Dr. Jacob C. Lutter
Assistant Professor of Chemistry
University of Southern Indiana
Department of Chemistry and Biochemistry
jlutter@usi.edu
(812) 464-1923

Curriculum Vitae

Education:

2009–2013: B.S. in Chemistry, with Honors and ASC certification. Shippensburg University
Advisor: Prof. Curtis Zaleksi

2013–2018: Ph.D. in Inorganic Chemistry. University of Michigan-Ann Arbor
Advisor: Prof. Vincent Pecoraro

2018: Teaching Postdoctoral Fellow. University of Michigan-Ann Arbor
Advisor: Prof. Vincent Pecoraro

2019–2022: Postdoctoral Fellow. Wayne State University.
Advisor: Prof. Matthew Allen

Research Topics:

Luminescence and magnetic properties of lanthanide ions

Synthesis of metallamacrocyclic molecules

Crystallography

Synthesis of macrocyclic organic molecules

Magnetic resonance

Cross-coupling reactions

Volunteering and Service:

You Be the Chemist Challenge Regional Coordinator

National Chemistry Week demonstration at the Evansville Museum

Presenter for USI visit to the Medical Professions Academy at Central High School

Demonstration Show at Helfrich Park STEM Academy

USI Regional Science Olympiad Event Sponsor

IN–KY border local ACS section Chair-Elect

Pott College Recruitment and Retention Committee

Classes Instructed:

CHEM 261: General Chemistry I

CHEM 441: Inorganic Chemistry

CHEM 462: Physical Chemistry II

Awards:

2016–2018 University of Michigan Chemistry Department Fellow

2019: Wayne State University Postdoctoral Research Fellow

2023: Science, Engineering, and Education Research Grant Award

Publications:
*Denotes Corresponding Author

Lutter, J. C.; Batchev, A.; Ortiz, C. J.; Sertage, A. G.; Romero, J.; Subasinghe, S. A. A. S.; Pedersen, S. E.; Samee, M. A. H.; Paulter, R. G.:* and Allen, M. J.* "Europium(II/III)-containing complexes encapsulated in a perfluorocarbon nanoemulsion for imaging oxygen using ^{19}F-magnetic resonance imaging." *Manuscript Submitted*.

Barraza, Jr., R.; Sertage, A. G.; Kajjam, A. B.; Ward, C. L.; Lutter, J. C.; Schlegel, H. B.; and Allen, M. J.* "Properties of amine-containing ligands that are necessary for visible-light-promoted catalysis with divalent europium." *Inorg. Chem.* **2022**, *61*, 19649–19657. doi: 10.1021/acs.inorgchem.2c02911

Berhard, M,; Lutter, J. C.; and Predecki, A.* "Crystal Structure of 2(*E*)-1-(4-ethoxyphenyl)-3-(4-fluorophenyl)-2-propen-1-one." *Acta. Cryst.* **2022**, *E78*, 821–824.

Corbin, B. A.; Lutter, J. C.; White, S. A.; Al-ani, E.; Biros, E. S.; Karns, J. P.; and Allen, M. J.* "Imaging." In *Comprehensive Inorganic Chemistry III*; Vincent Pecoraro and Zijian Guo, Eds.; Elsevier, *In Press*. doi: 10.1016/B978-0-12-823144-9.00157-6

Salerno, E. V.; Carneiro Neto, A. N.; Eliseeva, S. V.;* Hernandez-Rodriguez, M. A.; Lutter, J. C.; Kampf, J W.; Petoud, S.;* Carlos, L. D.;* and Pecoraro, V. L.* "Tunable optical molecular thermometers based on metallacrowns." *J. Am. Chem. Soc.* **2022**, *114*, 18259–18271. doi: 10.1021/jacs.2c04821

Lutter, J. C.* and Zaleski C. M. "A structural examination of metallacrowns with main group elements in the ring positions." In *Advances in Metallacrown Chemistry*; Curtis Zaleski, Ed.; Springer Nature: Cham, 2022. pp 333–377. doi: 10.1007-978-3-031-08576-5_9

