CURRICULUM VITAE – XIAOYU XUE, Ph. D

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EDUCATION AND TRAINING

1999-2003	B.S. in Biochemistry, Nanjing University, Nanjing, China
2003-2008	Ph.D.in Biology, Tsinghua University, Beijing, China Laboratory of Dr. Zihe Rao
2008-2014	Postdoctoral Associate, Yale University, New Haven, CT, USA Laboratory of Dr. Patrick Sung
2014-2018	Associate Research Scientist, Yale University, New Haven, CT, USA Laboratory of Dr. Patrick Sung

ACADEMIC POSITIONS AND APPOINTMENTS

2024-present	Associate Professor, Department of Chemistry and Biochemistry, Texas State University, San Marcos, TX
2018-2024	Assistant Professor, Department of Chemistry and Biochemistry, Texas State University, San Marcos, TX
2019-present	Regular Doctoral Faculty, Materials Science, Engineering, and Commercialization (MSEC) Program, Texas State University, San Marcos, TX

HONORS AND AWARDS

2005	Innovation awards of the 23rd Innovation Contest of Tsinghua University, China
2005	Second-class awards of the 23rd Innovation Contest of Tsinghua University, China
2006-2007	Hongkong Hengtai Scholarship (Grade 1) of Tsinghua University, China
2007	Awards of the 10th Challenge Cup (Grade 3), China
2021	Presidential Distinction Award for Excellence in Scholarly/Creative Activities, College of Science and Engineering, Texas State University
2022	College Achievement Award for Excellence in Scholarly/Creative Activities, College of Science and Engineering, Texas State University
2024	College Achievement Award for Excellence in Scholarly/Creative Activities, College of Science and Engineering, Texas State University

BIBLIOGRAPHY

PUBLICATIONS (PEER REVIEWED)

After Joining Texas State: (*, corresponding author; #, Texas State students and staff)

1) **Xue, X.***, Fan, J. (co-first), Li, S., Ignatyeva, S., Gallegos-Elias, P.[#], Zhu, X.[#], McEntire-Benitez, H.[#], Kar, T.[#], Epps, J.[#], Eliaz, L.[#], Holland, L.[#], Romero, A.[#], Zhao, X*. Multi-subunit collaboration enables Smc5/6 acting as a DNA stimulated composite SUMO E3 complex. (submitted).

2) Li, W., Wu, B., Gao, B, Irvin, E. M., Ghosh, A., Eliaz, L.[#], Huang, Y., Kwon, Y., Stiefel, C. M., Nguyen, T. T. N., Zhao, D., Suarez, H. J., Ni, T., Alejo, S., Fitzgerald, O., Song, X., Rath, S. K., Wasmuth, E. V., Yu, D. S., Zheng, S., Leung, J., **Xue, X.**, Wang, H., Ji, J. H.*, Lan, L.*, Zhao, W*. HELZ-BRCA2 Complex Resolves R-loops to Drive Transcription-coupled Homologous Recombination. ***Nat. Commun.*** (accepted)

3) Pade, O., Brozkova, A., Simonsen, A. K. W., Staby, L., Lim, E. W. K., Bagge, K. S. V., Ryberg, C. A., Tamayo, V. T., Bang-Jensen, E. L., Miller, T. C. R., **Xue, X.**, Kragelund, B. B., Lisby, M*. The DUF2439 domain of ZGRF1 is a RAD51 interactor and facilitator. ***Cell Rep.*** (in revision)

4) Guillén-Mendoza, C., Silva, S., Eliaz, L.[#], Gil-Lanza, N., Asua, L., Bayona-Feliu, A., **Xue, X.**, Luna, R., and Aguilera, A*. ALYREF RNA chaperon is recruited to DSBs by binding to PAR chains impairing repair when overexpressed in tumor cells. ***Cell Rep.*** (Submitted)

5) Bhandari, J.[#], Guillén-Mendoza, C., Banks, K.[#], Eliaz, L.[#], Southwell, S.[#], Eyaa, D.[#], Luna, R., Aguilera, A., **Xue, X***. The molecular chaperone ALYREF promotes R-loop resolution and maintains genome stability. ***J Biol Chem.*** 2024, 300(12):107996.

6) Chakraborty, A., Dutta, A., Dettori, L. G., Daoud, R., Li, J., Gonzalez, L.[#], **Xue, X.**, Hehnly, H., Sung, P., Bah, A., and Feng, W. Complex interplay between FMRP and DHX9 during DNA replication stress. ***J Biol Chem.*** 2024, 300(1):105572.

