SARAH H. SHAHMORADIAN
Assistant Professor of Molecular Biophysics, Center for Alzheimer's and Neurodegenerative Diseases
O'Donnell Brain Institute, University of Texas Southwestern Medical Center
Dallas, TX 75390, 6124 Harry Hines Blvd, NS 08.330
(469) 987-2800 sarah.shahmoradian@utsouthwestern.edu shahmoralab.org

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Education and Training

2013 – 2016	**Biozentrum, Roche Innovation Center Basel, Switzerland** Roche Postdoctoral Fellowship: Structural Neurobiology and Chemical Biology
2010 – 2012	**Rice University, Texas** NIH NIBIB Predoctoral Fellowship: Interdisciplinary Nanobiology
2006 – 2012	**Baylor College of Medicine, Texas** Ph.D. Molecular Physiology and Biophysics
2002 – 2006	**James Madison University, Virginia** B.Sc. Biology, Focus: Neurobiology

Positions and Employment

2021 – Present	Assistant Professor of Molecular Biophysics, Center for Alzheimer's and Neurodegenerative Diseases at the Peter J. O'Donnell Jr. Brain Institute, University of Texas Southwestern Medical Center, Dallas, TX
2016 – 2019	Principal Investigator, Paul Scherrer Institute of the ETH Domain, Department of Biology and Chemistry, Laboratory of Nanoscale Biology, Villigen, Switzerland
2013 – 2016	Post-Doctoral Fellow, Roche Innovation Center Basel and the Biozentrum University of Basel, Departments of Neurosciences, Ophthalmology and Rare Diseases (NORD), Chemical Biology, Structural Biology and Biophysics
2010 – 2012	Pre-Doctoral Fellow, NIH National Institute of Biomedical Imaging and Bioengineering (NIBIB) Nanobiology Interdisciplinary Graduate Training Fellowship
2007 – 2013	Graduate Research Assistant, National Center for Macromolecular Imaging, Department of Biochemistry, Baylor College of Medicine, TX
2009 – 2012	Visiting Researcher, Department of Neuroscience, Stanford University and University of California - San Diego, CA. Collaborative visits over 3 years.
2003 – 2006	Undergraduate Research Assistant, Neuroanatomy and Neurobiology Lab, Department of Biology, James Madison University, VA.
2004	Undergraduate Research Intern, Department of Anatomy and Neurobiology, School of Medicine, Virginia Commonwealth University, VA.

Awards and Honors

2024	Department of Defense (DoD), Peer Reviewed Medical Research Program (PRMRP) Award
2024	National Institutes of Health (NIH) R01 Research Project Award, National Institute for Neurological Disorders and Stroke (NINDS)
2024	Pine Family Foundation Research Award
2023	Rainwater Charitable Foundation (RCF) Tauopathy Challenge Workshop Award
2023	National Institutes of Health (NIH) R21 Exploratory/Developmental Research Award, National Institute on Aging (NIA)
2023	Lyda Hill Foundation Pilot Grant Award
2022	Stanley Fahn Junior Faculty Award, Parkinson's Foundation
2022	Distinguished Researcher Award, President's Research Council (PRC) and the University of Texas Southwestern Medical Center
2016	Competence Centre for Materials Science and Technology (CCMX) Analytical Platform Grant Funding (Cryo-Biological Imaging)
2016	Paul Scherrer Institute CROSS Initiative Funding: Interdisciplinary Research Funding
2011	Pre-Doctoral Award, European Molecular Biology Laboratory (EMBL) Advanced Training Centre Corporate Partnership Programme

2006	Margaret A. Gordon Memorial Award, Excellence in Undergraduate Biological Research
2006	Consortium for Mathematics and its Applications (COMAP), Interdisciplinary Award in Mathematical Modeling
2005	Consortium for Mathematics and its Applications (COMAP), Interdisciplinary Award in Mathematical Modeling

