and Promote the Aggregation of Huntingtin Protein with Non-pathological Repeat Expansions" – *submitted. (September 2024)*
2. Rodriguez, K., Meier, K.K. "Defining Key Factors that Influence the Stability of Tetrameric EgtB from *Chloracidobacterium Thermophilum*." – *near submission. (Summer 2024)*

PEER-REVIEWED PUBLICATIONS

Independent Career

1. Badve, P., **Meier, K.K.** "Defining Requirements for Heme Binding in PGRMC1 and Identifying Key Elements that Influence Protein Dimerization." ***Biochemistry*. 2024**, *63*, 7**,** 926-938.
2. Lobato, A.G., Ortiz-Vega. N., Zhu, Y., Neupane, D., **Meier. K.,** Zhai. R.G. "Copper enhances aggregational toxicity of mutant huntingtin in a *Drosophila* model of Huntington's disease." ***Biochimica et Biophysica Acta (BBA) – Molecular Basis of Disease.* 2024,** *1870,* 1, 166928.
3. El Metwally A. E., Goodarzi, F., **Meier, K. K.**, Zahran, E. M., Rayat, S., Kegnæs, S., Knecht, M. R., Bachas, L. G. "Cu_2S@Bi_2S_3 Double-Shelled Hollow Cages as a Nanocatalyst with Substantial Activity in Peroxymonosulfate Activation for Atrazine Degradation" ***ACS Applied Nano Materials* 2021,** *4,* 12222-12234.
4. Paulino, V.; Mukhopadhyay, A., Tsironi, I.; Liu, K.; Husainy, D.; Liu, C.; **Meier, K.***; Olivier, J.-H.* "Molecular Engineering of Water-Soluble Oligomers to Elucidate Radical π-Anion Interactions in n-doped Nanoscale Objects" ***J. Phys. Chem. C* 2021,** *125,* 10526-10538. **Corresponding author*

Graduate and Postdoctoral Work

5. Lim, H.; Brueggemeyer, M.; Transue, W.; **Meier, K.**; Jones, S.; Kroll, T.; Sokaras, D.; Kelemen, B.; Hedman, B.; Hodgson, K.; Solomon, E. "Kβ X-ray Emission Spectroscopy of Cu(I)-Lytic Polysaccharide Monooxygenase: Direct Observation of the Frontier Molecular Orbital for H_2O_2 Activation" ***J. Am. Chem. Soc.* 2023**, *145*, 29, 16015-16025.
6. Jones, S. M.; Transue, W. J.; **Meier, K. K.**; Kelemen, B.; Solomon, E. I. "Kinetic Analysis of Amino Acid Radicals Formed in H2O2-Driven Cu(I) LPMO Reoxidation Implicates Dominant Homolytic Reactivity." ***Proc. Natl. Acad. Sci.* 2020,** *117,* 11916-11922.
7. Appel, M. J.*; **Meier, K. K.***; Lafrance-Vanasse, J.; Lim, H.; Tsai, C.-L.; Tainer, J. A.; Solomon, E. I.; Bertozzi, C. R. "The formylglycine-generating enzyme binds substrate directly at a mononuclear Cu(I) center to initiate O2 activation" (*co-first authors) ***Proc. Natl. Acad. Sci.* 2019,** *116,* 5370-5375. (Highlighted in: Schilter, D. ***Nature Reviews Chemistry* 2019,** *3,* 203.)
8. **Meier, K.**; Jones, S.; Kaper, T.; Hansson, H.; Koetsier, M.; Sarkehabadi, S.; Solomon, E.; Sandgren, M.; Keleman, B. "Oxygen activation by Cu LPMOs in recalcitrant carbohydrate polysaccharide conversion to monomer sugars." ***Chem. Rev.* 2018**, *118*, 2593-2635.
9. Hansson, H.; Karkehabadi, S.; Mikkelsen, N.; Douglas, N.; Kim, S.; Lam, A.; Kaper, T.; Kelemen, B.; **Meier, K. K.**; Jones, S. M.; Solomon, E. I.; Sandgren, M. "A lytic polysaccharide monooxygenase from *Hypocrea jecorina* with a structurally defined linker sequence." ***J. Biol. Chem.* 2017**, *292*, 19099-19109.
10. **Meier, K. K.**; Rogers, M.; Kovaleva, E. G.; Lipscomb, J. D.; Münck, E. Bominaar, E. "Enzyme Substrate Complex of the H200C Variant of Homoprotcatechuate 2,3-Dioxygenase: Mossbauer and Computational Studies." ***Inorganic Chemistry.* 2016**, *55*, 5862-5870.
11. **Meier, K. K.**; Rogers, M.; Kovaleva, E. G.; Bominaar, E.; Lipscomb, J. D.; Münck, E. "A Long-Lived Fe(III)-(Hydroperoxo) Intermediate in the Active H200C Variant of Homoprotocatechuate 2,3-Dioxygenase: Characterization by Mossbauer, Electron Paramagnetic Resonance, and Density Functional Theory Methods." ***Inorganic Chemistry.* 2015**, *54,* 10269-10280.
12. Prakash, J.; Rohde, G. T.; **Meier, K. K.**; Münck, E.; Que Jr., L. "Upside Down! Crystallographic and Spectroscopic Characterization of an $[Fe^{IV}(O_{syn})(TMC)]^{2+}$ Complex." ***Inorganic Chemistry.* 2015**, *54,* 11055-11057.
13. Serrano-Plana, J.; Oloo, W. N.; Acosta-Rueda, L.; **Meier, K. K.**; Verdejo, B.; Garcia-Espana, E.; Basallote,

