# Xiaolei Su

Department of Cell Biology
Yale School of Medicine
PO Box 208002, SHM-C 425A
333 Cedar St, New Haven, CT 06520
Email: xiaolei.su@yale.edu
Web: https://medicine.yale.edu/profile/xiaolei_su/

**RESEARCH GOAL**

My overarching research goal is to understand signaling pathways mediating immune responses and to leverage this knowledge to the engineering of immune cells for cancer therapy. My current research program focuses on 1) understanding how phase separation regulates immune signaling; 2) reprogramming T cells and mast cells for cancer therapy.

**APPOINTMENT & AFFILIATION**

07/2024 - present Associate Professor, Department of Cell Biology, Yale School of Medicine;
Member of Yale Cancer Center, Yale Center for Immuno-Oncology,
Yale Stem Cell Center, and Yale Center for Systems & Engineering Immunology;
Faculty of Yale BBS Program – MCGD and BQBS track, and Yale PEB Program.
01/2018 - 06/2024 Assistant Professor, Department of Cell Biology, Yale School of Medicine.

**EDUCATION**

09/2006 - 05/2012 Ph.D., Cell and Developmental Biology, Harvard University
09/2002 - 07/2006 B.S., Biological Sciences, Peking University

**RESEARCH TRAINING**

01/2013 - 12/2017 Postdoctoral Fellow, University of California, San Francisco / Howard Hughes Medical Institute
*Mentor:* Ronald Vale
*Topic:* Mechanisms of T cell activation
06/2016 - 07/2016 Visiting scientist, HHMI Summer Institute, Marine Biological Laboratory
*Topic:* Creating cellular liquid phases by synthetic approaches
06/2015 - 07/2015 Visiting scientist, HHMI Summer Institute, Marine Biological Laboratory
*Topic:* Comparative understanding of T cell signaling and mast cell signaling
07/2014 - 08/2014 Visiting scientist, HHMI Summer Institute, Marine Biological Laboratory
*Topic:* T cell microcluster dynamics in a reconstituted actomyosin network
07/2013 - 08/2013 Visiting scientist, HHMI Summer Institute, Marine Biological Laboratory
*Topic:* 2-D protein phase separation
04/2007 - 05/2012 Graduate Student, Howard Hughes Medical Institute / Dana-Farber Cancer Institute, Harvard Medical School
*Mentor:* David Pellman

*Topic:* Regulation of microtubule dynamics by molecular motors

06/2009 - 08/2009 Student, Physiology Course, Marine Biological Laboratory
*Instructor:* Dyche Mullins & Clare Waterman
*Mentor:* Wallace Marshall / Gaudenz Danuser / Dan Fletcher
*Topic:* Post-mitotic cell symmetry / Modeling microtubule dynamics with depolymerases/ Mechanical properties of bacteria cytoskeleton

07/2004 - 07/2006 Research Assistant, Peking University
*Advisor:* Jianguo Chen & Junling Teng
*Topic:* Proteomic study of microtubule-associated proteins during brain development

**GRANTS**

| | |
|---|---|
| 2024 - 2025 | NCI Clinical and Translational Exploratory/Developmental Studies Grant (R21) |
| 2024 | Yale Liver Center Pilot Grant |
| 2024 | Lion Heart Pilot Award |
| 2023 - 2026 | Pershing Square Sohn Prize for Cancer Research |
| 2023 - 2026 | Gabrielle's Angel Foundation for Cancer Research Grant |
| 2022 - 2023 | Yale Cancer Center Pilot Award |
| 2022 - 2025 | American Cancer Society Research Scholar Grant |
| 2021 - 2024 | Human Frontier Science Program Early-Career Research Grant |
| 2021 - 2022 | Yale Cancer Center Team Science Pilot Grant |
| 2020 - 2025 | NIGMS Maximizing Investigators' Research Award (MIRA) (R35) |
| 2020 - 2022 | Yale SPORE in Skin Cancer DRP Award |
| 2020 - 2021 | Frederick A. DeLuca Foundation Research Grant |
| 2019 - 2024 | Rally Foundation Childhood Cancer Research Grant |
| 2019 - 2021 | Charles H. Hood Foundation Child Health Research Awards |
| 2019 - 2020 | Gilead Sciences Research Scholars Program in Hematology/Oncology |
| 2019 - 2020 | B+ Foundation Research Grant |
| 2018 - 2019 | American Cancer Society Institutional Research Grant |
| 2014 - 2017 | Cancer Research Institute Irvington Postdoctoral Fellowship |

