Susan Schroeder, Ph.D.

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Education:
1991-1996: B.S., Chemistry, University of Rochester
1995-1996: Service Learning Program, Glasgow University
1996-2002: Ph.D., Biophysical Chemistry, University of Rochester
2002-2005: NIH Postdoctoral Fellow, Yale University
2017: Visiting Scholar, Pennsylvania State University

Academic Appointments:
2012-present: Associate Professor, Department of Chemistry & Biochemistry, Department of Microbiology & Plant Biology, Oklahoma University
2010-2012: Assistant Professor, Department of Microbiology & Plant Biology, Oklahoma University
2006-2012: Assistant Professor, Department of Chemistry & Biochemistry, Oklahoma University

Honors and Awards
2009- 2015: NSF CAREER Award
2013: Nancy L. Mergler Faculty Mentor Award for Undergraduate Research
2003-2005: NIH Ruth L. Kirchstein Postdoctoral Fellow
1999-2000: Weissberger Memorial Fellowship for Research Accomplishments
1997: W.D. Walters Teaching Award
1996-2000: Sherman-Clarke Fellowship
1991-1995: Bausch & Lomb Scholar

Research Support:

Current:

- 2017-2020: NSF, "NSFMRI: Acquisition of the First 800 MHz NMR Spectrometer with a Cryogenically Colled Probe in Oklahoma for Interdisciplinary Research and Training"
- 2016-2019: Oklahoma State Regents, "Oklahoma State Regents for Education K20-OKC Physical Science Foundations Teacher Academy"
- 2016-2019: Noble Public Schools, "Noble Public Schools Central Oklahoma Rural Partnership for Science (CORPS)"
- 2017-2018: Burroughs Wellcome Fund Collaborative Research Travel Grant, "Metal Ion Interactions in RNA Shapeshifters"

- 2017-2018: University of Oklahoma Faculty Investment Program, "RNA Structure and the Hide-and-Seek Games in Virus-Host Interactions"

Past:

- 2017: Senior Faculty Summer Fellowship, College of Arts and Sciences, University of Oklahoma, "Metal Ion and Protein Binding Sites in Viral RNA."
- 2016-2017: NIH HIV Accessory and Regulatory Complexes Collaborative Center, University of California, "Protein and Metal Ion Binding in Viral RNA"
- 2013-2016: Oklahoma Center for the Advancement of Science and Technology Health Research Program, "Predicting Viral RNA Structure, Function, and Drug Targets from Sequence"
- 2009-2015: National Science Foundation, "NSF CAREER: Advancing Viral RNA Structure Prediction"
- 2009-2013: National Science Foundatiom, "NSFMRI: Acquisition of Robotics Instrumentation for Crystallization of Macromolecules", Role: Co-PI
- 2009-2012: Oklahoma Center for the Advancement of Science and Technology Health Science Research Program, "RNA Energetics and Structures that Enable Cancer Therapies"
- 2008-2009: American Cancer Society Institutional Research Grant Oklahoma Health Sciences Center, "RNA Energetics and Structures that Enable Cancer Therapies"
- 2008-2009: Oklahoma Center for the Advancement of Science and Technology Plant Science Basic Research Program, "Discovering Satellite Tobacco Mosaic Viral RNA Structure"
- 2008-2009: Pharmaceutical Research and Manufacturers of America Foundation, "Computational Advances Towards Predicting Encapsidated Viral RNA Structure"

Selected Publications:

