Ryan Loren Peterson, PhD

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APPOINTMENTS

10/2019 – Present	Assistant Professor, Department of Chemistry and Biochemistry Texas State University, San Marcos, TX
2021 – present	Adjunct Faculty – Graduate Faculty Courtesy Appointment, Department of Biology, Texas State University, San Marcos, TX
2020 – present	Associated Doctoral Faculty, Materials Science, Engineering, and Commercialization (MSEC) Program Texas State University, San Marcos, TX
2020 – present	Associated Research Faculty, Department of Chemistry and Biochemistry, Texas State University, San Marcos, TX

EDUCATION

09/2019 – 08/2016	Postdoctoral Fellow (Advisor: Thomas R. Ward) University of Basel, Basel, Switzerland
07/2013 – 08/2016	Postdoctoral Fellow (Advisor: Valeria C. Culotta) Johns Hopkins University Bloomberg School of Public Health, Baltimore, Maryland
08/2006 – 07/2015	Graduate Student (Advisor: Kenneth D. Karlin) Degree(s): PhD in Chemistry and MA in Chemistry Johns Hopkins University, Baltimore Maryland
9/2003 – 5/2006	Sonoma State University (Advisor: Carmen F. Works) Degree(s): BS Chemistry Graduated Magna Cum Laude Rohnert Park, California

CONTINUING EDUCATION

2021-2022	ESCALA Certificate in College Teaching at Hispanic Serving Institutions

HONORS AND AWARDS

Professional Honors

2005	SSU Department of Chemistry Department and Faculty Scholarship
2006	BS Chemistry Graduation with Honors and *Magna Cum Laude*
2006-2007	Marks Graduate Fellowship (Department of Chemistry Johns Hopkins University)
2009	Global (GCOE) Research Intern with Shunichi Fukuzumi (Osaka University)
2010	International Conference Bio-Inorganic Chemistry 15 (ICBIC15); Awarded the 3rd place poster award from *Helvetica Chimica Acta*
2011-2012	Rudolf Sonneborn Fellowship (Department of Chemistry Johns Hopkins University)
2015-2016	Johns Hopkins University/Goucher College Teaching Fellow

2023 Texas State University CoSE Scholarly Achievement for Excellence in Scholarly / Creative Activities
2024 Texas State University CoSE Millionaire Award
2024 THRC Faculty Fellow for Health and Economic Resilience Research

PUBLICATIONS AND PRESENTATIONS

*‡ Texas State undergraduate student; ⁺ Texas State graduate student; *As Corresponding Author.*

Submitted Manuscripts

1. Espinoza-Chavez, W.F., **Peterson, R.L.**, Mandal, S. Harnessing Lignocellulosic Biochar for Sustainable Remediation of Pesticide and Pharmaceutical Contaminants in Soil: A Review. Submitted August 4, 2025. Under review in *CLEAN – Soil, Air, Water*.

Publications

23. **Peterson, R.L**.* and Culotta, V.C. From Hemocuprein to CSRP: the Many Faces of Cu/Zn Superoxide Dismutase. Submitted Dec 18, 2025. In Press *Metallomics*
22. Maldonado, C.A.O., Mares, D.M., Garcia, P.C., Gamez, M.F., Flores, M.R., Friudenberg, A.D.,⁺ **Peterson, R.L.**, Harr, J.C. Microplastic-mediated Delivery of Di-butyl Phthalate Alters *C. elegans* Lifespan and Reproductive Fidelity. *Microplastics* **2025**, 4, 96.
21. Anne, S.,⁺ McDonald, M.R.,‡ Lu, Y., **Peterson. R.L.*** *Pseudogymnoascus destructans* Transcriptional Response to Chronic Copper Stress. *J. Fungi* **2025**, 11, 325.
20. Ogunwa, T., Ledezma, D.,‡ Thornhill, G.,‡ **Peterson. R.L.*** Enhancing Copper Toxicity Against *Saprolegnia parasitica,* a Devastating Oomycete Pathogen in Aquaculture. *Discover Applied Sciences* **2025,** 7, 446.
19. Anne, S.,⁺ Friudenberg, A.D.,⁺ **Peterson, R.L.*** Characterization of a High-Affinity Copper Transporter *CTR1a* in the White-Nose Syndrome Causing Fungal Pathogen *Pseudogymnoascus destructans*. *J. Fungi* **2024**, *10*, 729.
18. Igareta, N.I., Tachibana, R., Spiess, D.C., **Peterson, R.L.,*** Ward, T.R.. *Shielding the Active Site: A Chimeric Streptavidin Superoxide-Dismutase Chimera as Host Protein for Asymmetric Transfer Hydrogenation*. Faraday Discussion **2023**, 244 9-20.
17. Christoffel, F., Igareta, N.I., Pellizzoni, M.M., Tiessler-Sala, L., Lozhkin, B., Spiess, D.C., Lledos, A., Marechal, J.D., **Peterson, R.L.,*** Ward, T.R. Design and Evolution of Chimeric Streptavidin for Protein-Enabled Dual Gold Catalysis. Nature Catalysis **2021** 4(8). 643-653
16. Serrano-plana, J., Rumo, C., Rebelein, J.G., **Peterson, R.L**., Barnet, M., Ward, T.R. Enantioselective Hydroxylation of Benzylic C(sp^3)–H Bonds by an Artificial Iron Hydroxylase Based on the Biotin–Streptavidin Technology. *J. Am. Chem. Soc.* **2020.** 142. 10617-10623.