Student Supervision and Professional Contributions

2025	Course Lecturer, Cryo-Electron Tomography, UT Southwestern Medical Center
2022 – 2024	Course Leader, Proteins IV Core Curriculum, UT Southwestern Medical Center
2024 – Present	PhD Committee member, Daniel Kieffer (Lukasz Joachimiak lab)
2023 – Present	PhD Committee member, Dominique Lagasca (Kendra Frederick lab)
2022 – Present	PhD Committee chair, Paweł Wydorski (Lukasz Joachimiak lab)
2024 – Present	PhD primary supervisor, Nicholas Sutliff (UT Southwestern Medical Center, MSTP Medical Scientist Training Program)
2024 – Present	PhD joint primary supervisor, Benjamin Harrington (UT Southwestern Medical Center, Neuroscience Graduate Program)
2016 – 2021	PhD primary supervisor, Hung Tri Tran (ETH Zürich, Biology Graduate Program)
2016	Lecturer, Stereology and Morphometry in Neurosciences Course, VU Medical Center, Amsterdam, Netherlands
2015	Instructor, Block Course Structural Biology and Biophysics, Biozentrum University of Basel, Switzerland

Publications:

1. Vaquer-Alicea J, Manon V, Bommareddy V, Kunach P, Gupta A, Monistrol J, Perez V, Tran HT, Du S, Batra S, White CL, Joachimiak LA, **Shahmoradian SH**, Diamond MI. Functional classification of tauopathy strains reveals the role of protofilament core residues. *Science Advances* 2025 Jan 22.
2. Kim S, Phan S, Tran HT, Shaw TR, **Shahmoradian SH**, Ellisman MH, Veatch SL, Barmada SJ, Pappas SS, Dauer WT. TorsinA is essential for the localization and progression of neuronal nuclear pore complex localization and maturation. *Nature Cell Biology* 2024 Aug 8.
3. Kunach P, Vaquer-Alicea J, Smith MS, Hopewell R, Monistrol J, Moquin L, Therriault J, Tissot C, Rahmouni N, Massarweh G, Soucy J-P, Guiot M-C, Shoichet BK, Rosa-Neto P, Diamond MI, **Shahmoradian SH**. Cryo-EM structure of Alzheimer's disease tau filaments with PET ligand MK-6240. *Nature Communications* 2024 Oct 1.
4. Lewis A, Shafiei N, Stahli D, Burger D, Di Fabrizio M, Van den Heuvel L, Daraspe J, Boing C, **Shahmoradian SH**, van de Berg WDJ, Genoud C, Stahlberg H. A versatile correlative light and electron microscopy protocol for human brain and other biological models. *Nature Protocols* (Accepted)
5. Smith MS, Kunach P, Knight IS, Kormos R, Pepe JG, Glenn I, Irwin JJ, DeGrado WF, Diamond MI, **Shahmoradian SH**, Shoichet BK. Docking for molecules that bind in a symmetric stack to Alzheimer's disease tau fibrils with SymDOCK. *Biophysical Journal.* 2024 Feb 8.
6. Smith MS, Knight IS, Kormos RC, Pepe JG, Kunach P, Diamond MI, **Shahmoradian SH**, Irwin JJ, DeGrado WF, Shoicet BK. Docking for molecules that bind in a symmetric stack with SymDOCK. *Journal of Chemical Information and Modeling.* 2024 Jan 8.
7. Tran HT, Lucas MS, Ishikawa T, **Shahmoradian SH**, Padeste C. A Compartmentalized Neuronal Cell-Culture Platform Compatible With Cryo-Fixation by High-Pressure Freezing for Ultrastructural Imaging. *Frontiers in Neuroscience*. 2021 Sep 8.
8. Galaz-Montoya JG, **Shahmoradian SH**, Shen S, Frydman J, Chiu W. Cryo-electron tomography provides topological insights into mutant huntingtin exon 1 and polyQ aggregates. *Nature Communications Biology*. 2021 Jul 8.
9. Miettinen A, Zippo AG, Patera A, Bonnin A, **Shahmoradian SH**, Biella GEM, Stampanoni M. Micrometer-resolution reconstruction and analysis of whole mouse brain vasculature by synchrotron-based phase-contrast tomographic microscopy. *bioRxiv*. 2021 Mar 16.
10. Tran HT, Tsai EHR, Lewis AJ, Moors T, Bol JGJM, Rostami I, Diaz A, Jonker AJ, Guizar-Sicairos M, Raabe J, Stahlberg H, van de Berg WDJ, Holler M, **Shahmoradian SH**. Alterations in sub-axonal architecture between normal aging and Parkinson's diseased human brains using label-free cryogenic X-ray nanotomography. *Frontiers in Neuroscience*. 2020 Nov 25.