M. G.; Munck, E.; Que, Jr., L.; Company, A.; Costas, M. "Trapping a Highly Reactive Nonheme Iron Intermediate That Oxygenates Strong C-H Bonds with Stereoretention." ***J. Am. Chem. Soc.*** **2015**, *137,* 15833-15842.

14. Prakash, J.; Rohde, G. T.; **Meier, K. K.;** Jasniewski, A. J.; Van Heuvelen, K. M.; Munck, E.; Que, Jr., L. **"**Spectroscopic identification of an Fe(III) center, not Fe(IV), in the crystalline Sc-O-Fe adduct derived from $[Fe(IV)(O)(TMC)]^{2+}$. ***J. Am. Chem. Soc.*** **2015**, *137,* 3478-3481.
15. Biswas, A. N.; Puri, M. **Meier, K. K.**; Oloo, W. N.; Rohde, G. T.; Munck, E.; Que, Jr., L. "Modeling TauD-J: a high-spin nonheme oxoiron(IV) complex with high reactivity toward C-H bonds." ***J. Am. Chem. Soc.*** **2015**, *137,* 2428-2431.
16. Makris, T. M.; Vu, V. V.; **Meier, K. K.**; Komor, A. J.; Rivard, B. S.; Munck, E.; Que, Jr., L.; Lipscomb, J. D. "An Unusual Peroxo Intermediate of the Arylamine Oxygenase of the Chloramphenicol Biosynthetic Pathway." ***J. Am. Chem. Soc.*** **2015**, *136,* 1608-1617.
17. *Liu, J.; **Meier, K.**; Tian, S.; Zhang, J.; Guo, H.; Schulz, C. E.; Robinson, H.; Nilges, M. J.; Munck, E.; Lu, Y. "Redesigning an Electron Transfer Protein into a Mononuclear Non-heme Iron Enzyme: Preparation and Study of Fe(II)-M121E Azurin." ***J. Am. Chem. Soc.*** **2014**, *136*, 12337-12344. *Co-first authors
18. Chiang, C.-W.; Kleespies, S. T.; Stout, H. D.; **Meier, K. K.**; Li, P.-Y.; Bominaar, E. L.; Que, Jr., L.; Munck, E.; Lee, W.-Z. "Characterization of a Paramagnetic Mononuclear Nonheme Iron-Superoxo Complex." ***J. Am. Chem. Soc.*** **2014**, 136, 10846-10849.
19. England, J.; Bigelow, J.O.; Van Heuvelen, K.M.; Farquhar, E.R.; Martinho, M.; **Meier, K.K.**; Frisch, J.R.; Munck, E.; Que, Jr., L. "An Ultra-Stable Oxoiron(IV) Complex and Its Blue Conjugate Base." ***Chem. Sci.*** **2014**, 5, 1204-1215.
20. Oloo, W.N.; **Meier, K.K.**, Munck, E., Que Jr., L. "Identification of a low-spin acylperoxoiron(III) intermediate in bio-inspired non-heme iron-catalysed oxidations." ***Nature Commun.*** **2014**, *5*, 3046.
21. Li, F.; Van Heuvelen, K.M.; **Meier, K.K.**; England, J.; Münck, E.; Que, Jr., L. "Sc^{3+} triggered oxoiron(IV) formation from O2 and its nonheme iron(II) precursor via a Sc^{3+}-peroxo-Fe^{3+} intermediate." ***J. Am. Chem. Soc.*** **2013**, *135*, 10198-10201.
