

# JULIAN AVERY REES, Ph.D.

Chemical Sciences Division I Heavy Element Chemistry Program  
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## EDUCATION

- 2013, 2016 **M.S., Ph.D. Chemistry**, University of Washington, *Seattle, WA*  
*"Insight into biological small-molecule activation from enzymes, model complexes and X-ray spectroscopy"*
- 2009 **B.A. Chemistry**, with ACS certification, Goucher College, *Baltimore, MD*  
*"Mechanism and inhibition of amyloid- $\beta$  fibril formation by metal quinoline derivatives"*

## PROFESSIONAL EXPERIENCE AND EMPLOYMENT

- 2017 – Present **Lawrence Berkeley National Laboratory**, *Berkeley, CA*  
Chemist Postdoc Fellow, Heavy Element Chemistry Program, Chemical Sciences Division  
Advisor: Professor Rebecca J. Abergel
- 2014 – 2015 **Max Planck Institute for Chemical Energy Conversion**, *Mülheim an der Ruhr, Germany*  
DAAD Graduate Scholar, Department of Molecular Theory and Spectroscopy  
Advisor: Professor Dr. Serena DeBeer
- 2011 – 2016 **University of Washington**, *Seattle, WA*  
Graduate Student, Predoctoral Instructor, Department of Chemistry  
Advisor: Professor Julie A. Kovacs
- 2009 – 2011 **Notre Dame of Maryland University**, *Baltimore, MD*  
Technical Support Specialist, School of Pharmacy
- 2008 **Amgen, Inc.**, *Seattle, WA*  
Undergraduate Intern, Protein Biochemistry Group  
Advisor: Dr. David P. Meiningner
- 2007 – 2009 **Goucher College**, *Baltimore, MD*  
Undergraduate Research Student, Department of Chemistry  
Advisor: Professor Scott P. Sibley

## HONORS, AWARDS AND RESEARCH SUPPORT

- 2015 – 2016 Basil G. and Gretchen F. Anex Endowed Fellowship in Chemistry (University of Washington)
- 2015 Graduate Student Travel Award (University of Washington) - \$750 travel expenses
- 2014 – 2015 X-ray Beamtime - 3 awarded / 3 applications (European Synchrotron Radiation Facility) - total 16 days
- 2014 – 2015 Graduate Study Scholarship, (German Academic Exchange Service, DAAD) - €10,000 / 10 months
- 2009 ACS Undergraduate Award for Excellence in Inorganic Chemistry (Goucher College)
- 2009 Louise Kelley Prize in Chemistry (Goucher College)
- 2009 Student Employee of the Year Award (Goucher College)

## PUBLICATIONS

13. Rees, J.A.; Deblonde, G.J.-P.; An, D.D.; Ansoborlo, C.; Gauny, S.S.; Abergel, R.J. "Evaluating the potential of chelation therapy to prevent and treat gadolinium deposition from MRI contrast agents." *Sci. Rep.* **2018**, *8*, 4419
12. Leipzig, B.K.; Rees, J.A.; Kowalska, J.K.; Theisen, R.M.; Kavcic, M.; Poon, P.C.Y.; Kaminsky, W.; DeBeer, S.; Bill, E.; Kovacs, J.A. "How Do Ring Size and  $\pi$ -Donating Thiolate Ligands Affect Redox-Active,  $\alpha$ -Imino-N-Heterocycle Ligand Activation?" *Inorg. Chem.* **2018**, *57*, 1935-1949

