

SHUO QIAN

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EDUCATION

- **Rice University** Houston, TX U.S.A.
Ph.D. in Physics 2009
- **University of Science and Technology of China** Hefei, Anhui, China
B.S. in Applied Physics 2004

CERTIFICATION

- **Cornell University** Ithaca, NY U.S.A.
Certificate in Managing for Execution 2014

POSITIONS

- **2013 - Present:** *The Bio-SANS Instrument Scientist and Staff Scientist*, Center for Structural Molecular Biology, Oak Ridge National Laboratory (Employed by UT-Battelle)
- **2012 - 2013 :** *Career-development Instrument Scientist* for the Bio-SANS, Center for Structural Molecular Biology, Oak Ridge National Laboratory (Employed by Oak Ridge Institute for Science and Education, Oak Ridge Associated Universities)
- **2009 - 2011 :** *Postdoctoral Research Fellow*, Chemical Sciences Division and Neutron Scattering Sciences Division, Oak Ridge National Laboratory (Employed by Oak Ridge Institute for Science and Education, Oak Ridge Associated Universities)

HONORS

2014 ORNL Performance Award
2009 Biophysical Society Student Travel Awards
2008 Rice University Graduate Student Travel Award
2007 Rice University Graduate Student Travel Award
2004 Rice University Fellowship
2003 Outstanding Student Scholarship of USTC
2001 Outstanding Student Leader of USTC
1999 Outstanding Freshman Scholarship of USTC

EXPERIENCE

- **Oak Ridge National Laboratory** Oak Ridge, TN
2009-present
 - Local contact of the Bio-SANS instrument, developing new instrumentations on SANS beam line;
 - Studying structure and interaction of protein and phospholipid membrane, structure and interaction of protein and protein in solution, membrane fusion, membrane-active peptides;
 - Techniques: Small-angle X-ray/neutron scattering/diffraction, Oriented Circular Dichroism, computer simulation and modeling;
 - Grant: ORNL LDRD (FY2015-2017) PI for the development of Small-Wide Angle Neutron Scattering (SWANS) instrument concept

- Grant: ORNL LDRD (FY2012-2015) Co-PI for the development of Grazing Incidence Small Angle Neutron Scattering (GISANS) on Bio-SANS
- Grant: ORNL LDRD (FY2012-2014) Co-PI for the development of nondestructive evaluation of hydrided Zr cladding by in-situ neutron scattering and tomography

- **Laboratory of Membrane Biophysics, Rice University** Houston, TX U.S.A
2004 - 2009
Advisor: Huey W. Huang
 - Studied the structure and mechanism of pore-forming peptides in lipid membrane; membrane fusion kinetics and structures;
 - Solved two major membrane pore structures and visualized them in 3D by Grazing Incidence X-ray diffraction;
 - Developed a software suite to process GIXD data from lipid membrane and perform 3D structural reconstruction automatically and interactively;
 - Experienced user at National Synchrotron Light Source of Brookhaven National Laboratory;
 - Designed and constructed apparatus to manipulate lipid vesicles under microscope; maintained x-ray diffractometers and Circular Dichroism spectrometers; and supported laboratory daily operation.
- **Superconductor Research Laboratory of USTC** Hefei, Anhui, China
2002 - 2004
 - Studied transport property of solid state materials under extreme conditions;
 - Developed data acquisition software for transport properties measurement with superconducting magnet;
 - Designed procedures to grow single crystals by solid state reactions.

PROFESSIONAL SERVICE

- Proposal Peer Review: NIST Center for Neutron Research
- Journal Peer Review: *Biophysical Journal*, *PLOS ONE*
- Mentor for intern undergraduate students (Oak Ridge Institute for Science and Education): Thomas Bowling (GaTech 2013), Holly Ray (Univ. of Tennessee 2013), Jordan Favret (Louisiana State Univ. 2014), Evan Glass (University of Florida 2015)
- Session co-chair, Annual Meeting of Biophysical Society, Long Beach, CA 2008
- National School on Neutron and X-ray Scattering, ORNL, Oak Ridge, TN 2010, 2011, 2012, 2013, 2014
- Graduate Course on Neutron Scattering Applications in Structural Biology, ORNL, Oak Ridge, TN 2010 and 2011
- Organizing session chair: “Membrane Protein Scattering”, American Crystallographic Association annual meeting, Honolulu, HI 2013
- Session Chair, American Conference on Neutron Scattering (ACNS), Knoxville, TN 2014
- Chair for Small Angle Scattering Special Interest Group (2015), American Crystallographic Association
- Organizing session chair: “SAS with Membranes and Membrane Proteins”, American Crystallographic Association annual meeting, Philadelphia, PA 2015