**AWARDS AND HORNORS**

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|---|---|
| 2018 | FASEB Junior Investigator Travel Award |
| 2015 | Keystone Symposia Future of Science Fund Scholarship |
| 2012 | Richard J. Herrnstein Prize for dissertation, Harvard University |
| 2009 | Lola Ellis Robertson Endowed Scholarship, Marine Biological Laboratory |
| 2006 | Graduates with honors, Peking University |
| 2004 | Hewlett-Packard Scholarship |
| 2002 - 2006 | Mingde Scholarship, Peking University |

**PROFESSIONAL AFFILIATIONS**

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|---|---|
| 2024 - present | American Heart Association |
| 2022 – 2023 | American Association of Immunologists |
| 2019 - 2022 | American Association for Cancer Research |

2008 - present American Society for Cell Biology

**GRANT REVIEWER SERVICE**

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|---|---|
| 2024 | NIH Special Emphasis Panel |
| 2023 | ACS-IBCD |
| 2022 | NSF-MCB |
| 2021 | ERC Advanced Grants |
| 2020 | NIH BBM Study Section |

**JOURNAL REVIEWER SERVICE**

*Biochemical Society Transactions, Cell, Cell Reports, Chinese Journal of Cell Biology, EMBO Journal, Frontiers in Plant Science, Frontiers in Physiology, Interface Focus, JCI Insight, Journal of Basic Microbiology, Journal of Cell Biology, Journal of Molecular Medicine, Matter, mBio, Molecular Biology of the Cell, Molecular Microbiology, Molecular Therapy, Nature Cancer, National Science Open, Neural Plasticity, Proceedings of the National Academy of Sciences, Protein & Cell, Science, Science Advances, Science Bulletin, Science China Life Sciences, Science Immunology, Science Signaling, Scientific Reports.*

**CONFERENCE&SEMINAR ORGANIZATION**

ImmuneZoom (Apr 2020 – present): Weekly online seminars for immunologists all over the world (Co-organized with Chuan Wu) https://immunezoom.github.io/
ASCB/EMBO 2024 annual meeting, Subgroup: Transendothelial Migration: A Romance of Leukocytes and Endothelium
ASCB/EMBO 2021 annual meeting, Subgroup 13: Immune Cell Biology and Immunotherapy (Co-organized with Meghan Morrissey and Marcus Taylor)
ASCB/EMBO 2019 annual meeting, Subgroup J: Visualizing Immune Cell Activation (Co-organized with Meghan Morrissey)
ASCB/EMBO 2018 annual meeting, Subgroup C: Cell Biology in Cancer Immunity (Co-organized with Enfu Hui)
ASCB/EMBO 2017 annual meeting, Subgroup C: Cell Biology in Adaptive Immune Response (Co-organized with Jonathon Ditlev)
ASCB 2016 annual meeting, Subgroup U: Understanding T cell activation, developing tools for cancer immunotherapy
PKU Bio-Net 2016 Symposium (Co-organized with PKU Bio Class 2002)
ASCB 2015 annual meeting, Subgroup M: nucleation phenomena in cell biology (Co-organized with Gary Brouhard and Cliff Brangwynne)

**INVITED OR SELECTED TALKS**

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|---|---|
| 06/2024 | GRC, Intrinsically Disordered Protein, Les Diablerets, Switzerland |
| 06/2024 | FASEB, Immunoreceptors and Immunotherapy, St. Paul, MN |
| 10/2023 | Department of Physiology, UT Southwestern Medical Center, Dallas, TX |
| 08/2023 | Molecular control of immune cell activation in health and disease, Lofoten, Norway |
| 04/2023 | 2nd Community of Scholars Biomembranes Symposium, University of Tennessee, Knoxville, Knoxville, TN |