22. Banerjee, R.; **Meier, K.K.**; Münck, E.; Lipscomb, J.D. "Intermediate P* from Soluble Methane Monooxygenase Contains a Diferrous Cluster." ***Biochemistry.*** **2013**, *52*, 4331-4342.
23. Mbughuni, M.M.; **Meier, K.K.**; Münck, E.; Lipscomb, J.D. "Substrate-Mediated Oxygen Activation by Homoprotocatechuate 2,3-Dioxygenase: Intermediates Formed by a Tyrosine 257 Variant." ***Biochemistry*****. 2012**, *51*, 8743-8754.
24. Cranswick, M.A.; **Meier, K.K.**; Shan, X.; Stubna, A.; Kaizer, J.; Mehn, M.P.; Münck, E.; Que, Jr., L. "Protonation of a Peroxodiiron(III) Complex and Conversion to a Diiron (III/IV) Intermediate: Implications to Proton-assisted O-O Bond Cleavage in Nonheme Diiron Enzymes." ***Inorganic Chemistry*****. 2012**, *5*, 10417-10426.
25. Van Heuvelen, K.M.; Fiedler, A.T.; DeHont, R.; Shan, X.; **Meier, K.K.**; Bominaar, E.; Münck, E.; Que, Jr. L. "One-electron oxidation of an oxoiron(IV) complex to form an $[O=Fe^{V}=NR]^{+}$ center." ***Proc. Ntl. Acad. Sci*****. 2012**, *109*, 11933-11938.
26. Mbughuni, M.M.; Chakrabarti, M.; Hayden, J.A.; **Meier, K.K.**; Dalluge, J.J.; Hendrich, M.P.; Münck, E.; Lipscomb, J.D. "Oxy-intermediates of homoprotocatechuate 2,3-dioxygenase: facile electron transfer between substrates." ***Biochemistry*****. 2011**, *50*, 10262-10274.
27. Li, F.; **Meier, K.K.**; Cranswick, M.A.; Chakrabarti, M.; Van Heuvelen, K.M.; Münck, E.; Que, Jr., L. "Characterization of a High-Spin Non-Heme Fe^{III}-OOH Intermediate and Its Quantitative Conversion to an Fe^{IV}=O Complex." ***J. Am. Chem. Soc.*** **2011**, *133*, 7256-7259.
28. Walsh, J.D.; **Meier, K.**; Ishima, R.; Gronenborn, A.M. "NMR Studies on Domain Diffusion and Alignment in Modular GB1 Repeats." ***Biophysical Journal*****. 2010**, *99*, 2636-2646.

INVITED TALKS

Independent Career

1. **Meier, K.K.** (21 August 2024) "Meier, K.K. (24 October 2024) "Defining factors that influence the stability and reactivity of *Cth*EgtB" **Fall 2024 SERMACS Meeting and Exposition**, Mechanistic Studies of Chemical/Biochemical Processes, held in Atlanta, Georgia.
2. **Meier, K.K.** (21 August 2024) "Meier, K.K. (21 August 2024) "Spectroscopic Definition of the Requirements for Heme Binding and Dimerization of PGRMC1" **Fall 2024 ACS National Meeting and Exposition**, Inorganic Division held in Denver, Colorado. *Also served as session presider.

