

## Ryan Loren Peterson, PhD

Department of Chemistry and Biochemistry  
Texas State University  
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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

### **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 3<sup>rd</sup>  
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

## **PUBLICATIONS AND PRESENTATIONS**

### **1. Publications**

<sup>‡</sup> Texas State undergraduate student; <sup>+</sup> Texas State graduate student; \*As Corresponding Author.

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<sup>3</sup>)-H Bonds by an Artificial Iron Hydroxylase Based on the Biotin-Streptavidin Technology. *J. Am. Chem. Soc.* **2020**. 142. 10617-10623.
15. Schatzman, S.S., **Peterson, R.L.**, Tekla, 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<sub>2</sub>Cu<sup>III</sup>(O<sub>2</sub><sup>2-</sup>) Species to Form L<sub>2</sub>Cu<sup>III</sup>(O)<sub>2</sub> 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<sub>2</sub><sup>2-</sup>)-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 Dioxide ( $O_2$ ) 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 Poepelmeir, 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**

2020 – present

Texas State University

- CHEM 1432 **General Chemistry II.** 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.** 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; 2 – 3 students)
- CHEM 5341 **Inorganic Chemistry.** 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.** 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)

## **SCHOLARLY ACTIVITY**

### **1. Research Grant Support**

- 2022 – 2024      AFRI Competitive Grant, US Department of Agriculture “Elucidating the metal cell biology of *Saprolegnia parasitica*” 1027918, R.L. Peterson PI.
- 2014 – 2016      Ruth L. Kirschstein National Research Service Award (NRSA). “*Candida albicans* SOD5: a novel copper-only superoxide dismutase.” GM112320, R.L. Peterson, PI.

### **2. Training Grant Support**

- 2021 – 2026      U-RISE Award, National Institute of General Medical Sciences, National Institutes of Health. “U-RISE at Texas State University”. 1 T34 GM136482-01A1, K.A. Lewis, Contact PI.

### **3. Research Mentoring Activity**

#### **a. Mentoring Program Participation**

- 2021 – 2022      U-RISE Research Mentor (NIH GM136482, K. Lewis, PI)  
*Students: C. McDonald*
- 2021              Student Research Mentor, STEM Undergraduate Research Experience (SURE) Program (DoEd P031C160036, D. Brown, PI)  
*Students: C. McDonald*
- 2021              Mentor, REU Site: A Chemistry REU on Molecular Innovation and Entrepreneurship (CheMIE) (NSF 1757843; G.Beall/C.Holland, PI)  
*Students: A. Friudenberg; D. Ledezma*

#### **b. Master’s Thesis Supervisor (1 in progress)**

<i>Student</i>	<i>Thesis</i>	<i>Year</i>	<i>Post-graduate position; Current position</i>
Saika Anne	In progress		

c. Thesis/Dissertation Committee Member

<i>Student</i>	<i>Degree</i>	<i>Thesis/Dissertation</i>	<i>Year</i>	<i>Post-graduate position; current position</i>
Mariana Acostca	PhD	In Progress	2022	
Andrew Lee	M.S.	In Progress	2022	
Nate Paulsen	M.S.	In Progress		
Elizabeth Williams	M.S.	In Progress		
Armand Barry	M.S.	In Progress		

d. Undergraduate Research Supervisor ( 2 alumni, 8 current)

*\* indicates non-TX State summer research student*

<i>Student</i>	<i>Year(s)</i>	<i>Graduation</i>	<i>Post-graduate position; current position</i>
Kaci Reaves	2020 – 2021	2021	Applying to Medical Schools
Noah Williamson	2020 – 2021		Martial Arts Instructor
Nicolas Coral	2020 – present		
Christopher McDonald	2021 – present		
Alyssa Friudenberg	2021 – present		
Daniel Ledezma	2021 – 2022		
Kobe Graham	2021 – present		
Jeneasa Glanton	2021 – present		
Precious Obafemi	2022 – present		
Ramon Pena	2022 – present		

## **SERVICE ACTIVITY**

### ***1. Institutional***

#### **a. University**

2022

Departmental representative, Bobcat Days (Spring '22)

b. Department

2021	Member, Chemistry Graduate Student Admission Committee
2021	Member, MSEC Graduate Student Admission Committee
2021 – 2022	CoSE Undergraduate Scholarship Reviewer

**2. Professional**

a. Manuscript Review

2021 – Journal of Biological Inorganic Chemistry (JBIC)

b. Symposia and Conferences

c. Professional Development

**3. Community**