11. Agbo, P; Rees, J.A.; Abergel, R.J. "Actinide Biological Inorganic Chemistry: The Overlap of 5f Orbitals with Biology" in *Experimental and Theoretical Approaches to Actinide Chemistry: From Fundamental Systems to Practical Applications* edited by J.K. Gibson and W.A. de Jong. John Wiley & Sons, **2018**
10. Kowalska, J.K.; Nayyar, B.; Rees, J.A.; Scheiwer, C.E.; Lee, S.C.; Kovacs, J.A.; Meyer, F., Weyhermüller, T.; Otero, E.; DeBeer, S. "Iron L<sub>2,3</sub>-edge X-ray Absorption and Magnetic Circular Dichroism Studies of Molecular Iron Complexes with Relevance to the FeMoco and FeVco Active Sites of Nitrogenase" *Inorg. Chem.* **2017**, *56*, 8147-8158
9. Römelt, C.; Song, J.; Tarrago, M.; Rees, J.A.; van Gastel, M.; Weyhermüller, T.; DeBeer, S.; Bill, E.; Neese, F.; Ye, S. "Electronic Structure of a Formal Fe(0) Porphyrin Complex Relevant to CO<sub>2</sub> Reduction." *Inorg. Chem.* **2017**, *56*, 4745-4750
8. Casitas, A.; Rees, J.A.; Goddard, R.; Bill, E.; DeBeer, S.; Fürstner, A. "Two Exceptional Homoleptic Fe(IV) Tetraalkyl Complexes." *Angew. Chem. Int. Ed.* **2017**, *129*, 10242-10247 **\*\*Highlighted in Nature Reviews Chemistry**
7. Rees, J.A.; Björnsson, R.; Kowalska, J.K.; Lima, F.A.; Schlesier, J.; Sippel, D.; Weyhermüller, T.; Einsle, O.; Kovacs, J.A.; DeBeer, S. "Comparative Electronic Structures of Nitrogenase FeMoco and FeVco." *Dalton Trans.* **2017**, *46*, 2445-2455 **\*\*Highlighted on back cover**
6. Villar-Acevedo, G.; Lugo-Mas, P.; Blakely, M.N.; Rees, J.A.; Ganas, A.S.; Hanada, E.M.; Kaminsky, W.; Kovacs, J.A. "Metal-Assisted Oxo Atom Addition to an Iron(III)-Thiolate." *J. Am. Chem. Soc.* **2017**, *139*, 119-129
5. Kowalska, J.K.; Lima, F.A.; Pollock, C.J.; Rees, J.A.; DeBeer, S. "A Practical Guide to High-Resolution X-ray Spectroscopic Measurements and Their Applications in Bioinorganic Chemistry." *Isr. J. Chem.* **2016**, *56*, 803-815
4. Rees, J.A.; Wandzilak, A.; Maganas, D.; Wurster, N.; Hugenbruch, S.; Kowalska, J.K.; Pollock, C.J.; Lima, F.A.; Finkelstein, K.D.; DeBeer, S. "Experimental and Theoretical Correlations Between Vanadium K-edge X-ray Absorption and K $\beta$  Emission Spectra." *J. Biol. Inorg. Chem.* **2016**, *21*, 793-805
3. Kupper, C.; Rees, J.A.; Dechert, S.; DeBeer, S.; Meyer, F. "Complete Series of {FeNO}<sup>8</sup>, {FeNO}<sup>7</sup> and {FeNO}<sup>6</sup> Complexes Stabilized by a Tetracarbene Macrocyclic." *J. Am. Chem. Soc.* **2016**, *138*, 7888-7898
2. Rees, J. A.; Björnsson, R.; Schlesier, J.; Sippel, D.; Einsle, O.; DeBeer, S. "The Fe-V Cofactor of Vanadium Nitrogenase Contains an Interstitial Carbon Atom." *Angew. Chem. Int. Ed.* **2015**, *54*, 13249-13252
1. Rees, J. A.; Martin-Diaconescu, V.; Kovacs, J. A.; DeBeer, S. "X-ray Absorption and Emission Study of Dioxygen Activation by a Small-Molecule Manganese Complex." *Inorg. Chem.* **2015**, *54*, 6410-6422