3. **Meier, K.K.** (2 April 2024) “Spectroscopic Definition of the Requirements for Heme Binding and Dimerization of PGRMC1" Florida International University, Biomolecular Sciences Institute Seminar
4. **Meier, K.K.** (17 November 2023) “Defining the interaction of metals with the huntingtin protein" University of St. Thomas, Chemistry Department Seminar
5. **Meier, K.K.** (16 November 2023) “Defining the interaction of metals with the huntingtin protein" Macalester College, Chemistry Department Seminar
6. **Meier, K.K.** (2 October 2023) “Defining the interaction of metals with the huntingtin protein" University of Miami, Biology Department Seminar
7. **Meier, K.K.** (24 March 2023) “Defining the Roles of Metals in Mediating Structural Changes and Protein-Protein Interactions" Carnegie Mellon University, Chemistry Department Seminar
8. **Meier, K.K.** (5 December 2022) “Defining the Roles of Metals in Mediating Structural Changes and Protein-Protein Interactions" University of Georgia, Inorganic Chemistry Seminar
9. **Meier, K.K.** (23 August 2022) "Elucidating the role of multi-scale metal-protein interactions in Huntington’s Disease”, **Fall 2022 ACS National Meeting and Exposition**, Inorganic Division held in Chicago, Illinois. *Also served as session presider.
10. **Meier, K.K.** (13 May 2022) "Bridging STEM Disciplines to Tackle Big Problems in Human Health”, Freedom Area High School - Keynote speaker for Spring 2022 Science Conference.
11. **Meier, K.K.** (1 April 2022) "Multi-tasking metals: Defining the functional roles of copper in enzymes and proteins”, Florida International University, Chemistry Department Spring Seminar Series.
12. **Meier, K.K.** (15 November 2021) “Defining the Functional Roles of Copper in Enzymes and Proteins”, South Florida Section of the American Chemical Society, Fall Seminar Series (virtual)
13. **Meier, K.K.** (26 October 2021) “Elucidating the role of metal-protein interactions in Huntington’s Disease”, University of Miami, 5th Annual Neural Engineering Research Symposium (virtual)
14. **Meier, K.K.** (4 June 2020) “Defining the Role of Copper in Neurodegenerative Disease Progression and Exploring its Potential as a Druggable Target”, University of Miami, Frost Junior Fellows Symposium

<u>Graduate and Postdoctoral Work</u>

15. **Meier, K.K.** (4 February 2019) “Spectroscopic characterization of unique iron and copper active sites in biology”, Northwestern University, Chemistry Department Seminar
16. **Meier, K.K.** (15 January 2019) “Spectroscopic characterization of unique iron and copper active sites in biology”, University of Washington, Chemistry Department Seminar
17. **Meier, K.K.** (7 January 2019) “Spectroscopic characterization of unique iron and copper active sites in biology”, University of Wisconsin, Milwaukee, Chemistry Department Seminar
18. **Meier, K.K.** (17 December 2018) “Spectroscopic characterization of unique iron and copper active sites in biology”, University of North Carolina, Chapel Hill, Chemistry Department Seminar.
19. **Meier, K.K.** (13 December 2018) “Spectroscopic characterization of unique iron and copper active sites in biology”, University of Miami, Coral Gables, Chemistry Department Seminar
20. **Meier, K.K.** (10 December 2018) “Spectroscopic characterization of unique iron and copper active sites in biology”, West Virginia University, Chemistry Department Seminar
21. **Meier, K.K.** (6 December 2018) “Spectroscopic characterization of unique iron and copper active sites in biology”, University of Chicago, Chemistry Department Seminar
22. **Meier, K.K.** (4 December 2018) “Spectroscopic characterization of unique iron and copper active sites in biology”, University of Illinois, Chicago, Chemistry Department Seminar
23. **Meier, K.K.** (29 November 2018) “Spectroscopic characterization of unique iron and copper active sites in biology”, University of Michigan, Chemistry Department Seminar
24. **Meier, K.K.** (23 August 2017) “New Insight Into the Reaction Mechanism of the Formylglycine Generating Enzyme: A spectroscopic perspective.” **254th ACS National Meeting and Exposition**, Inorganic Division held in Washington, D.C.
25. **Meier, K.K.** (6 December 2013) “Studies of an Fe(II) dioxygenase and its intermediates using Mössbauer Spectroscopy and DFT.” 9th Annual Mini-Symposium on Metals in Biological Systems held at Duquesne University, Pittsburgh, PA.
26. **Meier, K.K.** (20 June 2013) “At the Frontier of Oxygen Activation Chemistry: The hunt for FeV=O Centers.” **Chemistry Graduate Student Seminar Series at Carnegie Mellon University**, Pittsburgh, PA.