7) Marchena-Cruz, E., Camino, L. P., Bhandari, J. **#**, Silva, S., Marqueta-Gracia, J. J., Amdeen, S. A. **#**, Guillén-Mendoza, C., García-Rubio, M. L., Calderón-Montaño, J. M., **Xue, X.**, Luna, R.*, and Aguilera, A*. DDX47, MeCP2 and other functionally heterogeneous factors protect cells from harmful R-loops. ***Cell Rep***. 2023, 42(3): 112148.

8) Li, S., Mutchler, A. **# (co-first author)**, Zhu, X. **#**, So, S. **#**, Epps, J. **#**, Guan, D., Zhao, X.*, and **Xue, X*** (**co-corresponding author**). Multifaceted regulation of the sumoylation of the Sgs1 DNA helicase. ***J Biol Chem***. 2022, 298(7): 102092.

9) Li, S., Bonner, J. N., Wan, B., So, S. **#**, Mutchler, A. **#**, Gonzalez, L. **#**, **Xue, X.***, and Zhao, X.* (**co-corresponding author**). Esc2 orchestrates substrate-specific sumoylation by acting as a SUMO E2 cofactor in genome maintenance. ***Genes Dev.*** 2021, 35(3-4): 261-272.

10) Lisby, M. * and **Xue, X.*** (**co-corresponding author and Lead Contact**). Protocol for purification of human ZGRF1 and its regulatory function on RAD51-mediated D-loop formation. ***STAR Protoc.*** 2020, 1(2): 100099.

11) Brannvoll, A., **Xue, X.** (**co-first author**), Kwon, Y., Kompocholi, S., Simonsen, A. K. W., Viswalingam, K. S., Gonzalez, L. **#**, Hickson, I. D., Oestergaard, V. H., Mankouri, H. W., Sung, P., and Lisby, M. The ZGRF1 helicase promotes recombinational repair of replication-blocking DNA damage in human cells. ***Cell Rep.*** 2020, 32(1): 107849.

12) Pérez-Calero, C., Bayona-Feliu, A., **Xue, X.**, Barroso, S. I., Muñoz, S., González-Basallote, V. M., Sung, P., and Aguilera, A. UAP56/DDX39B is a major cotranscriptional RNA-DNA helicase that unwinds harmful R loops genome-wide. ***Genes Dev.*** 2020, 34(13-14): 898-912.

13) Daley, J. M., Tomimatsu, N., Hooks, G., Wang, W., Miller, A. S., **Xue, X.**, Nguyen, K. A., Kaur, H., Williamson, E., Mukherjee, B., Hromas, R., Burma, S., and Sung, P. Specificity of end resection pathways for double-strand break regions containing ribonucleotides and base lesions. ***Nat Commun.*** 2020, 11(1): 3088.

14) Jiang, H., **Xue, X.**, Panda, S., Kawale, A., Hooy, R. M., Liang, F., Sohn, J., Sung, P., and Gekara, N. O. Chromatin-bound cGAS is an inhibitor of DNA repair and hence accelerates genome destabilization and cell death. ***EMBO J.*** 2019, 38(21): e102718.

15) Xue, C., Daley, J. M., **Xue, X.**, Steinfeld, J., Kwon, Y., Sung, P., and Greene, E. C. Single-molecule visualization of human BLM helicase as it acts upon double- and single-stranded DNA substrates. ***Nucleic Acids Res.*** 2019, 47(21):11225-11237.

Before Joining Texas State:

16) Wang, W., Daley, J. M., Kwon, Y., **Xue, X.**, Krasner, D., Miller, A. S., Nguyen, K., Williamson, E., Shim, E., Lee, S., Hromas, R., and Sung, P. A DNA nick at Ku-blocked double-strand break ends serves as an entry site for exonuclease 1 (Exo1) or Sgs1-Dna2 in long-range DNA end resection. ***J Biol. Chem.*** 2018, 293(44): 17061-17069.

17) Li, T., Zhao, Q., Yang, X., Chen, C., Yang, K., Wu, C., Zhang, T., Duan, Y., **Xue, X.**, Mi, K., Ji, X., Wang, Z., and Yang, H. Structural insight into the Zika virus capsid encapsulating the viral genome. ***Cell Res.*** 2018, 28(4): 497-499.

18) Daley, J. M., Jimenez-Sainz, J., Wang, W., Miller, A. S., **Xue, X.**, Nguyen, K. A., Jensen, R. B., and Sung, P. Enhancement of BLM-DNA2-Mediated Long-Range DNA End Resection by CtIP. ***Cell Rep.*** 2017, 21(2): 324-332.