Karns, J. P.; Eliseeva, S. V.;* Ward, C. L.; Allen, M. J.; Petoud, S.;* and Lutter, J. C.* "Near-infrared lanthanide-based emission from fused bis[Ln(III)/Zn(II) 14-metallacrown-5] coordination compounds." *Inorg. Chem.* **2022**, *61*, 5691–5695. doi: 10.1021/acs.inorgchem.2c00084

Biros, E. S.; Ward, C. L.; Allen, M. A.; and Lutter, J. C.* "Identification of seven-coordinate Ln^{III} ions in a $Ln^{III}[15\text{-}MC_{Fe}{}^{III}{}_{N(shi)}\text{-}5](OAc)_2Cl$ species crystallized from methanol and pyridine." *J. Chem. Crystallogr.* **2022**, *52*, 152–160. doi: 10.1007/s10870-021-00900-6

Stark, M.;* Fradgley, J. D.; De Rosa, D. F.; Batsanov, A. S.; Papa, M.; Taylor, M. J.; Lovett, J. E.; Lutter, J. C.; Allen, M. J.; and Parker, D.* "Versatile para-substituted pyridine lanthanide coordination complexes allow late stage tailoring of complex function." *Chem. Euro. J.* **2021**, *27*, 17921–17927. doi: 10.1002/chem.202103243

Ward, C. L.; Allen, M. A.; and Lutter, J. C.* "Hexa-μ-acetato-chlorido (μ-N,2-dioxodobenzene-1-carboximidato)-μ_3-oxido-tetrairon(III)–water (1/1) and hexa-μ-acetato-(μ-N,2-dioxodobenzene-1-carboximidato)fluorido-μ_3-oxido-tripyridinetetrairon(III)–pyridine–water (1/1/0.24)." *Acta. Cryst.* **2021**, *E77*, 1003-1009. doi: 10.1107/S2056989021009208

Lutter, J. C.; Boron, T. T.;* Chadwick, K. E.; Davis, A. H.; Kleinhous, S.; Kampf, J. W.; Zaleski, C. M.;* and Pecoraro, V. L.* "Identification of Slow Magnetic Relaxation and Magnetocoolant Capabilities of Heterobimetallic Lanthanide-Manganese Metallacrown-Like Compounds." *Polyhedron.* **2021**, *202*, 115190–115195. doi: 10.1016/j.poly.2021.115190

Lutter, J. C.; Elisseva, S. V.;* Collet, G.; Martinic, I.; Kampf, J. W.; Schneider, B. L.; Carichner, A.; Sobilo, J.; Lerondel, S.; Petoud, S.;* Pecoraro, V. L.* "Iodinated Metallacrowns: Toward Combined Bimodel Near-infrared and X-ray Contrast Imaging Agents." *Chem. Eur. J.* **2020**, *26*, 1274–1277. doi: 10.1002/chem.201905241

Lutter, J. C.; Lopez Bermudez, B. A.; Nguyen, T. N.; Kampf, J. W.; Pecoraro, V. L.* "Functionalization of Luminescent Lanthanide-Gallium Metallacrowns using Copper-Catalyzed Alkyne-Azide Cycloaddition and Thiol-Maleimido Michael Addition." *J. Inorg. Biochem.* **2019**, *192*, 119–125. doi: 10.1016/j.jinorgbio.2018.12.011

Lutter, J. C.; Hale, L. V. A.; Schultz, G. V.* "Unpacking graduate students' knowledge for teaching solution chemistry concepts." *Chem. Educ. Res. Pract.* **2019**, *20*, 258–269. doi: 10.1039/c8rp00205c

Lutter, J. C.; Eliseeva, S. V.;* Kampf, J. W.; Petoud, S.;* Pecoraro, V. L.* "A Unique Ln(III){[3.3.1]Ga(III) Metallacryptate} Series That Possesses Properties of Slow Magnetic Relaxation and Visible/Near-Infrared Luminescence." *Chem. Eur. J.* **2018**, *24*, 10773–10783. doi: 10.1002/chem.201801355

