

## **CORIE RALSTON**

Biophysicist Staff Scientist  
Head, Berkeley Center for Structural Biology  
Molecular Biophysics and Integrated Bioimaging Division  
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### **RESEARCH STATEMENT**

As head of the Berkeley Center for Structural Biology, I drive advanced technological development of X-ray beamlines in order to serve a wide structural biology community. Recent achievements include upgrades of beamline optics and endstation software and hardware on five different beamlines in order to specifically facilitate successful data collection on small and weakly diffracting crystals, and the development of an X-ray footprinting facility at the Advanced Light Source.

### **EDUCATION**

**PhD, Biophysics**                      University of California at Davis, Doctoral Advisor: Stephen P. Cramer Thesis Title: L-edge Spectroscopy of Nickel Proteins

**BS, Physics**                         University of California at Berkeley  
Honors Thesis in Physics

### **ACCOMPLISHMENTS**

- Successful commissioning and operation of the Howard Hughes Medical Institute beamlines at the Advanced Light Source from their build date in 2001 to the present
- As the BCSB Operations Manager, stabilized and maintained efficient and highly reliable operations of five crystallography beamlines for the past six years, including oversight of major optics upgrades and numerous endstation improvements
- Oversight of Collaborative Crystallography program, which has resulted in over a hundred PDB depositions in the previous three years
- Development of instrumentation and a user program for X-ray footprinting at the ALS
- Maintained active research program collaborations in several structure-based projects, including work on chaperonin proteins with Dr. Paul Adams, LBNL, and Dr. Judith Frydman, Stanford University

## PROFESSIONAL EXPERIENCE

- Deputy Division Director** Aug 2016 - present  
Molecular Biophysics and Integrated Bioimaging  
Lawrence Berkeley National Laboratory
- Head, Berkeley Center for Structural Biology** May 2012 - present  
Physical Bioscience Division, Lawrence Berkeley National Laboratory
- Staff Scientist** Jan 2008 – May 2012  
Physical Bioscience Division, Lawrence Berkeley National Laboratory
- Scientist** Jan 2002 – Jan 2008  
Physical Biosciences Division, Lawrence Berkeley National Laboratory
- Post-Doctoral Researcher** Sept 1997 – Sept 2001  
NIH post-doctoral research fellowship  
Physiology and Biophysics Department, Albert Einstein College of Medicine
- *Research on RNA kinetics of folding using time resolved X-ray footprinting*
- Teaching Assistant and Research Assistant** Sept 1991 – Sept 1997  
Physics and Applied Science Departments  
University of California at Davis
- *(Ph.D. research) Characterization of structure and function of nickel proteins in various states within a catalytic cycle using the technique of X-Ray absorption spectroscopy*
  - *Developed soft x-ray spectroscopy experiments at the ALS, SSRL and the NSLS*
  - *Taught lab section of undergraduate physics courses*
- Associate Engineer** July 1989 – Aug 1991  
IBM Corporation, Hopewell Junction, NY
- *Developed new laser ablation techniques for thin film packaging technology*

## PROFESSIONAL ACTIVITIES

- Advanced Light Source Users Executive Committee: liaison between beamline users and ALS management. Served 2004-6, Re-elected for 2011-2013 cycle and elected Chair in 2013.
- Synchrotron and Neutron Users Group: advocating for synchrotron sciences to Congress, 2004 – 2007
- ALS Staff Safety Committee, Deputy Chair, 2006 – present
- Served as reviewer for NSF Instrumental Development for Biological Research (IDBR) program, Aug, 2011
- Served on the BES Review of the NSLS, April 2008 and Dec 2010
- Served on the BES Review of the APS, August 2017

- Served on NIH Scientific Review Special Emphasis panel to evaluate grant proposals for shared x-ray crystallographic instruments (grants up to \$500k) June 2009 and June 2010

## RECENT PUBLICATIONS

J. Bohon, R. D'Mello, C. Ralston, S. Gupta, M. R Chance, "Synchrotron footprinting on tour," *J. Sync. Rad.*, 21, 24-31, 2014.

S. Gupta, R. Celestre, C. Petzold, M.R. Chance, C. Ralston, "Development of a microsecond x-ray protein footprinting facility at the Advanced Light Source," *J. Sync. Rad.*, 2014, 21, 690, 2014.

S. Gupta, R. Celestre, J. Bohon, M.R. Chance, C. Ralston, "Development of a High Throughput X-Ray Footprinting Facility at the Advanced Light Source to Study the Structure and Dynamics of Complex Biological Macromolecules," *Biophysical Journal*, 106(2) 457a, 2014.

P. Zwart, J. Taylor, S. Morton, R. Cayford, G. Fontenay, M. Allaire, B. Sankaran, J. Dickert, K. Royal, A. Rozales, A. Dautz, D. Bryant, N. Smith, S. Ortega, N. Sauter, P.D. Adams, C. Ralston, "The Berkeley Center for Structural Biology at the Advanced Light Source," *SRN*, v. 28 No2, 22-27, 2015.