19) Miller, A. S., Daley, J. M., Pham, N. T., Niu, H., **Xue, X.**, Ira, G., and Sung, P. A novel role of the Dna2 translocase function in DNA break resection. ***Genes Dev.*** 2017, 31(5): 503-510.

20) **Xue, X.**, Papusha, A., Choi, K., Bonner, J. N., Niu, H., Kaur, H., Zheng, X. F., Donnianni, R., Lu, L., Lichten, M., Zhao, X., Ira, G., and Sung, P. Differential regulation of the anti-crossover and replication fork regression activities of Mph1 by Mte1. ***Genes Dev.*** 2016, 30(6): 687-699.

21) Bonner, J. N., Choi, K., **Xue, X.**, Torres, N., Szaka, B., Wei, L., Wan, B., Arter, M., Matos, J., Sung, P., Brown, G., Branzei, D., and Zhao, X. Smc5/6 Mediated Sumoylation of the Sgs1-Top3-Rmi1 Complex Promotes Removal of Recombination Intermediates. ***Cell Rep.*** 2016, 16(2): 368-378.

22) **Xue, X.**, Sung, P. and Zhao, X. Functions and regulation of multi-tasking FANCM family of DNA motor proteins (invited review). ***Genes Dev.*** 2015, 29(17): 1777-1788.

23) **Xue, X.,** Choi, K., Bonner, J. N., Szakal, B., Papusha, A., Saro, D., Niu, H., Ira, G., Branzei, D., Sung, P., and Zhao, X. Selective modulation of the functions of a conserved DNA motor by a histone-fold complex. ***Genes Dev.*** 2015, 29(10): 1000-1005.

24) **Xue, X.,** Choi, K., Bonner, J. N., Chiba, T., Kwon, Y., Xu, Y., Sanchez, H., Wyman, C., Niu, H., Zhao, X., and Sung, P. Restriction of Replication Fork Regression Activities by a Conserved SMC Complex. ***Mol Cell***. 2014, 56(3): 436-445.

25) Zhao, Q., **Xue, X. (co-first authors)**, Longerich, S., Sung, P., and Xiong, Y. Structural Insights into 5' Flap DNA Unwinding and Incision by the Human FAN1 Dimer. ***Nat Commun***. 2014, 5:5726.

26) Daley, J. M., Chiba, T., **Xue, X.**, Niu, H., and Sung, P. Multifaceted role of the Topo IIIα-RMI1-RMI2 complex and DNA2 in the BLM-dependent pathway of DNA break end resection. ***Nucleic Acids Res***. 2014, 42(17): 11083-91.

27) **Xue, X.,** Raynard, S., Busygina, V., Singh, A. K., and Sung, P. Role of Replication Protein A in Double Holliday Junction Dissolution Mediated by the BLM-Topo IIIα-RMI1-RMI2 Protein Complex. ***J Biol. Chem***. 2013, 288(20): 14221-7.

28) Tsai, S. P., Su, G. C., Lin, S. W., Chung, C. I., **Xue, X.**, Dunlop, M. H., Akamatsu, Y., Jasin, M., Sung, P., and Chi, P. Rad51 presynaptic filament stabilization function of the mouse Swi5-Sfr1 heterodimeric complex. ***Nucleic Acids Res***. 2012, 40(14): 6558-69.

29) Daee, D. L., Ferrari, E., Longerich, S., Zheng, X. F., **Xue, X.**, Branzei, D., Sung, P., and Myung, K. Rad5-dependent DNA repair functions of the Saccharomyces cerevisiae FANCM protein homolog Mph1. ***J Biol. Chem***. 2012, 287(32): 26563-75.

30) Hohl, M., Kwon, Y., Galván, S. M., **Xue, X.**, Tous, C., Aguilera, A., Sung, P., and Petrini, J. H. J. The Rad50 coiled-coil domain is indispensable for Mre11 complex functions. ***Nat Struct Mol Biol***. 2011, 18(10): 1124-31.

31) **Xue, X.**, Yu, H., Yang, H., Xue, F., Wu, Z., Shen, W., Li, J., Zhou, Z., Ding, Y., Zhao, Q., Zhang, X. C., Liao, M., Bartlam, M., and Rao, Z. Structures of Two Coronavirus Main Proteases: Implications for the Substrate Binding and Anti-viral Drug Design. ***J Virol***. 2008, 82(5): 2515-27

32) Bartlam, M., **Xue, X.** and Rao, Z. The search for a structural basis for therapeutic intervention against the SARS coronavirus (review). ***Acta Crystallographica Section A***. 2008, 64(Pt 1): 204-13.