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| 02/2023 | T-cell lymphoma hub, Online |
| 07/2022 | ImmuneZoom Seminar, Online |
| 03/2022 | Division in Biological Sciences, University of California, San Diego, San Diego, CA |
| 03/2022 | ACS Spring, Session of Mediation of Biological Processes by Membranes in Space, Time, and Force, San Diego, CA |
| 03/2022 | Department of Biochemistry and Molecular Biology, University of Chicago, Chicago, CA |
| 12/2021 | ASCB/EMBO annual meeting, Subgroup 13, online |
| 05/2021 | AACR annual meeting, ED079, Phase Separation and Membraneless Organelles, online |
| 01/2021 | Phase Separation Subgroup, Biophysical Society of China, online |
| 10/2020 | Dept. of Biochemistry and Biophysics, University of North Carolina, Chapel Hill, online |
| 12/2019 | ASCB/EMBO annual meeting, Subgroup J, Washington, DC |
| 11/2019 | 5$^{th}$ Annual Immune Imaging Symposium, Rochester, NY |
| 07/2019 | GRC, Molecular and Cellular Biology of Lipids, Waterville Valley, NH |
| 06/2019 | FASEB, The Signal Transduction in the Immune System, Western Shore, Canada |
| 06/2019 | PKU Bio-Net 2019 Symposium, Boston, MA |
| 05/2019 | CSHA Membrane Proteins: from Physiology to Pharmacology, Suzhou, China |
| 01/2019 | The Company of Biologists: Reconstitution of cell cytoskeleton in vitro, Wiston House, UK |
| 12/2018 | ASCB/EMBO annual meeting, Subgroup C, San Diego, CA |
| 06/2018 | FASEB, Immunoreceptors and Immunotherapy, Snowmass Village, CO |
| 12/2017 | ASCB/EMBO annual meeting, Minisymposium 18, Philadelphia, PA |
| 12/2017 | ASCB/EMBO annual meeting, Subgroup C, Philadelphia, PA |
| 08/2017 | Institute of Biochemistry and Cell Biology, Chinese Academy of Sciences |
| 12/2016 | ASCB annual meeting, Subgroup U, San Francisco, CA |
| 09/2016 | EMBO workshop: The Modularity of Signaling Proteins and Networks, Seefeld, Austria |
| 09/2016 | EMBO workshop: Membrane Contact Sites, Chia, Italy |
| 08/2016 | Institute of Immunology, Tsinghua University, Beijing, China |
| 08/2016 | School of Life Sciences, Peking University, Beijing, China |
| 06/2016 | Skirball Institute of Biomolecular Medicine, NYU Langone Medical Center, New York, NY |
| 12/2015 | ASCB annual meeting, Subgroup M, San Diego, CA |
| 10/2015 | Bay Area Meeting on Lymphocyte Cell Biology |
| 01/2015 | Keystone symposium, The Biological Code of Cell Signaling: A Tribute to Tony Pawson |
| 12/2014 | ASCB annual meeting, minisymposium, Philadelphia, PA |
| 05/2014 | EMBO Conference: Lymphocyte Signaling, Bertinoro, Italy |
| 05/2014 | Quantitative imaging in Cell Biology, Santa Clara, CA |
| 04/2014 | Great People & Sciences, University of California, San Francisco, CA |
| 08/2013 | Dana-Farber Cancer Institute, Boston, MA |
| 05/2012 | Department of Molecular Genetics and Cell Biology, University of Chicago, Chicago, IL |
| 10/2011 | School of Life Sciences, Peking University, Beijing, China |
| 10/2011 | Institute of Biophysics, Chinese Academy of Sciences, Beijing, China |
| 09/2011 | Boston Area Mitosis and Meiosis Meeting, Boston, MA |
| 02/2011 | Boston Area Yeast Meeting, Boston, MA |
| 12/2009 | ASCB annual meeting, minisymposium, San Diego, CA |
| 10/2009 | Cell-Bio Day, Harvard Medical School, Boston, MA |