Prior to Texas State University

15. Schatzman, S.S., **Peterson, R.L,** Teka, M., He, B., Cabelli, D.E, Cormack, B.P., and Culotta V.C. Extracellular SODs for Morphogenesis and Fe Starvation Stress in Candida Species *J. Biol. Chem.* **2020**, 295, 570-583.
14. Deliz Liang, A., Serrano-plana, J., Peterson, R.L., Ward, T.R Artificial Metalloenzymes Based on the Biotin–Streptavidin Technology: Enzymatic Cascades and Directed Evolution *Acc. Chem. Res.* **2019,** 523, 585-595
13. Robinett, N.G., **Peterson, R.L.**, and Culotta V.C. Eukaryotic Cu-only Superoxide Dismutases (SODs): A new class of SOD enzymes and SOD-like protein domains. *J. Biol. Chem.* **2018**, 293, 4636-4643.

12. Garcia-Bosch, I., Cowley, R.E., Díaz, D.E., **Peterson, R.L.**, Solomon, E.I and Karlin, K.D. Substrate and Lewis Acid Coordination Promote O–O Bond Cleavage of an Unreactive $L_2Cu^{II}_2(O_2^{2-})$ Species to Form $L_2Cu^{III}_2(O)_2$ Cores with Enhanced Oxidative Reactivity. *J. Am. Chem. Soc.,* **2017**, 139, 3186-95.

11. **Peterson, R.L.**, Galaleldeen, A., Villarreal, J., Taylor, A.B., Cabelli, D.E., Hart, P.J., Culotta, V.C. The Phylogeny and Active Site Design of Eukaryotic Cu-only Superoxide Dismutases. *J. Biol. Chem.* **2016**, 291, 20911-20923.

10. Kim S, Ginsbach, J.W., Lee, J.Y., **Peterson, R.L.**, Liu, J.J., Siegler, M.A., Sarjeant, A.A., Solomon, E.I., Karlin, K.D. Amine Oxidative N-Dealkylation via Cupric Hydroperoxide Cu-OOH Homolytic Cleavage Followed by Site-Specific Fenton Chemistry. *J. Am. Chem. Soc.,* **2015**, 137, 2867-74.

9. Garcia-Bosch, I, Adam, S.M., Schaefer, A.W., Sharma, S.K., **Peterson, R.L.**, Solomon, E.I., Karlin, K.D. A "naked" Fe(III)-(O_2^{2-})-Cu(II) species allows for structural and spectroscopic tuning of low-spin heme-peroxo-Cu complexes. *J. Am. Chem. Soc.,* **2015**, 137, 1032-35.

8. Lee, J.Y., **Peterson, R.L.**, Ohkubo, K, Garcia-Bosch, I, Himes, R.A., Woertink, J, Moore, C.D., Solomon, E.I., Fukuzumi, S, Karlin, K.D. Mechanistic insights into the oxidation of substituted phenols via hydrogen atom abstraction by a cupric-superoxo complex. *J. Am. Chem. Soc.,* **2014**, 136, 9925-37.

7. Gleason, J.E., Galaleldeen, A., **Peterson, R.L.**, Taylor, A.B., Holloway, S.P., Waninger-Saroni, J., Cormack. B.P., Cabelli, D.E., Hart, P.J., Culotta, V.C. Candida albicans SOD5 represents the prototype of an unprecedented class of Cu-only superoxide dismutases required for pathogen defense. *Proc. Natl. Acad. Sci*. **2014**, 111(16), 5866-71.

6. Ginsbach, J. W., **Peterson, R. L**., Cowley, R. E., Karlin, K. D., Solomon, E. I. Correlation of the Electronic and Geometric Structures in Mononuclear Copper(II) Superoxide Complexes. *Inorg. Chem.* **2013**, 52, 12872.