MEMBERSHIPS

Biophysical Society
 American Crystallographic Association
 American Physical Society
 Neutron Scattering Society of America (NSSA)

PUBLICATIONS

- Anunciado D., Rai D., **Qian S.**, Urban V., O'Neill H., "Small-angle neutron scattering reveals the assembly of alpha-synuclein in lipid membranes", BBA in-press
- **Qian S.**, "Probing Peptide-Membrane Interaction by Neutron Scattering", *Proceedings of the 24th American Peptide Symposium*, (2015) dx.doi.org/10.17952/24APS.2015.225.
- **Qian S.**, Heller W. T., "Melittin-induced cholesterol reorganization in lipid bilayer membranes", *Biochimica et Biophysica Acta - Biomembranes*, 1848 (2015) 2253-2260.
- Y. Yan, **S. Qian**, K. Littrell, C.M. Parish, L.K. Plummer, "Fast, quantitative, and nondestructive evaluation of hydrided LWR fuel cladding by small angle incoherent neutron scattering of hydrogen", *Journal of Nuclear Materials*, 460 (2015) 114-121
- L. He, C. Do, **S. Qian**, G. D. Wignall, W. T. Heller, K. C. Littrell, G. S. Smith, "Corrections for the geometric distortion of the tube detectors on SANS instruments at ORNL", *Nucl. Inst. Meth. in Phys. Res. A* (2015) 775, pp 63-70
- **S. Qian**, D. K. Rai, W. T. Heller, "Alamethicin Disrupts the Cholesterol Distribution in Dimyristoyl Phosphatidylcholine-Cholesterol Lipid Bilayers", *J. Phy. Chem. B* (2014) 118 (38), pp 1120011208
- Heller, W. T., Urban, V. S., Lynn, G. W., Myles, D. A., Pingali, S. V., **Qian, S.**, Littrell, K. C., Melnichenko, Y. B., Wignall, G. D., Buchanan, M. V., Selby, D. L. and Butler, P. D., "The Bio-SANS Small-Angle Neutron Scattering Instrument at the High Flux Isotope Reactor at Oak Ridge National Laboratory", *J. Appl. Crystallogr.* (2014) 47 (4)
- A. Sverzhinsky, **S. Qian**, L. Yang, M. Allaire, I. Moraes, D. Ma, J. W. Chung, M. Zoonens, J.-L. Popot, J. W. Coulton, "Amphipol-trapped ExbBExbD Membrane Protein Complex from Escherichia coli: a Structural and Biochemical Case Study", *J. Membrane Biol.* (2014) 247
- R. Le, B. Harris, I. J. Iwuchukwua, B. Bruceb, X. Cheng, **S. Qian**, W. Heller, H. M. O'Neill, P Frymier, "Analysis of the Solution Structure of Thermosynechococcus elongatus Photosystem I in n-dodecyl- β -D-maltoside Using Small-Angle Neutron Scattering and Molecular Dynamics Simulation", *Archives of Biochemistry and Biophysics* (2014) Volume 550-551, 50-57
- F. Giusti, J. Rieger, L. J. Catoire, **S. Qian**, A. N. Calabrese, T. G. Watkinson, M. Casiraghi, S. E. Radford, A. E. Ashcroft, J.-L. Popot "Synthesis, Characterization and Applications of a Perdeuterated Amphipol", *J. Membrane Biol.* (2014) 247 (4)
- Y. Yan, **S. Qian**, K. Littrell, C. M. Parish, G. L. Bell and L. K. Plummer, "Nondestructive Evaluation on Hydrided LWR Fuel Cladding by Small Angle Incoherent Neutron Scattering of Hydrogen", *MRS Proceedings* (2014) Volume 1653
- **S. Qian**, R. Dean , V. Urban, B. Chaudhuri "Internal organization of the mycobacterial partition assembly: does the DNA wrap a protein core?", *PLOS ONE* (2012) 7(12): e52690
- **S. Qian**, H.W. Huang, "A Novel Phase of Compressed Bilayers That Models the Pre-Stalk Transition State of Membrane Fusion", *Biophys. J.* (2012) 102, 48-55
- **S. Qian**, W. T. Heller, "Peptide-Induced Asymmetric Distribution of Charged Lipids in a Vesicle Bilayer Revealed by Small-Angle Neutron Scattering", *J. Phy. Chem. B* (2011) 115, 9831-9837
- C. Lee, Y. Sun, **S. Qian**, H.W. Huang, "Transmembrane Pores Formed by Human Antimicrobial Peptide LL-37", *Biophys. J.* (2011) 100, 1688-1696
- **S. Qian**, W. Wang, L. Yang, H.W. Huang, "Structure of transmembrane pore induced by Bax derived peptide: Evidence for lipidic pores", *Proc. Nat. Acad. Sci. U.S.A* (2008) 105, 17379-17383
- **S. Qian**, W. Wang, L. Yang, H.W. Huang, "Structure of the Alamethicin Pore Reconstructed by X-Ray Diffraction Analysis", *Biophys. J.* (2008) 94, 3512-3522

