Curriculum Vitae: Xiaowei Zhuang

Professor of Chemistry and Chemical Biology
Professor of Physics
Howard Hughes Medical Institute Investigator

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Education

1987-1991	B.S., Physics, University of Science and Technology of China
1991-1996	Ph.D., Physics, University of California, Berkeley
1997-2001	Chodorow Postdoctoral Fellow, Stanford University

Positions

2005-	Investigator, Howard Hughes Medical Institute
2006-	Professor, Department of Chemistry and Chemical Biology, Department of Physics, Harvard University
2005	Associate Professor, Department of Chemistry and Chemical Biology, Department of Physics, Harvard University
2001-2005	Assistant Professor, Department of Chemistry and Chemical Biology, Department of Physics, Harvard University

Honors

Selected Awards

2011	Raymond & Beverly Sackler International Prize in Biophysics
2010	Max Delbruck Prize in Biological Physics
2008	HHMI collaborative Innovation Award
2008	Coblentz Award
2006	Pure Chemistry Award
2005	Camille Dreyfus Teacher-Scholar Award
2004	Sloan Research Fellowship
2004	Technology Review Worlds Top 100 Young Innovators Award
2003	MacArthur Fellowship
2003	Packard Fellowship for Science and Engineering
2003	CAREER award, National Science Foundation
2003	Searle Scholar
2003	Beckman Young Investigator Award
2002	Young Investigator Award, Office of Naval Research
2000	Individual National Research Service Award, National Institute of Health
1997	Chodorow Postdoctoral Fellowship, Stanford University,

Distinguished Lectureship

2011	Greenfield Lecture, Case Western University
2011	Fredric Fay Lecture, University of Massachusetts School of Medicine
2011	Closs Lecture, University of Chicago
2011	Maggie & Nick DeWolf Public Lecture, Aspen Center for Physics
2010	Magomedov-Shcherbinina Memorial Prize Lecture, University of Rochester
2011	Leica Scientific Forum, Heidelberg, Munich, Berlin.
2008	ST Huang Memorial Lecture, Hong Kong University

2008 Brockman Lecture, University of Michigan
2008 Morrison Lecture, Cornell University
2006 Seymour Rothchild Lecture, University of Rochester
2004 Gunnar and Gunnel Kallén Memorial Lecture, Lund University, Sweden
2004 Jean-Francois Lefèvre Lecture in Biophysics, Ecole Supérieure de Biotechnologie de Strasbourg, France

Editorial Board Position

Cell, Annual Review on Biophysics, Biophysical Journal, Chemical Physics Letters, Optical Nanoscopy

Other Professional Services

Co-Chair, Cold Spring Harbor Conference on "New Advances in Optical Imaging of Live Cells and Organisms" (2011)
Chair, American Society of Cell Biology Meeting, Symposium on “Breaking the diffraction barrier” (2009)
Co-chair, Gordon Research Conference on “Single Molecule Approaches to Biology” (2008)
Co-chair, American Chemical Society National Meeting, Symposium on “Single-molecule imaging, spectroscopy, and manipulation of biomolecular systems” (2007)
Co-vice chair, Gordon Research Conference on “Single Molecule Approaches to Biology” (2006)

Member, College of NIH CSR Reviewers (2010-present)
NIH Study Section: Review panel on Nanomedicine Development Centers for the NIH Roadmap Nanomedicine Initiative (2008), Interview panel of the NIH Director’s Pioneer Award (2007), Study section on Molecular Structure and Function C (2007), Study section on Cell Structure and Function (2006), Study section on Nanomedicine Development Centers for the NIH Roadmap Nanomedicine Initiative (2005), Study section on Bioanalytical, Engineering, and Chemistry Emphasis (2003)

Member, Center for Brain Science, Systems Biology Program, Virology Program, Harvard University
Standing committee member, Biophysics program, Chemical Physics program, Harvard University
Scientific Advisory Board, Biodynamic Optical Imaging Center, Peking University
Scientific Advisory Board, Department of Neurobiology and Biophysics, University of Science and Technology of China

Publications

K. Xu, H. P. Babcock, X. Zhuang. Dual-objective STORM reveals three-dimensional filament organization in the actin cytoskeleton. ***Nat. Methods*** (in press).

G. T. Dempsey, J. C. Vaughan, K. H. Chen, M. Bates, X. Zhuang. Evaluation of fluorophores for optimal performance in localization-based super-resolution imaging. ***Nat. Methods*** **8**, 1027-1036 (2011)).