33) **Xue, X.**, Yang, H., Shen, W., Zhao, Q., Li, J., Yang, K., Chen, C., Jin, Y., Bartlam, M., and Rao, Z. Production of authentic SARS-CoV M(pro) with enhanced activity: application as a novel tag-cleavage endopeptidase for protein overproduction. ***J Mol. Biol***. 2007, 366 (3): 965-75.

34) Liang, W., Yang, H., **Xue, X.**, Huang, Q., Bartlam, M., and Chen, S. Expression, crystallization and preliminary X-ray studies of the immunoglobulin-like domain 3 of human paladin. ***Acta Crystallogr Sect F Struct Biol Cryst Commun***. 2006, 62 (6): 556-58

35) Yang, H., Xie, W., **Xue, X.**, Yang, K., Ma, J., Liang, W., Zhao, Q., Zhou, Z., Pei, D., Ziebuhr, J., Hilgenfeld, R., Yuen, K. Y., Wong, L., Gao, G., Chen, S., Chen, Z., Ma, D., Bartlam, M., and Rao, Z. Design of wide-spectrum inhibitors targeting coronavirus main proteases. ***PLoS Biol***. 2005, 3 (10): e324.

36) Wu, D., Yang, H., and **Xue, X.**, Liang, W., Miao, X., Chen, S., and Pang, H. Oligomerization study of NHR3 and NHR4 domains from ETO protein involved in t(8;21)-associated acute myeloid leukemia. ***Chinese Science Bulletin***. 2005, 50 (9): 875-9.

37) Yang, H., Wu, D., **Xue, X.**, Liang, W., Miao, X., Pang, H., and Chen, S. Cloning, expression, purification and crystallization of NHR3 domain from acute myelogenous leukemia-related protein AML1-ETO. ***Acta Biochim Biophys Sin (Shanghai)***. 2004, 36 (8): 566-70

PATENT

Rao, Z., Yang, H., **Xue, X.**, Yang, K., Bartlam, M., Ma, D., Xie, W. *Preparation and application of inhibitors targeting the main proteases of Coronaviruses.* Patent registration number (China): 200410087721.7. Date of registration: Oct 22nd, 2004.

INVITATED PRESENTATIONS

1) **Xue, X.** *Mechanism of Smc5/6-mediated protein sumoylation in genome maintenance*. **ACS-SWRM,** Waco, TX, October 21, 2024.

2) **Xue, X.** *Mechanism of Smc5/6-mediated protein sumoylation in genome maintenance*. **Trinity University**, San Antonio, TX, Nov 11, 2024.

3) **Xue, X.** *Multi-faceted regulation of the sumoylation of the Sgs1 DNA helicase in genome maintenance*. **6th International Conference on Nucleic Acids: Research and Therapeutics**, virtually, Jan 27, 2023.

4) **Xue, X.** *The Functions and Regulation of DNA/RNA helicases in DNA damage repair and genome maintenance*. **Clemson University**, Clemson, SC, Feb 3, 2023.

5) **Xue, X.** *The Functions and Regulation of DNA/RNA helicases in DNA damage repair and genome maintenance*. **Purdue University**, West Lafayette, IN, Feb 15, 2023.

6) **Xue, X.** *The Functions and Regulation of DNA/RNA helicases in DNA damage repair and genome maintenance*. **Texas State University**, San Marcos, TX, Mar 20, 2023.

7) **Xue, X.** *The Functions and Regulation of DNA/RNA helicases in DNA damage repair and genome maintenance*. **UT Austin**, Austin, TX, August 10, 2023

8) **Xue, X.** Career Development Workshop: introduction of career experience and Texas State University to Ph.D. candidates. **FASEB - The Genetic Recombination and Genome Rearrangements Conference,** Steamboat Springs, CO, August 14-19, 2022.

9) **Xue, X.** *Mechanisms of ZGRF1 in Replication-Blocking DNA Damage Repair and Homologous Recombination*. **UT Health San Antonio**, San Antonio, TX, Dec 13, 2021.

10) **Xue, X.** *Mechanisms of ZGRF1/Mte1 in Replication-Blocking DNA Damage Repair and Homologous Recombination*. **Cleveland State University**, Cleveland, OH, Mar 26, 2021.

11) **Xue, X.** *Mechanisms of DNA/RNA motor proteins in genome maintenance and cancer avoidance*. **Texas State University**, San Marcos, TX, Feb 5, 2018.

12) **Xue, X.** *Mechanisms of DNA/RNA motor proteins in genome maintenance and cancer avoidance*. **University of Toledo**, Toledo, OH, Jan 17, 2018.

