

Xiaolei Su

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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 granulocytes for cancer therapy.

APPOINTMENT

01/2018 - present 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

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 HONORS

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

2019 - present American Association for Cancer Research
2019 - present American Association of Immunologists
2008 - present American Society for Cell Biology

TEACHING

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

2022 – present	Fawzaan Hashmi, Summer Research Fellowship in 2022
2021 – 2022	Suzanna Yang, Research Assistant (Currently undergraduate at Yale)
2019 - 2019	Wei Li, Summer Research Fellowship in 2019 (Currently undergraduate at Yale)
2018 - 2019	Hannah Triscott, Summer Research Fellowship in 2018 and Thesis in 2019 (Currently PhD student in the University of Queensland)
2018 – 2022	Kendra Libby, Summer Research Fellowship in 2018-2021 (Currently PhD student at MIT)

PhD Candidate

2020 - present	Jianjian Guo, Yale MCGD track
2019 - present	Walker Fuchs, Yale BQBS track

Postdoc

2022 - present	Yiwei Xiong
2022 - present	Elahe Kamali
2022 - present	Kazuki Sato, Daiichi Sankyo Foundation Fellowship
2021 - present	Xinyan Zhang, Leslie Warner Fellowship
2019 - 2021	Ron Orbach (Currently Assistant Professor at Bar-Ilan University in Israel)
2019 - 2021	Qian Xiao (Currently Assistant Professor at Rutgers Cancer Institute of New Jersey)
2018 - present	Longhui Zeng, CRI Irvington Fellowship

Rotation student

Neng Wan (2018), Mengwei Hu (2019), Vincent Tran (2019), Ceara McAtee (2020), Christian Freniere (2021)

PHD QUALIFYING EXAM COMMITTEE

Andres Guillen (Cell Bio, 2018), Ian Gonzalez (Cell Bio, 2018), Bing Yang (Genetics, 2018), Mengwei Hu (Genetics, 2019), Grace Swaim (Cell Bio, 2019), Bruna Mafra de Faria (Cell Bio, 2020), William Chakwick (Cell Bio, 2021), Ruifeng Sun (Immunobio, 2022).

PHD THESIS COMMITTEE

Ian Gonzalez (Cell Bio, 2018 – present), Grace Swaim (Cell Bio, 2019 – present), Sam Kerr (Pathology, 2020 – 2022), Meng Tian (Cell Bio, 2021 – present), Ruifeng Sun (Immunobio, 2022 - present).

OTHER INSTITUTE SERVICE

2021 - 2023	Yale Cell Biology “Beyond the Bench” Committee
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2021 - 2023 Yale Cell Biology Seminar Committee
2019 - 2020 Yale Cell Biology Faculty Recruitment Committee
2019 - 2021 Yale BBS program MCGD track Graduate Student Admission

GRANT REVIEWER SERVICE

2022 NSF-MCB
2021 ERC Advanced Grants
2020 NIH BBM Study Section

JOURNAL REVIEWER SERVICE

Biochemical Society Transactions, 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, Nature Cancer, Neural Plasticity, Proceedings of the National Academy of Sciences, Protein & Cell, Science, Science Advances, Science Bulletin, Science Immunology, Science Signaling, Scientific Reports.

CONFERENCE&SEMINAR ORGANIZATION

ImmuneZoom (Apr 2020 – present): Weekly online seminars by immunologists all over the world (Co-organized with Chuan Wu) <https://immunezoom.github.io/>
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

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

PUBLICATIONS

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**.

PLC γ 1 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.