- K.Q. Ruan, Y. Yu, S.L. Huang, H.L. Li, **S. Qian**, L.Z. Cao, “Physical properties in layered transition-metal oxide crystals and anisotropic transport measurement” *Proceedings of the Twentieth International Cryogenic Engineering Conference, ICEC 20* (2005) 545-548
- Y. Yu, K. Q. Ruan, S. L. Huang, **S. Qian**, Y. Chai, H. Yang, L. Z. Cao, “Transport Property Of $Nd_{2-x}Sr_xNiO_4$ Poly Crystals”, *Chinese Journal of Low Temperature Physics* (2004) 24, 204
- H. L. Li, K. Q. Ruan, Q. Wang, Y. Chen, **S. Qian**, Y. Yu, S. L. Huang, Z. Zheng, C. Y. Wang, L. Z. Cao, “Out-of-plane Transport in $Bi_{2-x}Pb_xSr_2Co_2O_y$ Single Crystals”, *Physica Status Solidi (B)* (2003) 240, 596

INVITED TALKS

- “Application of SANS for Biomolecules Complex”, ORNL SANS and Neutron Spin Echo Workshop, Oak Ridge, TN 2014
- “Bio-SANS, A Neutron Toolbox for Biomacromolecules Study”, American Crystallographic Association annual meeting, Albuquerque, NM 2014
- “Recent Developments at the Bio-SANS”, ORNL Neutron and Nano User meeting, Oak Ridge, TN 2013
- “Bio-SANS Effort on Membrane Protein Scattering”, American Crystallographic Association annual meeting, Honolulu, HI 2013
- “SANS Studies of Membrane-Active Peptides with Membrane, and Beyond”, Biology and Soft Matter Division Seminar, ORNL, Oak Ridge, TN 2013
- “Large Scale Structures in Biology”, Integrative Graduate Education and Research Traineeship (IGERT) Courses, Oak Ridge, TN 2013
- “Neutrons in Biology”, Oak Ridge Institute for Continued Learning, Oak Ridge, TN October 2012
- “Introduction to SAS Analysis”, Workshop for Analyzing SANS Data, ORNL, Oak Ridge, TN 2011