R.L. Leverenz, M. Sutter, A. Wilson, S. Gupta, A. Thurotte, C. Boucier de Carbon, C. Petzold, C. Ralston, D. Kirilovsky, C.A. Kerfeld, "Carotenoid translocation in the Orange Carotenoid Protein activates a photoprotective mechanism in cyanobacteria," 2015, *Science* V348, 6242, p1463-1466, 2015.

Gupta S, Guttman M, Leverenz RL, Zhumadilova K, Pawlowski EG, Petzold CJ, Lee KK, Ralston C, Kerfeld CA. Local and global structural drivers for the photoactivation of the orange carotenoid protein. 2015, *Proceedings National Academy of Sciences*, Sep 18. Online [PMID: 26385969]

S. Gupta, R. Celestre, J. Feng, C.Y. Ralston, "Advancements and Application of Microsecond X-ray Footprinting at the Advanced Light Source," *Synchrotron Radiation News*, V29 No1, p39, 2016. DOI: 10.1080/08940886.2016.1124684

S. Gupta, J. Feng, M.R. Chance, C.Y. Ralston, "Recent Advances and Applications in Synchrotron X-ray Protein Footprinting for Protein Structure and Dynamics Elucidation," *Protein & Peptide Letters*", Vol. 23, No. 3, 2016. [PMID:26833224]

B.E. Allred, P.B. Rupert, S.S. Gauny, D.D. An, C.Y. Ralston, M. Sturzbecher-Hoehne, R.K. Strong & R.J. Abergel, "Siderocalin-mediated recognition, sensitization, and cellular uptake of actinides," *PNAS*, 2015 Aug 18;112(33):10342-7. [doi: 10.1073/pnas.1508902112]

Vassiliy N. Bavro, Sayan Gupta, Corie Ralston, "Oxidative footprinting in the study of structure and function of membrane proteins: current state and perspectives," *Biochemical Society Transactions*, Oct 09, 2015,43(5)983-994. DOI: 10.1042/BST20150130. [PMID: 26517913]

R.M. Hulscher, J. Bohon, M.C. Rappe, S. Gupta, R. D'Mello, M. Sullivan, C.Y. Ralston, M.R. Chance, S.A. Woodson, "Probing the structure of ribosome assembly intermediates in vivo using DMS and hydroxyl radical footprinting," *Methods, Methods. 2016 Jul 1;103:49-56*. DOI: 10.1016/j.ymeth.2016.03.012.

S. Gupta, J. Feng, C. Petzold, C.Y. Ralston, "Synchrotron X-ray Footprinting as a Method to Visualize Water in Proteins," *J. Synchrotron Radiation*, 2016 Sep 1;23(Pt 5):1056-69. doi: 10.1107/S1600577516009024. Epub 2016 Jul 2.

Gupta, S., Feng, J., Chance, M.R., Ralston, C.Y. (2016) "Recent Advances and Applications in Synchrotron X-ray Protein Footprinting for Protein Structure and Dynamics Elucidation," *Protein & Peptide Letters*, Vol. 23, No. 3. [PMID: 26833224]

Ilya Captain, Gauthier J.-P. Deblonde, Peter B. Rupert, Dahlia D. An, Marie-Claire Illy, Emeline Rostan, Corie Y. Ralston, Roland K. Strong, and Rebecca J. Abergel, "Engineered Recognition of Tetravalent Zirconium and Thorium by Chelator-Protein Systems: Toward Flexible Radiotherapy and Imaging Platforms," *Inorganic Chemistry*, *Inorg. Chem.* 2016, *55* (22), pp 11930–11936  
DOI: 10.1021/acs.inorgchem.6b02041

Gauthier J.-P. Deblonde, M. Sturzbecher-Hoehne, Peter B. Rupert, Dahlia D. An, Marie-Claire Illy, Corie Y. Ralston, Jiri Brabec, W.A. de Jong, Roland K. Strong, and Rebecca J. Abergel, "Chelation and stabilization of berkelium in oxidation state +IV" *Nature Chemistry*, Published online April 10, 2017.  
DOI:10.1038/nchem.2759

Fukushima, T., Gupta, S., Rad, B., Cornejo, J.A., Petzold, C.J., Chan, L.J.G., Mizrahi, R.A., Ralston, C.Y. and Ajo-Franklin, C.M., "The Molecular Basis for Binding of an Electron Transfer Protein to a Metal Oxide Surface," *J. Am. Chem. Soc.*, 2017, *139*(36):12647-54. [PMID: 28806874]

Huang, W., Peng, Y., Kiselar, J., Zhao, X., Albaqami, A., Mendez, D., Chen, Y.-H., Chakravarthy, S., Gupta, S., Ralston, C.Y., Kao, H.-Y., Chance, M., and Yang, S. "Multidomain architecture of estrogen receptor reveals interfacial cross-talk between its DNA-binding and ligand-binding domains," *Nature Communications*, 2018, *9*, Article number: 3520. DOI:10.1038/s41467-018-06034-2