## PATENTS

1. Rebecca Abergel, Ilya Captain, Julian Rees "Peptoid-based chelating molecules" WO/2018/063638

## POSTERS AND PRESENTATIONS

11. "Metals in biology – from chemical transformations to cancer therapies." **\*\*Invited seminar**, Department of Biology and Chemistry, Embry Riddle Aeronautical University, Prescott, AZ, November 2018
10. "Bio-inspired peptoid chelators for imaging and targeted alpha therapy." *Poster*, TERACHEM Symposium on Technetium and Other Radiometals in Chemistry and Medicine, Bressanone, Italy, September 2018
9. "High-resolution X-ray spectroscopy of nitrogenase FeMoco and FeVco" **\*\*Invited seminar**, CHESS Users' Meeting and X-ray Emission Spectroscopy Methods Workshop, Cornell High Energy Synchrotron Source, Cornell University, Ithaca, NY, May 2018
8. "Bio-inspired peptoid chelators for imaging and targeted alpha therapy." *Poster*, Symposium on Radiopharmaceutical Chemistry, National Meeting of the American Chemical Society, New Orleans, LA, March 2018
7. "Prevention and treatment of internal gadolinium contamination from MRI contrast agents." *Poster*, Metals in Biology Gordon Research Conference and **\*\*Selected oral presentation**, Bioinorganic Chemistry Gordon Research Seminar, Ventura, CA, January 2018
6. "Comparative electronic structure of the molybdenum and vanadium nitrogenases." **\*\*Selected oral presentation**, poster, Penn State Bioinorganic Chemistry Workshop, State College, PA, June 2016

5. "The inorganic chemistry of biological nitrogen fixation." **\*\*Invited seminar**, *Annual Chemistry Department Banquet, Goucher College, Baltimore, MD, April 2016*
4. "Comparative electronic structure of the molybdenum and vanadium nitrogenases." *Poster, Metals in Biology Gordon Research Conference and Bioinorganic Chemistry Gordon Research Seminar, Ventura, CA, January 2016*
3. "Geometric and electronic structure of the Fe-V cofactor in vanadium nitrogenase determined by X-ray spectroscopy." *Poster, CHESS Users' Meeting, Cornell High Energy Synchrotron Source, Cornell University, Ithaca, NY, June 2015*
2. "X-ray spectroscopic investigation of small-molecule manganese O<sub>2</sub> activation." **\*\*Selected oral presentation**, *poster, Bioinorganic Chemistry Gordon Research Seminar, Ventura, CA, January 2015*
1. "Manganese K-edge X-ray absorption and emission spectroscopy reveals mechanisms of O-O bond activation." *Poster, Metals in Biology Gordon Research Conference, Ventura, CA, January 2015*

#### TEACHING AND MENTORING

**Postdoctoral Mentor**, Lawrence Berkeley National Laboratory  
 Matthew Flick, UC Berkeley Undergraduate (Neurobiology & Molecular and Cell Biology)  
 Shea O'Sullivan, UC Berkeley Undergraduate (Chemistry)

**Predoctoral Instructor**, University of Washington  
 CHEM 142 – General Chemistry (Quarter 1 of 3) **\*\* Instructor of record**

**Teaching Assistant**, University of Washington  
 CHEM 317 – Inorganic Chemistry Laboratory  
 CHEM 312 – Inorganic Chemistry (+ Guest Lecturer)  
 CHEM 162 – General Chemistry (Quarter 3 of 3) – Lead Teaching Assistant  
 CHEM 152 – General Chemistry (Quarter 2 of 3)  
 CHEM 120 – Introduction to General Chemistry

**X-ray Spectroscopy Workshop Instructor**  
 2018 CHESS Users' Meeting, Cornell University  
 2016 Bioinorganic Chemistry Workshop, Penn State University  
 2015 CHESS Users' Meeting, Cornell University

**Graduate Student Mentor**, University of Washington  
 Kaylee McClure, UW Undergraduate (now Radiochemistry PhD program, UNLV)

**Discussion Section Leader**, Goucher College  
 CHE 151 – Principles of Chemistry II  
 CHE 111 – Principles of Chemistry I

#### PROFESSIONAL MEMBERSHIPS, SERVICE, AND EXTRACURRICULAR

American Chemical Society – *Member*  
 Society of Biological Inorganic Chemistry – *Member*

*Journal of the American Chemical Society* – *Reviewer*  
 LBNL Chemical Sciences Division Diversity, Equity, & Inclusion Committee – *Member, 2018 – Current*  
 UW Faculty Council on Faculty Affairs – *Graduate Student Representative, 2012 – 2016*  
 UW Chemistry Graduate Student Club, *Officer, 2011 – 2013*  
 Goucher College Student Judicial Review Board, *Member, 2006 – 2008*

NCAA and US Soccer Federation Referee and Referee Instructor  
 US Sailing Member and Community Sailing Instructor