Lutter, J. C.; Zaleski, C. M.; Pecoraro, V. L.* "Metallacrowns: Supramolecular Constructs with Potential in Extended Solids, Solution-State Dynamics, Molecular Magnetism, and Imaging." In *Advances in Inorganic Chemistry, Vol 71*; Rudi Van Eldik and Ralph Puchta, Eds.; Elsevier: San Diego, 2018. pp 177–247. doi: 10.1016/bs.adioch.2017.11.007

Boron, T. T.;* Lutter, J. C.; Daly, C. I.; Chow, C. Y.; Davis, A. H.; Nimthong-Roldan, A.; Zeller, M.; Kampf, J. W.; Zaleski, C. M.;* Pecoraro, V. L.* "The Nature of the Bridging Anion Controls the Single-Molecule Magnetic Properties of DyX_4M 12-Metallacrown-4 Complexes." *Inorg. Chem.* **2016**, *55*, 10597–10607. doi: 10.1021/acs.inorgchem.6b01832

Hale, L. V. A.; Lutter, J. C.; Schultz, G. V.* "The development of a tool for measuring graduate students' topic specific pedagogical content knowledge of thin layer chromatography." *Chem. Educ. Res. Pract.* **2016**, *17*, 700–710. doi: 10.1039/c5rp00190k

Zaleski, C. M.;* Lutter, J. C.; Zeller, M. "Crystallization of the $Mn^{II}[12\text{-}MC_{Mn}{}^{III}{}_{N(shi)}\text{-}4]^{2+}$ Structure with 1,2,4-Triazolate from Methanol." *J. Chem. Crystallogr.* **2015**, *45*, 142–150. doi: 10.1007/s10870-015-0576-0

Azar, M. A.; Boron, T.T.; Lutter, J. C.; Daly, C. I.; Zegalia, K. A.; Nimthong, R.; Ferrence, G. M.; Zeller, M.; Kampf, J. W.; Pecoraro, V. L.;* Zaleski, C. M.* "Controllable Formation of Heterotrimetallic Coordination Compounds: Systematically Incorporating Lanthanide and Alkali Metal Ions into the Manganese 12-Metallacrown-4 Framework." *Inorg. Chem.* **2014**, *53*, 1729–1742. doi: 10.1021/ic402865p

Lutter, J. C.; Kampf, J. W.; Zeller, M.; Zaleski, C. M.* "Bis(dimethylformamide)pentakis(μ-N,2-dioxidobenzene-1-carboximidato)tetrakis(1-methylimidizol)di-μ-propionato-pentamanganese(III)manganese(II)-dimethylformamide-methanol(1/0.24/1.36)." *Acta. Cryst.* **2013,** *E69*, m483–m484. doi: 10.1107/s1600536813021314

Lutter, J. C., Wu, T.; Yangie, Z.* "Hydration of Cations: A Key to Understanding the Specific Cation Effects on Aggregation Behaviors of PEO-PPO-PEO Triblock Copolymers." *J. Phys. Chem. B*, **2013**, *117*, 10132–10141. doi: 10.1021/jp405709x

Patents Filed:

Trivedi, E. R.; Pecoraro, V.L.; Eliseeva, S. V.; Petoud, S.; Chow, C. Y.; Nguyen, T.; Lutter, J. C.; Martinic, I. Ln(III) and Ga(III) Metallacrown Complexes, **2018**. US Patent No. 10562920.

IONIC VIPEr Learning Objects:

Lutter, J. *Five Slides About*: "Basics of Lanthanide-Based Photophysics."

Quillian, B.; Kissel, D.; Sylvester, E.; Lutter, J.; Sanford, M.; Swails, R.; and Lin, S. *Problem Set*: "Ni(II) Ni(III) Ni(IV) Electron Counting and Geometries (Sanford)."