27. **Meier, K.K.** (2 November 2012) "The New Frontier: Novel Fe^{V}=O Centers." Research was presented in a **60-minute lecture** as part of the **joint Physics/Chemistry seminar series at Allegheny College**, Meadville, PA.
28. **Meier, K.K.** (June 2012) "Spectroscopic Characterization of Novel Fe^{V}=O Centers." Research was presented at the **Pennsylvania State University Bioinorganic Training Workshop** in an **invited 75- minute talk** including real-time tutorials for an audience of 70+ graduate students and post-docs and 10+ faculty, State College, PA.
29. **Meier, K.K.**; Van Heuvelen, K.M.; Fiedler, A.T.; DeHont, R.; Shan, X.; Bominaar, E.; Münck, E.; Que, Jr., L. (27 January 2012) "One-electron Oxidation of an Oxoiron(IV) Complex." Research was presented at the **Gordon Research Seminar** as a **30-minute talk**, Ventura, CA.
30. **Meier, K.K.** (6 October 2011) "Enhancing the Information Content of EPR Using High-Frequency Techniques." Presented in the Graduate Seminar series as a **45-minute talk**, Carnegie Mellon University, Pittsburgh, PA.

Undergraduate Work

31. **Meier, K.K.**; Walsh, J.; Ishima, R. (1 August 2008) "Determination of Backbone Dynamics in Single and Dual Domain Protein GB1: Comparison in the Presence and Absence of Alignment Media." Research was presented at the University of Pittsburgh Summer Undergraduate Research Conference held in Pittsburgh, PA.

POSTERS

1. **Meier, K. K.**; Appel, M. J.; Lim, H.; Bertozzi, C. R.; Solomon, E. I. (12 June 2018) "New Insight Into the Reaction Mechanism of the Formylglycine Generating Enzyme and its Requirements for O_2 Activation." 2018 Metallocofactors Gordon Research Conference. Mount Holyoke College, South Hadley, MA.
2. **Meier, K. K.**; Rogers, M.; Kovaleva, E. G.; Bominaar, E.; Munck, E.; Lipscomb, J.D. (10 August 2014) "Characterization of a new, long-lived intermediate in H200C homoprotocatechuate 2,3 dioxygenase by Mossbauer, EPR, and DFT methods." 248th ACS National Meeting and Exposition – Inorganic Division, San Francisco, CA.
3. **Meier, K. K.**; Mbughuni, M.M.; Munck, E.; Lipscomb, J.D. (3 April 2014) "Mössbauer and Density Functional Theory Characterization of Two Short-Lived Intermediates in the Catalytic Cycle of Y257F Homoprotocatechuate 2,3-Dioxygenase." Innovation with Impact Research Exhibition, Carnegie Mellon University, Pittsburgh, PA.
4. **Meier, K.K.**; Mbughuni, M.M.; Munck, E.; Lipscomb, J.D. (22-27 July 2013) "Probing the Reaction Cycle of Y257F Homoprotocatechuate 2,3 Dioxygenase: Mössbauer and Density Functional Theory characterization of two short-lived intermediates." **16th International Conference on BioInorganic Chemistry**, Grenoble, France.
5. **Meier, K.K.**; Van Heuvelen, K.M.; Fiedler, A.T.; DeHont, R.; Shan, X.; Bominaar, E.; Münck, E.; Que, Jr., L. (31 May 2012-9 June 2012) "Spectroscopic Characterization of Novel Fe^{V}=O Centers." The Pennsylvania State University Bioinorganic Training Workshop, State College, PA.
6. **Meier, K.K.**; Li, F.; Cranswick, M.A.; Chakrabarti, M.; Van Heuvelen, K.M.; Münck, E.; Que, Jr., L. (5 April 2012) "Characterization of a High-Spin Nonheme FeIII–OOH Intermediate and Its Conversion to an FeIV=O Complex." Innovation with Impact Research Exhibition, Carnegie Mellon University, Pittsburgh, PA.
7. **Meier, K.K.**; Van Heuvelen, K.M.; Fiedler, A.T.; DeHont, R.; Shan, X.; Bominaar, E.; Münck, E.; Que, Jr., L. (25-28 January 2012) "One-electron Oxidation of an Oxoiron(IV) Complex." Gordon Research Seminar, Ventura, CA.
8. **Meier, K.K.**; Li, F.; Cranswick, M.A.; Chakrabarti, M.; Van Heuvelen, K.M.; Münck, E.; Que, Jr., L. (10 August 2011) "Characterization of a High-Spin Nonheme Fe^{III}–OOH Intermediate and Its Conversion to an Fe^{IV}=O Complex." **15th International Conference on Bio Inorganic Chemistry**, Vancouver, BC Canada.
9. **Meier, K.K.**; Nocera, T.; Abood, R.; Chen, M.; Hilfiger, M.; Petasis, D.; Achim, C.; Dunbar, K. (16-20 March 2009) "Electron Paramagnetic Resonance Spectroscopic Studies of Cyanide-Bridged Fe/Os and Fe/Ru Clusters." 2009 APS March Meeting, Pittsburgh, PA.
10. **Meier, K.K.**; Walsh, J.; Ishima, R. (17 October 2008) "Determination of Backbone Dynamics in Single and Dual Domain Protein GB1: Comparison in the Presence and Absence of Alignment Media." Allegheny College Inaugural Symposium, Meadville, PA.

