SHIXIN LIU

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POSITION

The Rockefeller University 2016—present
Assistant Professor
Head of the Laboratory of Nanoscale Biophysics and Biochemistry

ACADEMIC TRAINING

University of California, Berkeley 2010—2015
Postdoctoral Fellow
Advisor: Prof. Carlos Bustamante
Research Topic: Using single-molecule manipulation methods to study cellular processes driven by molecular motors.

Harvard University 2003—2009
Ph.D., Chemistry
Advisor: Prof. Xiaowei Zhuang
Dissertation: Single-molecule fluorescence studies of enzyme kinetics and protein-nucleic acid interactions.

University of Science and Technology of China 1998—2003
B.S., Biology
Advisor: Prof. Mian Wu
Thesis Topic: Function and regulation of apoptotic genes.

HONORS

2013 NIH Pathway to Independence Award (K99/R00)
2012 Education Travel Award, Biophysical Society
2008 Chinese Government Award for Outstanding Students Abroad
2003 Fieser Graduate Research Grant, Harvard University
1998 1st Place and Top Freshman Scholarship, Special Class for the Gifted Young, University of Science and Technology of China

PUBLICATIONS (*equal authorship)

1. **Liu S**, Tafoya S, Bustamante C. Probing the mechanism and regulation of the bacteriophage φ29 DNA packaging motor. *Methods Mol. Biol.* (in press)
2. Cheng B, Wu S, **Liu S**, Rodriguez-Aliaga P, Yu J, Cui S. (2015) Protein denaturation at a single-molecule level: the effect of nonpolar environments and its implications on the unfolding mechanism by proteases. *Nanoscale* 7:2970—2977.

3. **Liu S**[*], Chistol G[*], Hetherington CL[*], Tafoya S, Aathavan K, Schnitzbauer J, Grimes S, Jardine PJ, Bustamante C. (2014) A viral packaging motor varies its DNA rotation and step size to preserve subunit coordination as the capsid fills. *Cell* 157:702—713.
4. **Liu S**[*], Chistol G[*], Bustamante C. (2014) Mechanical operation and intersubunit coordination of ring-shaped molecular motors: insights from single-molecule studies. *Biophys. J.* 106:1844—1858. Review.
5. Dangkulwanich M[*], Ishibashi T[*], **Liu S**[*], Kireeva ML, Lubkowska L, Kashlev M, Bustamante C. (2013) Complete dissection of transcription elongation reveals slow translocation of RNA polymerase II in a linear ratchet mechanism. *eLife* 2:e00971.
6. Chistol G[*], **Liu S**[*], Hetherington CL, Moffitt JR, Grimes S, Jardine PJ, Bustamante C. (2012) High degree of coordination and division of labor among subunits in a homomeric ring ATPase. *Cell* 151:1017—1028.
7. **Liu S**[*], Harada BT[*], Miller JT, Le Grice SF, Zhuang X. (2010) Initiation complex dynamics direct the transitions between distinct phases of early HIV reverse transcription. *Nat. Struct. Mol. Biol.* 17:1453—1460.
8. Chung S, Wendeler M, Rausch JW, Beilhartz G, Gotte M, O'Keefe BR, Bermingham A, Beutler JA, **Liu S**, Zhuang X, Le Grice SF. (2010) Structure-activity analysis of vinylogous urea inhibitors of human immunodeficiency virus-encoded ribonuclease H. *Antimicrob. Agents Chemother.* 54:3913—3921.
9. Rausch JW, Abbondanzieri EA, **Liu S**, Zhuang X, Le Grice SF. (2010) Retrovirus replication: new perspectives on enzyme and substrate dynamics. In *Recent Advances in Human Retroviruses: Principles of Replication and Pathogenesis* (eds. Lever A, Jeang KT, Berkhout B. World Scientific) pp. 307—343. Book Chapter.
10. **Liu S**, Abbondanzieri EA, Rausch JW, Le Grice SF, Zhuang X. (2008) Slide into action: dynamic shuttling of HIV reverse transcriptase on nucleic acid substrates. *Science* 322:1092—1097.
11. **Liu S**, Bokinsky G, Walter NG, Zhuang X. (2007) Dissecting the multistep reaction pathway of an RNA enzyme by single-molecule kinetic "fingerprinting". *Proc. Natl. Acad. Sci. USA* 104:12634—12639.
12. Bokinsky G, Nivón LG, **Liu S**, Chai G, Hong M, Weeks KM, Zhuang X. (2006) Two distinct binding modes of a protein cofactor with its target RNA. *J. Mol. Biol.* 361:771—784.
13. Song Z, **Liu S**, He H, Hoti N, Wang Y, Feng S, Wu M. (2004) A single amino acid change (Asp53→Ala53) converts Survivin from anti-apoptotic to pro-apoptotic. *Mol. Biol. Cell* 15:1287—1296.