Quillian, B.; Kissel, D.; Sylvester, E.; Lutter, J.; Sanford, M.; Swails, R.; and Lin, S. *Literature Discussion*: "Design, Synthesis, and carbon-heteroatom coupling reactions of organometallic nickel (IV) complexes (Sanford)."

Lutter, J. *Five Slides About*: "Introduction to Pulsed Gradient Spin Echo DOSY."

Lutter, J. *In Class Activity*: "Advanced MO Diagram Activity."

Doctoral Thesis:

Lutter, J. C.; "Refining Lanthanide Luminescence in Metallacrowns by Systematic Alteration of Hydroximate Ligands." The University of Michigan: Ann Arbor, 2018.

Poster Presentations:

4/2013 – 245th ACS National Meeting and Exhibition. "Synthesis of Novel Magnetic Anisotropic Single-Molecule Magnets."

11/2014 – Ohio Inorganic Weekend. "Solvent Dependent Assembly of Zinc Metallacrown Frameworks."

8/2015 – Karle Symposium at University of Michigan, and 250th ACS National Meeting and Convention. "Multifunctional Behavior of a 20-MC-7 Metallacrown Species."

3/2016 – 251st ACS National Meeting and Exhibition, and 7/2016 Karle Symposium at the University of Michigan. “Utilization of Copper-Catalyzed Alkyne-Azide Cycloaddition Coupling in Luminescent Gallium-Based Metallacrowns.”

11/2017 – Ohio Inorganic Weekend at Ohio State University, and 8/2017 Karle Symposium at the University of Michigan. “Incorporation of Iodine onto Metallacrown Species which Exhibit Lanthanide-Based Luminescence.”

11/2018 – Ohio Inorganic Weekend at Ohio University. “Functionalization of Gallium based Metallacrowns with Biotin using Copper(I)-Catalyzed Alkyne-Azide Cycloaddition which Exhibit Lanthanide Luminescence.”

3/2020 – Graduate Student and Postdoctoral Research Symposium at Wayne State University. “Inclusion of Europium(II)-Containing Macrocyclic-Tetraamide Complexes in Perfluorocarbon Phase.”

Oral Presentations:

8/2015 – 250th ACS National Meeting and Exhibition. “Measurement of Graduate Teaching Assistants’ Pedagogical Content Knowledge Related to Solution-State Concepts.”

2/2016 – Invited Lecture at Shippensburg University of Pennsylvania. “Development of Lanthanide-Containing Metallacrowns towards Optical Imaging Applications.”

9/2017 – Marie Curie IRSES Symposium in Parma, Italy. “Incorporation of Iodine onto Metallacrown Species which Exhibit Lanthanide-Based Luminescence.”

10/2017 – University of Parma, Italy. “Assessment of Solution-State Stability of Metallacrowns.”

01/2020 – Invited Lecture at Concord University. “Development of Imaging Probes using Macrocyclic Lanthanide Complexes.”

12/2020 – Invited Lecture at Drury University. “Undergraduate Research on Metallacrowns towards Imaging Applications.”

11/2021 – Invited Lecture at Le Moyne College. “Exploration of Structural and Spectroscopic Inorganic Chemistry using Metallacrowns.”

01/2022 – Invited Lecture at Emporia State University. “Exploration of Structural and Spectroscopic Properties of Metallacrowns.”

03/2022 – Invited Lecture at the University of Southern Indiana. “Exploration of Trivalent Lanthanide Ion Luminescence in Metallacrown Scaffolds.”

03/2022 – ACS National Meeting and Exhibition. “Exploring Compositions of Lanthanide-Containing Metallacrown Complexes with Lanthanide-Based Near-IR Photoemission.”

References:

Prof. Vincent Pecoraro, John T. Groves Professor of Chemistry, The University of Michigan
Email: vlpec@umich.edu

Prof. Ken Walsh, Associate Professor of Chemistry and Department Chair, University of Southern Indiana
Email: walsh@usi.edu

Prof. Matthew Allen, Professor of Chemistry and Department Chair, Wayne State University
Email: mallen@chem.wayne.edu