TEACHING SPECIALIZATION

Instructor – Principles of Chemistry (CHM121-E) Coral Gables, FL
University of Miami, Chemistry Department Spring 2021, '22, '23, '24

- 149-student enrollment, in-person (2021)/ 197-student enrollment, in-person (2022)/ 207-student enrollment, in-person (2023)/ 150-student enrollment, in-person (2024)
- Designed course lectures, and exams, provided feedback to students, graded exams.
- Taught 50-minute lectures 3-times per week and held 3+-hours of office hours per week as well as 2.5 hours of 20-minute one-on-one appointments per week.

Instructor – Principles of Spectroscopic Techniques (CHM565 and 665) Coral Gables, FL
University of Miami, Chemistry Department Fall 2019, 2020, 2023

- 13-student enrollment, in-person format (2019)/ 6-student enrollment, hybrid format (2020)/ 10-student enrollment, in-person format (2023)
- Designed course lectures, assignments, rubrics for student presentations and writing, and exams.
- Taught 50-minute lectures 3-times per week and held two office hours per week as well as upon request.
- In Fall 2023 I incorporated more hands-on/lab-based components to better understand select spectroscopic techniques (i.e., CD, EPR, etc.).

Teaching Assistant – Mathematical Methods for Chemists Pittsburgh, PA
Carnegie Mellon University, Chemistry Department Fall 2010, 2011, 2012

- Designed course assignments, provided feedback to students, graded all materials.
- Taught weekly recitation sessions in addition to holding office hours and tutoring upon request.
- Lead instructor for several classes in years two and three.

Teaching Assistant – Physical Chemistry for Biologists Pittsburgh, PA
Carnegie Mellon University, Chemistry Department Spring 2012

- Designed course assignments and quizzes, provided feedback to students, graded all materials.
- Taught two recitation sessions per week in addition to holding office hours and tutoring upon request.

Teaching Assistant – Physical Chemistry Thermodynamics Pittsburgh, PA
Carnegie Mellon University, Chemistry Department Spring 2011

- Designed course assignments and weekly quizzes, provided feedback to students, graded all materials.
- Taught weekly recitation sessions in addition to holding office hours and tutoring upon request.

PERSONNEL/ MENTORING

Graduate Students:

Deepa Neupane – Graduate student – "Defining the role of copper in neurodegenerative disease progression – a look at the interaction of copper with huntingtin protein."

Prajakta Badve – Graduate student – "Spectroscopic characterization of heme protein-protein interactions promoting chemoresistance."