SELECTED CONTRIBUTED PRESENTATIONS

- **Oral Presentation** “Water Distribution in Membrane Fusion Intermediates Revealed by Neutron Membrane Diffraction”, American Crystallographic Association annual meeting, Philadelphia, PA 2015
- **Oral Presentation** “Redistribution of Cholesterol by Membrane Active Peptides Alamethicin and Melittin”, American Physical Society March Meeting, San Antonio, TX 2015
- “Application of Small Angle Neutron Scattering on the Structure and Function of Biological Complex” (poster), Molecular Biophysics Symposium at Virginia Tech, Blacksburg, VT 2014
- “Probing the induced folding of Alpha-synuclein in lipid membranes by small angle neutron scattering” (co-author, poster), Annual Meeting of Biophysical Society, San Francisco, CA 2014
- “Nondestructive Evaluation of Hydrated LWR Fuel Cladding by Small Angle Neutron Incoherent Scattering of Hydrogen” (co-author, talk), Material Research Society Fall meeting, Boston, MA 2013
- “Small Angle Neutron Scattering Study of Moisture-Induced Structural Changes in *Pinus Taeda*” (co-author, talk), Material Research Society Fall meeting, Boston, MA 2013
- “Recent Development from the Center for Structural Molecular Biology at Oak Ridge National Laboratory”, Atlanta Region Biophysics Symposium (Emory University), Atlanta, GA 2013
- “Recent Science and Technical Development from the Center for Structural Molecular Biology at Oak Ridge National Laboratory”, Bluegrass Molecular Biophysics Symposium (University of Kentucky), Lexington, KY 2013

- “Small-Angle Neutron Scattering for Membrane Protein”, Frontiers in Structural Biology of Membrane Proteins Symposium (University of Alabama at Birmingham), Birmingham, AL 2013
- “Redistribution of Cholesterol in Model Lipid Membranes in Response to the Membrane-Active Peptide Alamethicin” (co-author), American Physical Society March Meeting, Baltimore, MD 2013
- “Low Noise, High Throughput Small-Angle Neutron Scattering of Protein in Solution”, presenting author) Annual Meeting of Biophysical Society, Philadelphia, PA 2013
- **Symposium Talk** “Biomolecule Studies By Small Angle Neutron Scattering”, Symposium on Biomolecular Structure, Dynamics and Function, St. Jude Children’s Research Hospital, Memphis, TN April 2012
- “Peptide-induced Asymmetric Distribution of Charged Lipids in a Vesicle Bilayer Revealed by Small-Angle Neutron Scattering”, co-author) American Physical Society March Meeting, Boston, MA 2012
- “A Tale of Two Dimers: GFP Proteins Under Macromolecular Crowding Studied by Small Angle Neutron Scattering”, (presenting author) Annual Meeting of Biophysical Society, San Diego, CA 2012
- **Seminar Talk** “Small-angle Neutron Scattering Study of Lipid Bilayer and Protein”, Brookhaven National Laboratory, Upton, NY 2011
- “Biophysical analysis of conformational changes in Adeno-Associated Viruses under endosomal pH conditions”, (co-author) Annual Meeting of the American Crystallographic Association, New Orleans, LA 2011
- “Recent Bio-Science from the Center for Structural Molecular Biology at Oak Ridge”, (co-author) Annual Meeting of the American Crystallographic Association, New Orleans, LA 2011
- “SANS Investigation of the Response of DMPC-DMPG Lipid Bilayers to Membrane-active peptide”, (presenting author) Annual Meeting of Biophysical Society, Baltimore, MD 2011
- “The Center for Structural Molecular Biology at Oak Ridge National Laboratory”, (co-author) American Conference on Neutron Scattering, Ottawa, ON 2010
- **Platform Talk:**“Point Contact between Membranes Precursory to Fusion”, (presenting author) Annual Meeting of Biophysical Society, San Francisco, CA 2010
- “Evidence for Lipidic Pores”, (presenting author) Annual Meeting of Biophysical Society, Boston, MA 2009
- **Platform Talk:**“Electron Density Image of Alamethicin Pore: Constructed by X-Ray Anomalous Diffraction”, (presenting author) Annual Meeting of Biophysical Society, Long Beach, CA 2008
- “Discovery of a New Tetragonal Phase of Phospholipids Between the Lamellar Phase and the Rhombohedral (Stalk) Phase”, (presenting author) Annual Meeting of Biophysical Society, Baltimore, MD 2007
- “Fusogenic Lipid Compositions: The Relation between PEG-mediated Fusion and the Lamellar-Rhombohedral Phase Transition of Lipids”, Annual Meeting of Biophysical Society Meeting, (presenting author) Salt Lake City, 2006