13) **Xue, X.** *Mechanisms of DNA/RNA motor proteins in genome maintenance and cancer avoidance.* **University of New Mexico**, Albuquerque, NM, Jan 18, 2017.

14) **Xue, X.** *Mechanisms of DNA/RNA motor proteins in genome maintenance and cancer avoidance.* The **University of Texas Medical Branch**, Galveston, TX, Jan 31, 2017.

15) **Xue, X.** *Mechanisms of DNA/RNA motor proteins in genome maintenance and cancer avoidance*. **SUNY Upstate Medical University**, Syracuse, NY, Feb 12, 2018.

16) **Xue, X.** *Mechanisms of DNA/RNA motor proteins in genome maintenance and cancer prevention*. **University of South Florida**, Tampa, FL, Feb 27, 2018.

17) **Xue, X.** *Functions and Regulation of the FANCM Family DNA Motor Proteins in DNA Repair*. **Symposium on Directions in Modern Health Science** at Tianjin University, Tianjin, China, November 22-25, 2015.

18) **Xue, X.** *Design of Wide-Spectrum Inhibitors Targeting Coronavirus Main Proteases*. **International Workshop on Discovery of Antiviral Compounds** in Lubeck, Germany. April 26-29, 2006.

GRANTS

Funded external and internal grants:

1) **Xue, X (PI)**
Title: Mechanism of Smc5/6-mediated protein sumoylation in DNA repair
Agency: NIH-NIGMS
Type of grant: R16 (SuRE) Award
Amount: $400,000 direct / $592,912 total
Duration: 8/15/2025 - 6/30/2029

2) **Xue, X (PI)**
Title: Roles of the human UAP56 helicase in co-transcriptional R-loop resolution and genome maintenance
Agency: NIH-NIGMS
Type of grant: R15-AREA
Amount: $300,000 direct / $436,350 total
Duration: 9/1/2020 - 8/31/2024

3) **Xue, X (PI)**
Title: Functions of the DNA/RNA motor protein AQR in R-loop resolution
Agency: NIH-NIEHS
Type of grant: R21
Amount: $275,000 direct / $423,725 total
Duration: 12/15/2017 - 11/30/2020
$344,377.89 Transferred to Texas State University

4) Lewis, K. A. (PI), Kerwin, S. (Co-PI), Whitten, S. (Co-PI), Kornienko, A. (Supporting), Peterson, R. (Supporting), **Xue, X. (Supporting)**

Title: MRI: Acquisition of Automated Isothermal Titration Calorimeter for Biophysical Research at Texas State University
Agency: NSF
Type of grant: MRI
Duration: 8/1/2022 - 7/31/2025

5) **Xue, X (PI)**
Title: Interplay between human BRCA1-BARD1 and DNA/RNA helicase ZGRF1 in R-loop resolution and genome maintenance
Agency: Texas State University
Type of grant: Research Enhancement Program (REP)
Amount: $8,000 direct
Duration: 1/1/2024-5/31/2025

6) **Xue, X (PI)**
Title: Functions of the Human ZGRF1 Helicase in DNA Damage Repair
Agency: Texas State University
Type of grant: Health Scholar Showcase 2021 Award
Amount: $5,000
Duration: 5/5/2021 - 12/31/2021

7) **Xue, X (PI)**, Lewis, Karen (Co-PI)
Title: Roles of the Human TREX Complex Component UAP56 in R-loop Processing
Agency: Texas State University
Type of grant: Research Enhancement Program (REP)
Amount: $16,000 direct, 50% contribution
Duration: 1/1/2019 - 12/31/2020

8) Puig, A (Principle), **Xue, X (Supporting)**
Title: Functions of UAP56, ALYREF, and CHTOP on Aberrant R-loops Removal
Agency: Texas State University
Type of grant: Undergraduate Research Funding (URF)
Amount: $1,000 direct to Xue lab
Duration: 11/1/2019 - 8/31/2020

SCIENTIFIC REVIEWS AND SOCIETIES

Journal Review: Regular Reviewer for: BMC Cancer, Technology in Cancer Research & Treatment, Computational and Structural Biotechnology Journal, Clinical and Translational Medicine STAR Protocols, Genes, Protein & Cell, Journal of Biomedical Science, Bioprocess and Biosystems Engineering, Chemical Research in Chinese Universities, Life Science Research

Grant Review: Ad hoc Reviewer for: Medical Research Council (MRC, UK)

Scientific Societies: American Society for Biochemistry and Molecular Biology

Journal editor or editorial board: Co-Editor: Frontiers in Molecular Biosciences (IF 4.615), (2021)
Editorial board: International Journal of Bioorganic Chemistry & Molecular Biology (IJBCMB)