Kassidy Rodriguez – Graduate student – "Spectroscopic and Biophysical Characterization of *Cth*EgtB – Defining the impact of tertiary structure on reactivity and enzyme mechanism"

Opeyemi Isaac – Graduate Student – *Thesis title TBD*

Undergraduate Students:

Elliott Cleven – Undergraduate student – *Now Chemistry PhD at Univ. Miami*
Alfred Shomar – Undergraduate student – Chemistry
Allison Kelley – Undergraduate student – Biomedical Engineering
Alyssa Francis – Undergraduate student
Rahul Kumar – Undergraduate student – Pre-medicine/ Biology
Emirose Thattil – Undergraduate Student – Biomedical Engineering
Jacqueline Kerry Koerwitz – Undergraduate Student – Psychology, Chemistry (minor)

Nina Ally – Undergraduate Student – Chemistry/International Studies
Jordan Garber – Undergraduate Student – Chemistry
Saisavat Phommavongsa Aguiar – Undergraduate Student from Florida International University, Research Volunteer Spring 2023
Karsten Chima – Undergraduate Student – Chemistry, Physics (double major)

High-School Students:

Esmeralda Swietelsky – Ransom Everglades High School - University of Miami Young Scholar Program
Braylen Washington – Northeast High School – University of Miami Young Scholar Program
Andrea Herrera – School for Advanced Studies Kendall – ACS SEED Program – June – August 2024
Taronish Unwalla – Coral Gables Senior High School – June – July 2024

Dissertation committee member for:

Brianna Bernard – Leblanc Group, Chemistry
Dr. Nermina Brljak – Knecht Group, Chemistry – Defended Fall 2022
Dr. Caroline Velez – Acevedo Group, Chemistry – Defended Spring 2023
Ifigeneia Anais Tsironi Tzinious – Olivier Group, Chemistry
Dr. Emel Kirbas Cilingir – Leblanc Group, Chemistry – Defended Spring 2023
Braulio Carrera Loureiro B Ferreira – Leblanc Group, Chemistry
Dr. Yuliana Perdomo – Knecht Group, Chemistry – Defended Summer 2023
Justin Domena – Leblanc Group, Chemistry
Lukun Wang – Prabhakar Group, Chemistry
Dr. Leonardo Farias Serafim – Prabhakar Group, Chemistry – Spring 2022
Andrea Tomassini - Raymo Group, Chemistry
Kyle Meerbott – Knecht Group, Chemistry
Annu Joji – Leblanc Group, Chemistry
Shiwei Fu – Zhang Group, Chemistry
Sreerag Moorkkannur, Prabhakar Group, Chemistry
Elliott Cleven – Walls Group, Chemistry

SCIENTIFIC LEADERSHIP

1. Revamped a course for graduate students and advanced undergraduate students to teach them about the theory and application of spectroscopic techniques. Course content draws from Quantum Mechanics, Group Theory and symmetry arguments, and instrumentation/experimental considerations. Each time I teach the course I continue to revise and improve the content. For example, this year I included hands on modules on circular dichroism using the instrument in my lab. Feedback from students has included, *"(Dr. Meier) … seems truly enthusiastic and knowledgeable about the course material, and also is very understanding and caring of students when they don't understand."*
2. Mentored high school students through the University of Miami Young Scholar Program (YSP) and the ACS SEED Program. The main objectives of the Young Scholar Program are to offer an immersive research/scholarly experience over the summer term at the University of Miami. High school students previously mentored include Esmeralda Swietelsky, Braylen Washington, Taronish Unwalla, and Andrea Herrera (ACS SEED). These students were immersed in a research environment where they were able to learn and practice biochemical techniques including preparing plates for cell culture, preparing gels for SDS-PAGE, protein purification using affinity resin, etc. Taronish and Andrea worked with me to optimize a 3D printed UV-vis spectrometer that can be leveraged for outreach activities at local high schools.
3. Maytag Fellowship Reviewer (2019 – present) - The Maytag Fellowship Program recognizes the most educationally accomplished incoming students at the University of Miami. Each year I review applications from the College of Arts & Sciences and the Rosenstiel School of Marine, Atmospheric, and Earth Science. I've also led discussion of these reviews in meetings of the review committees over the past few years.
4. Manuscript Reviewer: *Journal of the American Chemical Society; Biochemistry; Frontiers in Chemical Biology, Inorganic Chemistry*