11. Holler M, Ihli J, Tsai EHR, Nudelmann F, Verezhak M, van de Berg WDJ, **Shahmoradian SH**. A lathe system for micrometer-sized cylindrical sample preparation at room and cryogenic temperatures. *Journal of Synchrotron Radiation*. 2020 Mar 1.
12. Rostami I, Rezvani AH, Hu Z, **Shahmoradian SH**. Breakthroughs in medicine and bioimaging with upconversion nanoparticles. *International Journal of Nanomedicine*. 2019 Sep 23.
13. Lewis AJ, Genoud C, Pont M, van de Berg WDJ, Frank S, Stahlberg H, **Shahmoradian SH**, Al-Amoudi A. Imaging of post-mortem human brain tissue using electron and X-ray microscopy. *Current Opinion in Structural Biology*. 2019 Oct 1.
14. **Shahmoradian SH**, Lewis AJ, Genoud C, Hench J, Moors T, Navarro PP, Castano-Diez D, Schweighauser G, Graff-Meyer A, Goldie KN, Suetterlin R, Huisman E, Ingrassia A, de Gier Y, Rozemuller AJM,..El-Mashtoly SF, Quadri M, van IJcken WFJ, Bonifati V, Gerwert K, Bohrmann B, Frank S, Britschgi M, Stahlberg H, van de Berg WDJ, Lauer ME. Lewy pathology in Parkinson's disease consists of a crowded organellar membranous medley. *Nature Neuroscience.* 2019 Jun 24.
15. Navarro PP, Genoud C, Castaño-Díez D, Graff-Meyer A, de Gier Y, Lauer ME, Britschgi M, Bohrmann B, Frank S, Hench J, Schweighauser G, Rozemuller AJM, van de Berg WDJ, Stahlberg H, **Shahmoradian SH**. Cerebral Corpora amylacea are dense membranous labyrinths containing structurally preserved cell organelles. *Scientific Reports*. 2018 Dec 21.
16. Holler M, Raabe J, Wepf R, **Shahmoradian SH**, Diaz A, Sarafimov B, Lachat T, Walther H, Vitins M. OMNY PIN: A versatile sample holder for tomographic measurements at room and cryogenic temperatures. *Review of Scientific Instruments*. 2017 Nov 20.
17. **Shahmoradian SH**, Tsai EHR, Diaz A, Guizar-Sicairos M, Raabe J, Spycher L, Britschgi M, Ruf A, Stahlberg H, Holler M. Three-Dimensional Imaging of Biological Tissue by Cryo X-Ray Ptychography. *Scientific Reports*. 2017 Jul 24.
18. Shen K, Calamini B, Fauerbach J, Ma B, **Shahmoradian SH**, Serrano Lachapel I, Chiu W, Lo D, Frydman J. Control of the structural landscape and neuronal proteotoxicity of mutant Huntingtin by domains flanking the polyQ tract. *eLife*. 2016 Oct 18.
19. Zhao X, Chen X, Han E, Hu Y, Paik P, Ding Z, Overman J, Lau AL, **Shahmoradian SH**, Chiu W, Thompson LM, Wu C, Mobley WC. TRiC subunits enhance BDNF axonal transport and rescue striatal atrophy in Huntington's disease. *Proceedings of the National Academy of Sciences*. 2016 Sep 20.
20. **Shahmoradian SH**, Galiano MR, Wu C, Chen S, Rasband MN, Mobley WC, Chiu W. Preparation of Primary Neurons for Visualizing Neurites in a Frozen-hydrated State Using Cryo-Electron Tomography. *Journal of Visualized Experiments*. 2014 Feb 12.
21. **Shahmoradian SH**, Galaz-Montoya J, Schmid M, Cong Y, Ma B, Spiess C, Frydman J, Ludtke S, Chiu W. TRiC's tricks inhibit huntingtin aggregation. *eLife*. 2013 Jul 9.
22. Fauerbach JA, Yushchenko DA, **Shahmoradian SH**, Chiu W, Jovin TM, Jares-Erijman EA. Supramolecular Non-Amyloid Intermediates in the Early Stages of aSyn-Synuclein Aggregation. *Biophysical Journal*. 2012 Mar 7.
23. Gabriele ML, **Shahmoradian SH**, French CC, Henkel CK, McHaffie JG. Early segregation of layered projections from the lateral superior olivary nucleus to the central nucleus of the inferior colliculus in the neonatal cat. *Brain Research*. 2007 Aug 8.