INVITED TALKS

Jul 2015	Peking Union Medical College, Beijing, China
Jun 2015	Tsinghua University School of Medicine, Beijing, China
Jun 2015	Peking University, Beijing, China
Mar 2015	Caltech, Division of Biology and Biological Engineering, Pasadena, CA
Mar 2015	UC San Diego, Department of Cellular and Molecular Medicine, San Diego, CA
Jan 2015	UT Southwestern Medical Center, Department of Biophysics, Dallas, TX
Jan 2015	Massachusetts Institute of Technology, Department of Chemistry, Cambridge, MA
Dec 2014	University of Michigan, Biophysics, Ann Arbor, MI
Sep 2014	The Rockefeller University, New York, NY
Jan 2014	UC Berkeley Statistical Mechanics Seminar, Berkeley, CA
Jan 2013	Shanghai Jiao Tong University, Institute of Natural Sciences, Shanghai, China

Oct 2011	XXII Biennial Conference on Phage/Virus Assembly, Port Aransas, TX
Jul 2009	BIT Life Sciences' 2nd World Summit of Antivirals, Beijing, China
Jul 2009	University of Science & Technology of China, School of Life Sciences, Hefei, China
Aug 2007	American Chemical Society National Meeting, Boston, MA

TEACHING

2014	Guest Lecturer, Introduction to Graduate Research in Physics, Physics 251, UC Berkeley
2012	Co-advisor, Readings on Single Molecule Biophysics, MCB 290, UC Berkeley
2011 & 2014	Guest Lecturer, Physical Biochemistry, MCB 206, UC Berkeley
2003 & 2004	Teaching Assistant, Principles of Chemistry, Chemistry 7, Harvard

Academic sociologists often contrast training with education. Sociologically, however, training should be conceptually opposed to schooling, leaving discussion ofâ€¦ â€¦ Dictionary of sociology.Â training â€” noun 1 learning skills ADJECTIVE â–ª basic, initial, preliminary â–ª New recruits undergo six weeks basic training at the base. â–ª advanced, high level â–ª â€¦ Collocations dictionary. Academic training is training related to a student's field of study. Appropriate activities vary over disciplines. For example, postdoctoral training in biochemistry might consist of paid research at one location with one faculty adviser, where academic training in music may involve a number of paid or unpaid teaching or performance opportunities. Academic training may involve sequential or simultaneous activities, either paid or unpaid, with several employers, provided the application and approval procedures are followed... Academic Training is training related to your field of study. It can be a job, internship, research position, cooperative education position, or other opportunity to obtain experience related to your field of study. If the position is off campus, you must *always* apply for academic training authorization, whether you are a current student or graduating soon.Â You must request Academic Training authorization from ISSS before starting your internship or job. The training may be paid or unpaid. Academic_Training_Guidelines What is Academic Training? Academic Training may be approved for J-1 students to apply knowledge and skills learned at school to a practical work experience off campus. It includes employment training, internships or work related to your field of study at UConn. Aca ...Â What is Academic Training? Academic Training may be approved for J-1 students to apply knowledge and skills learned at school to a practical work experience off campus.