1. "Challenges and Approaches to Predicting RNA with Multiple Functional Structures." S.J. Schroeder. RNA, in press doi: 10.1261/rna.067827.118 (2018).
2. "Surprising Sequence Effects on GU Closure of Symmetric 2 x 2 Nucleotide RNA Internal Loops." K.D. Berger, S.D. Kennedy, S.J. Schroeder, B.M. Znosko, H. Sun, D. H. Mathews, D. H. Turner. Biochemistry, 57: 2121-2131.
3. "Swellix: A Computational Tool to Explore RNA Conformational Space." N. Sloat, J.-W. Liu, S.J. Schroeder* BMC Bioinformatics 18: 504 (2017).
4. "Stack Locally and Act Globally: A Few Nucleotides Make All the Difference in Enterovirus 71 IRES Binding in hnRNAP A1 and Infectious Phenotypes." S.J. Schroeder* J. Mol. Biol. 429, 2859-2862 (2017).
5. "Advancing Viral RNA Structure Prediction: Measuring the Thermodynamics of Pyrimidine-Rich Internal Loops." A. Phan, K. Mailey, J. Saeki, X. Gu, Schroeder, S.J.* RNA. 23, 770-781 (2017).
6. "Thermodynamic Stabilities of Three-way Junction Nanomotifs in Prohead RNA." A.C. Hill, S.J. Schroeder*, RNA 23, 521-529 (2017).
7. "NMR Structures and Dynamics in a Prohead RNA Loop that Binds Metal Ions." X. Gu , S.-Y. Park, M. Tonnelli, G. Cornilescu, T. Xia, D. Zhong, S.J. Schroeder*, J. Phys. Chem. Lett. 7, 3841-3846(2016).
8. "Prohead RNA: A non-coding viral RNA of novel structure and function." A.C. Hill, L.E. Bartley, S.J. Schroeder. RNA Wires, doi: 10.1002/wrna.1330 (2016).
9. "Structures and Energetics of Four Adjacent GU Pairs that Stabilize an RNA Helix." X. Gu, B.H.M. Mooers*, L. Thomas, J. Malone, S. Harris, S.J. Schroeder* J. Phys. Chem. B. 119, 13252-13261(2015).
10. "A Parallel, Low Memory Implementation of the Wuchty Algorithm with Additional Experimental Filters to More Thoroughly Explore RNA Conformational Space." J. Stone, S. Bleckley, S. Lavelle, S.J. Schroeder*, PLoS ONE 10(2):e0117217 (2015).
11. "Probing Viral Genomic Structure: Alternative Viewpoints and Alternative Structures for Satellite Tobacco Mosaic Virus RNA.", S.J. Schroeder*. Biochemistry 53, 6728-6737 (2014).
12. "The Effects of Salt, Polyethylene Glycol, and Locked Nucleic Acids on the Thermodynamic Stabilities of Consecutive Terminal Adenosine Mismatches in RNA Duplexes." X. Gu, M.-T. Nguyen, A. Overacre, S. Seaton, S.J. Schroeder*. J. Phys. Chem. B. 117, 3531-3540 (2013).
13. "Incorporating Global Features of RNA Motifs in Predictions for an Ensemble of Secondary Structures for Encapsidated MS2 Bacteriophage RNA." S. Bleckley, S.J. Schroeder*. RNA. 18,1309-1318 (2012).
14. "Crumple: A Method for Complete Enumeration of All Possible Pseudoknot-Free RNA Secondary Structures." S. Bleckley, J.W. Stone, S.J. Schroeder*. PLoS ONE. e52414 (2012).
15. "Nucleotide Dynamics at the A-site Cleft in the Peptidyltransferase Center of H. marismortui 50 S Ribosomal Subunits." Y. Wang, J.K. Shen*, S.J. Schroeder*. J. Phys. Chem. Lett. 3, 1007-1010 (2012).