**TEACHING**

| | | |
|---|---|---|
| 2024 Spring | CB 606 | Advanced Topics in Cell Biology (Course director) |
| 2023 Fall | CB 603 | Seminar in Molecular and Cell Biology |
| 2023 Fall | CB 602 | Molecular Cell Biology |
| 2023 Fall | MCDB 530 | Biology of the Immune System |
| 2023 Spring | CB 606 | Advanced Topics in Cell Biology (Course director) |
| 2022 Fall | CB 603 | Seminar in Molecular and Cell Biology |
| 2022 Fall | CB 602 | Molecular Cell Biology |
| 2022 Spring | CB 606 | Advanced Topics in Cell Biology (Course director) |
| 2022 Spring | MCDB 517 | Methods and Logic in Interdisciplinary Research |
| 2021 Fall | CB 603 | Seminar in Molecular and Cell Biology |
| 2021 Fall | CB 602 | Molecular Cell Biology |
| 2021 Spring | CB 606 | Advanced Topics in Cell Biology (Course director) |
| 2021 Spring | MCDB 517 | Methods and Logic in Interdisciplinary Research |
| 2020 Spring | CB 606 | Advanced Topics in Cell Biology |
| 2020 Spring | MCDB 517 | Methods and Logic in Interdisciplinary Research |
| 2019 Spring | CB 606 | Advanced Topics in Cell Biology |
| 2019 Spring | MCDB 517 | Methods and Logic in Interdisciplinary Research |

**MENTORING**

Undergraduate

| Name | Year | Achievement in Su Lab | Position post Su Lab |
|---|---|---|---|
| Chengxuan Xie | 2024 | | Undergraduate at Cambridge Univ. |
| Jiaqi Hu | 2023 | | PhD student at Yale |
| Linjie Tong | 2023 | | PhD student at Scripps Research |
| Fawzaan Hashmi | 2022- present | Yale College Dean's Fellowship 2022<br>Yale College Dean's Fellowship 2023<br>Admission to the FlexMed Program (early assurance of medical school acceptance) at Mount Sinai | |
| Suzanna Yang | 2021-2022 | | Yale College Student |
| Wei Li | 2019 | Yale College Dean's Fellowship 2019 | Yale College Student |
| Hannah Triscott | 2018-2019 | Yale College Dean's Fellowship 2018 | PhD student at Univ. Queensland |
| Kendra Libby | 2018-2022 | *Methods Mol Biol.* 2020 (1st author)<br>*EMBO J.* 2020<br>*Biophysical Journal 2023*<br>Yale College Dean's Fellowship 2018<br>Yale College Dean's Fellowship 2019<br>Goldwater Scholar 2020<br>NSF Graduate Research Fellow 2021<br>Yale MB&B Paul Sigler Prize 2022<br>Yale Y-Work Award 2022 | PhD student at MIT |

PhD Candidate

| Name | Year | Achievement in Su Lab | Position post Su Lab |
|---|---|---|---|
| Ava Albis | 2024-present | | |
| Jianjian Guo | 2020-present | | |
| Walker Fuchs | 2019-2022 | *EMBO J.* 2020 | MakerSpace Teacher & Director of Technology at Fraser Woods Montessori School |

Postdoc and Associate Research Scientist

| Name | Year | Achievement in Su Lab | Position post Su Lab |
|---|---|---|---|
| Jiang Lyu | 2024-present | | |
| Yiwei Xiong | 2022-present | *Biophysical Journal 2023* (1st author) | |
| Elahe Kamali | 2022-2023 | | Postdoc at Upenn |
| Kazuki Sato | 2022-present | Daiichi Sankyo Foundation of Life Science Fellowship 2022 | |
| Xinyan Zhang | 2021-present | Leslie Warner Fellowship 2022<br>*Science Immunology* 2022 | |
| Ron Orbach | 2019-2021 | *Front Immunol. 2020* (1st author) | Assistant Professor at Bar-Ilan University, Israel |
| Qian Xiao | 2019-2021 | *Science Immunology 2022* (1st author)<br>*Nature Reviews Immunology 2022* (1st author)<br>*Methods Mol biol. 2023* (1st author)<br>*Bio Protocol 2023* (1st author)<br>*J Proteome Res* 2022 | Assistant Professor at Rutgers Center Institute of New Jersey |
| Longhui Zeng | 2018-present | CRI-Irvington Fellowship 2021<br>*J Cell Biol. 2021* (1st author)<br>*Methods Mol biol. 2023* (1st author) | |

