Department of Cell Biology
Yale School of Medicine

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 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 - 2026 NIH Exploratory/Developmental Bioengineering Research Grants (EBRG) (R21)

2024 - 2029 NIH Director’s Transformative Research Award

2024 - 2026 NCI Clinical and Translational Exploratory/Developmental Studies Grant (R21)

2024 - 2025 Yale Liver Center Pilot Grant

2024 - 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**

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**

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**

2025 ACS-IBCD

2024 NIH Special Emphasis Panel

2023 ACS-IBCD

2022 NSF-MCB

2021 ERC Advanced Grants

2020 NIH BBM

**JOURNAL ReviewER Service**

*Biochemical Society Transactions, Cell, Cell Reports, Chinese Journal of Cell Biology, Current Opinion in 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 – Oct 2024): 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**

10/2024 The 9th FIMSA Congress, Taipei

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

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 5th 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**

2025 Spring CB 606 Advanced Topics in Cell Biology (Course director)

2024 Fall CB 603 Seminar in Molecular and Cell Biology

2024 Fall CB 602 Molecular Cell Biology

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

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| --- | --- | --- | --- |
| 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 2022Yale College Dean’s Fellowship 2023Admission 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)*EMBO J.* 2020*Biophysical Journal 2023*Yale College Dean’s Fellowship 2018Yale College Dean’s Fellowship 2019Goldwater Scholar 2020NSF Graduate Research Fellow 2021Yale MB&B Paul Sigler Prize 2022Yale Y-Work Award 2022  | PhD student at MIT |

PhD Candidate

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| --- | --- | --- | --- |
| 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

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| 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*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)*Nature Reviews Immunology 2022* (1st author)*Methods Mol biol. 2023* (1st author)*Bio Protocol 2023* (1st author)*J Proteome Res* 2022 | Assistant Professor at Rutgers Center Institute of New Jersey |
| Longhui Zeng | 2018-present | CRI-Irvington Fellowship 2021*J Cell Biol. 2021* (1st author)*Methods Mol biol. 2023* (1st author) |  |

Rotation student

Bridget Tokiwa (MCGD 2025), 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**

Jaywon Lee (Cell Bio, 2024), 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**

Jaywon Lee (Cell Bio, 2024), 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**

Zeng L, Zhang X, Xiong Y, Sato K, Hajicek N, Sondek J, **Su X**.
Hyperactive PLCG1 drives non-canonical signaling to promote cell survival.
*bioRxiv*. 2024 Dec 18:2024.12.17.628879. doi: 10.1101/2024.12.17.628879. Preprint.

Xiong Y, Libby KA, **Su X.**
The Physical Landscape of CAR-T synapse.
*Biophysical Journal.* 2024 Aug 6;123(15):2199-2210. doi: 10.1016/j.bpj.2023.09.004.

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.

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.