16. "Ensemble of Secondary Structures for Encapsidated Satellite Tobacco Mosaic Virus RNA Consistent with Constraints from Chemical Probing and Crystallography." S.J. Schroeder*, J.W. Stone, S. Bleckley, T.R. Gibbons, D. Mathews, Biophys. J.,101, 167-175 (2011).
17. "Different Sequences Show Similar Quaternary Interaction Stabilities in Prohead Viral RNA Self Assembly." X. Gu, S.J. Schroeder* J. Biol. Chem., 286, 14419-14426 (2011).
18. "NMR Structure of a Prohead RNA E-loop Hairpin." S. Harris, S.J. Schroeder*. Biochemistry, 49, 5989-5997 (2010).
19. "Consecutive Terminal GU Pairs Stabilize RNA Helices." M.-T. Nguyen, S.J. Schroeder* Biochemistry. 49, 10574-10581 (2010).
20. "Advances in RNA Structure Prediction from Sequence: New Tools for Generating Hypotheses about Viral RNA Structure-Function Relationships." S.J. Schroeder*, J. Virol., 83, 6326-6334 (2009).
21. "Optical Melting Measurements of Nucleic Acid Thermodynamics." in Biophysical, Chemical, and Functional Probes of RNA Structure, Interactions, and Folding, Part A (D. Hershlag, ed.) S.J. Schroeder* and D.H. Turner, Methods in Enzymology, 468, 371-387 (2009).
22. "3' Terminal Nucleotides Determine Thermodynamic Stabilities at the Ends of RNA Helices." K. Clanton-Arrowood, J. McGurk(co-first author), S.J. Schroeder*, Biochemistry, 47, 13418-13427 (2008).
23. "rRNA Mutations Outside the Anisomycin Binding Site can Make Ribosomes Drug-resistant." G. Blaha, G. Gurel, S.J. Schroeder (co-first author), P.B. Moore, T.A. Steitz, J. Mol. Biol., 379, 505-519 (2008).
24. "The Structures of Antibiotics Bound to the E Site Region of the 50 S Ribosomal Subunit of Haloarcula marismortui: 13-deoxytedanolide and Girodazole." S.J. Schroeder, G. Blaha, J. Tirado- Rivas, T.A. Steitz, P.B. Moore, J. Mol. Biol., 367, 1471-1479 (2007).
25. "Negamycin Binds to the Wall of the Nascent Chain Exit Tunnel of the 50S Ribosomal Subunit." S.J. Schroeder, G. Blaha, P.B. Moore. Antimicrobial Agents and Chemotherapeutics 51, 46662-4665 (2007).
26. "The NMR Structures of (rGCUGAGGCU)2 and (rGCGGAUGCU)2: Probing the Structural Features that Shape the Thermodynamic Stability of Tandem GA Pairs." B. Tolbert, S.D. Kennedy, S.J. Schroeder, T.R. Krugh, D.H.Turner, Biochemistry, 46, 1511-1522 (2007).
27. "Incorporating Chemical Modification Restraints into a Dynamic Programming Algorithm for Prediction of RNA Secondary Structure." D.H. Mathews, M.D. Disney, J.L. Childs, S.J. Schroeder, M. Zuker, and D.H. Turner, Proc. Natl. Acad. Sci. USA, 101, 7287-7292 (2004).
28. "Thermodynamic Stabilities and Structural Features of the J4/5 Loop in a Pneumocystis carinii Group I Intron." S.J. Schroeder, M.A. Fountain, S.D. Kennedy, P.J. Lukavsky, J.D. Puglisi, T.R. Krugh, and D.H. Turner, Biochemistry, 42, 14184-14196 (2003).
29. "Sheared Aanti. Aanti Base Pairs in a Destabilizing 2 X 2 Internal Loop: The NMR Structure of 5'(rGGCAAGCCU)2." B.M. Znosko, M.E. Burkard, S.J. Schroeder, T.R. Krugh, and D.H. Turner, Biochemistry, 41, 14969-14977 (2002).
30. "The Energetics of Small Internal Loops." S.J. Schroeder, M.E. Burkard, and D.H. Turner, Biopolymers, 52, 157-167 (2001).
31. "Thermodynamic Stabilities of Internal Loops with GU Closing Pairs in RNA." S.J. Schroeder and D.H. Turner, Biochemistry, 40, 11509-11517 (2001).
32. "Factors Affecting the Thermodynamic Stability of Small Asymmetric Internal Loops in RNA." S.J. Schroeder and D.H. Turner, Biochemistry, 39, 9257-9274 (2000).
33. "Thermodynamic Parameters for an Expanded Nearest-Neighbor Model for Formation of RNA Duplexes with Watson-Crick Base Pairs." T. Xia, J. Santa Lucia, Jr., M.E. Burkard, R. Kierzek, S.J. Schroeder, X. Jiao, C. Cox, and D.H. Turner, Biochemistry, 37, 14719-14735 (1998).
34. "GA and UU Mismatches Can Stabilize RNA Internal Loops of Three Nucleotides." S.J. Schroeder, J. Kim, and D.H. Turner, Biochemistry, 35, 16105-16109 (1996).