Presentations (selected):

2025	**Invited keynote speaker,** EPFL Seminar Series in Imaging, Swiss Federal Institute of Technology (EPFL), Lausanne, Switzerland *(unable to attend)*
2025	**Invited speaker,** Roche Innovation Center Basel, Neuroscience DTA, Basel, Switzerland *(unable to attend)*
2024	**Invited speaker,** UCLA Department of Chemistry and Biochemistry, Los Angeles, CA
2024	**Invited speaker,** Genentech: Structural Biology/Neurobiology, San Francisco, CA
2024	**Invited speaker,** 1st Annual Meeting, Texas CryoEM Symposium, Dallas, Texas
2024	**Invited speaker,** 149th Annual Meeting, American Neurological Association (ANA) Annual Meeting, Session: Neurodegeneration and Cell Death, Orlando, Florida
2024	**Invited speaker,** AD/ADRD Seminar Series, Department of Neurology, UT Southwestern Medical Center, Dallas, Texas

2024 **Invited speaker,** 74th Annual Meeting, American Crystallographic Association (ACA), Session: New Developments in Cryo-EM and Cryo-ET, Denver, Colorado

2024 **Invited speaker,** American Society for Biochemistry and Molecular Biology (ASBMB), DiscoverBMB Annual Meeting, Session: The Rise of Molecular Assemblies, San Antonio, Texas

2024 **Invited spotlight speaker**, Thermo Fisher Scientific Cryo-Electron Tomography Webinar, 300+ attendance, Virtual

2024 **Invited speaker,** Washington University School of Medicine in St. Louis, Department of Biochemistry and Molecular Biophysics, St. Louis, Missouri

2023 **Invited speaker**, Baylor College of Medicine, Department of Biochemistry and Molecular Pharmacology, Houston, Texas

2023 **Invited speaker**, BWH Movement Disorders Conference, Harvard Medical School, Boston, Massachusetts

2023 **Invited speaker**, AD/PD™ 2023 Alzheimer's & Parkinson's Diseases Conference, 'Mechanisms and modulation of transcellular tau aggregate propagation: from cells to humans,' Gothenburg, Sweden

2023 **Invited speaker**, American Chemical Society National Annual Meeting: 'Frontiers of structural biology in complex environments,' Indianapolis, Indiana

2022 **Invited speaker**, National Science Foundation "Physical Mechanisms in Neurodegenerative Disease Workshop," Washington, DC Metro Area

2022 **Invited speaker**, Alliance of Women Scientists, UT Southwestern Medical Center, Dallas, Texas

2021 **Invited speaker**, Stanford-SLAC Cryo-EM Center (S2C2), Stanford University, Palo Alto, California

2019 **Invited speaker**, 89th IUVSTA International Union for Vacuum Science, Technique, and Applications Conference: Biological and soft matter sample preparation for high resolution imaging by high vacuum techniques, Zakopane, Poland

2019 **Invited speaker**, AD/PD 2019, the 14th International Conference on Alzheimer's and Parkinson's Diseases and related neurological disorders, Lisbon, Portugal

2018 **Invited speaker**, Diamond-II Workshop: Bio-Cryo Imaging & Microscopy, Oxfordshire, United Kingdom

2018 **Invited speaker**, SYNUCLEIN 2018: Demystifying Alpha-Synuclein Functions in Health and Disease, Lausanne, Switzerland

2017 **Invited speaker**, NanoSymposium at the Institute for Regenerative Medicine, University of Zurich, Switzerland

2016 **Invited lecturer**, Stereology and Morphometry in Neurosciences Course, VU Medical Center, Amsterdam, The Netherlands

2016 **Invited speaker**, Biozentrum Annual Symposium, Basel, Switzerland

2015 **Invited speaker**, Roche International RPF Symposium: Multi-Disciplinary Brain Research and Neuroscience to Explore Neuropathological Diseases, Copenhagen, Denmark

2014 **Invited speaker**, Roche Neuroscience Research Forum (NRF), Basel, Switzerland

2014 **Invited speaker**, Roche International RPF Symposium, Munich, Germany

2011 **Invited spotlight speaker**, 6th International Congress on Electron Tomography, European Molecular Biology Laboratory (EMBL), Heidelberg, Germany

2010 **Invited spotlight speaker**, Hereditary Disease Foundation Meeting: Milton Wexler Celebration of Life, Cambridge, Massachusetts