<u>Rotation student</u>

Ken Lee (MD/PhD, 2024), Nathaniel Dwyer (Immunobiology, 2023), Miharu Iguchi (MCGD, 2023), Siyi Chen (MCGD, 2023), Jason Lin (MCGD, 2022), Christian Freniere (BQBS, 2021), Ceara McAtee (MCGD, 2020), Vincent Tran (MCGD, 2019), Mengwei Hu (MCGD, 2019), Neng Wan (BQBS, 2018).

**PHD QUALIFYING EXAM COMMITTEE**

Maya Deshmukh (Immunobiology 2023), Luojia Yang (Genetics, 2022), Ruifeng Sun (Immunobiology, 2022), William Chadwick (Cell Bio, 2021), Bruna Mafra de Faria (Cell Biology, 2020), Grace Swaim (Cell Biology, 2019), Mengwei Hu (Genetics, 2019), Bing Yang (Genetics, 2018), Ian Gonzalez (Cell Biology, 2018), Andres Guillen (Cell Biology, 2018).

**PHD THESIS COMMITTEE**

Runfan Yang (University of North Carolina at Chapel Hill, 2023 – present), Maya Deshmukh (Immunobiology, 2023 - present), Luojia Yang (Genetics, 2022 - present), William Chakwick (Cell Biology, 2022 - present), Ruifeng Sun (Immunobiology, 2022 - present), Meng Tian (Cell Biology, 2021 – present), Sam Kerr (Pathology, 2020 – 2022), Grace Swaim (Cell Biology, 2019 – present), Ian Gonzalez (Cell Biology, 2018 – present).

**OTHER SERVICE**

| | |
|---|---|
| 2021 - present | Yale Cell Biology "Beyond the Bench" Committee |
| 2021 – 2024 | Yale Cell Biology Seminar Committee |
| 2019 - 2020 | Yale Cell Biology Faculty Recruitment Committee |
| 2019 - 2021 | Yale BBS program MCGD track Graduate Student Admission |

**PUBLICATIONS**

Zhang X, Xiao Q, Zeng L, Hashmi F, **Su X.**
IDR-induced CAR condensation improves the cytotoxicity of CAR-Ts against low-antigen cancers.
*bioRxiv.* 2023 Oct 28:2023.10.02.560460. doi: 10.1101/2023.10.02.560460. Preprint.

Xiong Y, Libby KA, **Su X.**
The Physical Landscape of CAR-T synapse.
*Biophysical Journal.* 2023 Sep 15; doi: 10.1016/j.bpj.2023.09.004.

Xiao Q, **Su X.**
Anti-tumor Efficacy of CD19 CAR-T in a Raji B Cell Xenografted Mouse Model.
*Bio Protocol.* 2023 Apr 20;13(8):e4655. doi: 10.21769/BioProtoc.4655.

Zeng L, **Su X.**
Biomolecular Condensation of SH2 Domain-Containing Proteins on Membranes.
*Methods in Molecular Biology.* 2023;2705:371-379. doi: 10.1007/978-1-0716-3393-9_20.

Xiao Q, **Su X.**
Imaging CAR-T Synapse as a Quality Control for CAR Engineering.
*Methods in Molecular Biology.* 2023;2654:503-512. doi: 10.1007/978-1-0716-3135-5_33.

Xiao Q, Zhang X, Tu L, Cao J Hinrichs CS, **Su X.**
Size-dependent activation of CAR-T cells.
*Science Immunology.* 2022 Aug 5. doi: 10.1126/sciimmunol.abl3995.

Griffith AA, Callahan KP, King NG, Xiao Q, **Su X,** Salomon AR.
SILAC Phosphoproteomics Reveals Unique Signaling Circuits in CAR-T Cells and the Inhibition of B Cell-Activating Phosphorylation in Target Cells.
*Journal of Proteome Research.* 2022 Feb 4;21(2):395-409. doi: 10.1021/acs.jproteome.1c00735.