5. **Peterson, R. L.**, Ginsbach, J. W., Cowley, R. E., Qayyum, M. F., Himes, R. A., Siegler, M. A., Moore, C. D. Hedman, B., Hodgson, K. O., Fukuzumi, S., Solomon, E. I.;,Karlin, K. D. Stepwise Protonation and Electron-Transfer Reduction of a Primary Copper-Dioxygen Adduct. *J. Am. Chem. Soc.* **2013**, 135, 16454.

4. Kakuda, S., **Peterson, R. L.**, Ohkubo, K., Karlin, K. D., Fukuzumi, S. Enhanced Catalytic Four-Electron Dioxygen (O_2) and Two-Electron Hydrogen Peroxide (H_2O_2) Reduction with a Copper(II) Complex Possessing a Pendant Ligand Pivalamido Group. *J. Am. Chem. Soc.* **2013**, *135*, 6513.

3. **Peterson, R. L.**, Himes, R. A., Kotani, H., Suenobu, T., Tian, L., Siegler, M. A., Solomon, E. I., Fukuzumi, S., Karlin, K. D. Cupric Superoxo-Mediated Intermolecular C-H Activation Chemistry. *J. Am. Chem. Soc.* **2011**, *133*, 1702.

2. Fukuzumi, S., Kotani, H., Lucas, H. R., Doi, K., Suenobu, T., **Peterson, R. L.**, Karlin, K. D. Mononuclear Copper Complex-Catalyzed Four-Electron Reduction of Oxygen. *J. Am. Chem. Soc.* **2010**, *132*, 6874.

1. **Peterson, R. L.**, Banker, K. J., Garcia, T. Y., Works, C. F. Isolation of a novel chromium(III) binding protein from bovine liver tissue after chromium(VI) exposure. *J. Inorg. Biochem.* **2008**, *102*, 833.

BOOK CHAPTERS & REVIEWS

1. Copper Enzymes. Peterson, Ryan L., Kim, S., Karlin, K.D., In Comprehensive Inorganic Chemistry II; Jan Reedijk, Kenneth Poeppelmeir, Eds.; Elsevier Ltd.: Oxford, 2012; Volume 3, "Bioinorganic Fundamentals and Applications: Metals in Natural Living Systems.; Pecoraro, Vincent L., Hambley, Trevor; Vol Eds. Chapter 3.09 **2013**; pp 149-177.

TEACHING ACTIVITY

1/2020 – present Texas State University

CHEM 1432 **General Chemistry II.** (F'21, F'22) Second of two lecture courses in general chemistry for science-related majors, covering equilibrium processes, acid-base chemistry, and kinetics, and electrochemistry. *(3 – hour / wk lecture; 98 students)*

CHEM 4241 **Advanced Laboratory II.** (S'21, S'22, S'23, S'24, S'25, S'26) An advanced integrated lab illustrating a variety of chemical techniques for the preparation, characterization and analysis of inorganic and organic materials. (1 – hour / wk Lecture; 4 – hour /wk laboratory; 18 – 30 students)

CHEM 4299 **Undergraduate Research.** This course is available to undergraduate chemistry or biochemistry majors only. It may be repeated for credit but a maximum of four semester hours from this course are applicable toward advanced chemistry electives. (4 – hour / wk laboratory; 1 – 3 students)

CHEM 5341 **Inorganic Chemistry.** (S'20, S'22) This course will review essential concepts in inorganic chemistry including atomic structure, bonding theory, acid-base chemistry, solid state structures, and coordination chemistry. Analytical techniques for characterizing inorganic structures will be discussed along with current topics in the field. (*3 – hour / wk lecture*; 8 – 10 students)

CHEM 5370 **Problems in Chemistry: Bioinorganic Chemistry.** (F'20, F'23) This course will review basic concepts in bioinorganic chemistry including metalloenzyme structure and function as well as the medical chemistry involving metal complexes. It will also discuss metalloenzyme reaction mechanisms and the characterization of transient intermediates formed over the course of catalysis. (*3 – hour / wk lecture*; 4 students)

CHEM 7395 **Fundamentals in Molecular and Biophysical Chemistry.** (F'24) This course is designed to provide a functional overview of the physics, chemistry, and biology concepts that are central to the practice of molecular biophysical chemistry. Students will develop a broad scientific foundation to pursue interdisciplinary projects within the biophysical and biochemical sciences, as well as productively interface and collaborate with colleagues across sub-disciplines throughout their doctoral studies. (*3 – hour / wk lecture*; 6 students; Preparation of 5 Lectures, Assessments and Exams)