Xiao Q, McAtee CK, **Su X.**
Phase separation in immune signalling.
*Nature Reviews Immunology.* 2022 Mar;22(3):188-199. doi: 10.1038/s41577-021-00572-5.

Zeng L, Palaia I, Šarić A, **Su X.**
PLCγ1 promotes phase separation of T cell signaling components.
*Journal of Cell Biology.* 2021 Jun 7;220(6):e202009154. doi: 10.1083/jcb.202009154.

Orbach R, **Su X.**
Surfing on membrane waves: microvilli, curved membranes, and immune signaling.
*Frontiers in Immunology*. 2020 Sep 11; doi: 10.3389/fimmu.2020.02187.

Dong R, Libby KA, Blaeschke F, Fuchs W, Marson A, Vale RD, **Su X.**
Rewired signaling network in T cells expressing the chimeric antigen receptor (CAR).
*EMBO Journal*. 2020 July 9; e104730. doi: 10.15252/embj.2020104730.

Libby KA, **Su X**.
Imaging Chimeric Antigen Receptor (CAR) Activation
*Methods in Molecular Biology*. 2020;2111:153-160. doi: 10.1007/978-1-0716-0266-9_13.

Ditlev JA, Vega AR, Köster DV, **Su X**, Tani T, Lakoduk AM, Vale RD, Mayor S, Jaqaman K, Rosen MK.
A composition-dependent molecular clutch between T cell signaling condensates and actin.
*eLife.* 2019 Jul 3;8. pii: e42695.

Carbone CB, Kern N, Fernandes RA, Hui E, **Su X**, Garcia KC, Vale RD.
In vitro reconstitution of T cell receptor-mediated segregation of the CD45 phosphatase.
*Proc Natl Acad Sci U S A.* 2017 Oct 31;114(44):E9338-E9345.

Arellano-Santoyo H, Geyer EA, Stokasimov E, Chen GY, **Su X**, Hancock W, Rice LM, Pellman D.
A Tubulin Binding Switch Underlies Kip3/Kinesin-8 Depolymerase Activity.
*Developmental Cell.* 2017 Jul 10;42(1):37-51.

Hui E, Cheung J, Zhu J, **Su X**, Taylor MJ, Wallweber HA, Sasmal DK, Huang J, Kim JM, Mellman I, Vale RD.
T cell costimulatory receptor CD28 is a primary target for PD-1-mediated inhibition.
*Science*. 2017 Mar 31;355(6332):1428-1433.

**Su X**, Ditlev JA, Rosen MK, Vale RD.
Reconstitution of TCR Signaling Using Supported Lipid Bilayers.
*Methods in Molecular Biology.* 2017;1584:65-76.

**Su X**, Ditlev JA, Hui E, Xing W, Banjade S, Okrut J, King DS, Taunton J, Rosen MK, and Vale RD.
Phase separation of signaling molecules promotes T cell receptor signal transduction
*Science*. 2016 Apr; 352(6285):595-9.

**Su X**, Arellano-Santoyo H, Portran D, Gaillard J, Vantard M, Thery M, and Pellman D.
Microtubule sliding activity of a kinesin-8 promotes spindle assembly and spindle length control.
*Nature Cell Biology*. 2013 Aug; 15(8): 948-57.

**Su X**, Ohi R, Pellman D.
Move in for the kill: motile microtubule regulators (Review).
*Trends in Cell Biology*. 2012 Nov;22(11):567-75.

**Su X**, Qiu W, Gupta ML Jr, Pereira-Leal JB, Reck-Peterson SL, Pellman D.
Mechanisms underlying the dual-mode regulation of microtubule dynamics by kip3/kinesin-8.
*Molecular Cell.* 2011 Sep 2;43(5):751-63.

Wang Q, Teng J, Shen B, Zhang W, Guo Y, **Su X**, Zhang C, Yu AC, Chen J.
Characterization of kinesin-like proteins in silkworm posterior silk gland cells.
*Cell Research.* 2010 Jun;20(6):713-27.