J. C. Vaughan, X. Zhuang. New fluorescent probes for Super-resolution imaging. ***Nat. Biotechnol.*** 29, 880-881 (2011)

W. Wang, G.W. Li, C. Chen, X. S. Xie, X. Zhuang. Chromosome organization by a nucleoid associated protein. ***Science*** **333**, 1445-1449 (2011).

E. C. Garner, R. Bernard, W. Wang, X. Zhuang, D. Z. Rudner, T. Mitchison. Circumferential Motions of the Cell Wall Synthesis Machinery Drive Cytoskeletal Dynamics in B. subtilis. ***Science*** **333**, 222-225 (2011).

S. Jones, S.-H. Shim, J. He, X. Zhuang. Fast three-dimensional super-resolution imaging of live cells. ***Nat. Methods*** 8, 499-505 (2011).

M. Mihalusova, J. Y. Wu, X. Zhuang. Functional importance of telomerase pseudoknot revealed by single-molecule analysis. ***Proc. Natl. Acad. Sci. USA*** (in press).

M. Bates, G. T. Dempsey, K. H. Chen, X. Zhuang. Multicolor super-resolution fluorescence imaging through via multi-parameter fluorophore detection ***Chemphyschem*** (in press)

B. Huang, H. Babcock, X. Zhuang, Breaking the diffraction barrier: Super-resolution imaging of cells. ***Cell 143***, 1047-1058 (2010).

S. Liu, B. T. Harada, J. T. Miller, S. F. J. Le Grice, X. Zhuang. Initiation complex dynamics direct the transitions between distinct phases of early HIV reverse transcription. ***Nat. Struct. Mol. Biol.*** **17**, 1453-1460 (2010)

A. Dani, B. Huang, J. Bergan, C. Dulac, X. Zhuang. Super-resolution imaging of chemical synapses in the brain. ***Neuron*** **68**, 843-856 (2010)

M. Wu, B. Huang, M. Graham, A. Raimondi, J. E. Heuser, X. Zhuang, P. De Camilli. Coupling between clathrin-dependent endocytic budding and F-BAR-dependent tubulation in a cell-free system. ***Nat. Cell Biol.*** **12**, 902-908 (2010)

S. Chung, M. Wendeler, J. W. Rausch, G. Beilhartz, M. Gotte, B. R. O'Keefe, A. Bermingham, J. A. Beutler, S. Liu, X. Zhuang, S. F.J. Le Grice. Structure-Activity Analysis of Vinylogous Urea Inhibitors of Human Immunodeficiency Virus-Encoded Ribonuclease H. ***Antimicrob Agents Chemother*** **54**, 3913-3921 (2010)

M. Bates, S. A. Jones, X. Zhuang. Stochastic Optical Reconstruction Microscopy (STORM) -- A Method for Superresolution Fluorescence Imaging. Chapter 35 in Imaging: A Laboratory Manual. Ed. Rafael Yuste. Cold Spring Harbor Laboratory Press (2010)

G. Dempsey, W. Wang, X. Zhuang, Fluorescence Imaging at Sub–Diffraction-Limit Resolution with Stochastic Optical Reconstruction Microscopy. Pp. 95-127 in *Handbook of Single-molecule Biophysics* (ed. Hinterdorfer P, van Oijen AM), Springer Science and Business Media, New York.

T. Blosser, J. Yang, M. Stone, G. Narlikar, X. Zhuang, Dynamics of nucleosome remodeling by individual ACF complexes. ***Nature*** **462**, 1022-1027 (2009)

G. T. Dempsey, M. Bates, W. E. Kowtoniuk, D. R. Liu, R. Y. Tsien, X. Zhuang. Photoswitching mechanism of cyanine dyes. ***J. Am. Chem. Soc.*** **131**, 18192-18193 (2009)

M. Bates, B. Huang, M. Rust, G. Dempsey, W. Wang, X. Zhuang. Sub-diffraction-limit Imaging with Stochastic Optical Reconstruction Micrscopy (STORM). ***Nobel Volume on Single Molecule Spectroscopy in Chemistry***, Springer Publishing (2009).

J. Wu, M. Stone, X. Zhuang. A Single-molecule assay for telomerase structural-function analysis. ***Nucleic Acid Res.*** doi:10.1093/nar/gkp1033 (2009)

J. Vaughan, B. Brandenburg, J. Hogle, X. Zhuang. Rapid actin-dependent viral motility in live cells. ***Biophysical Journal*** **97**, 1647-1656 (2009)

X. Zhuang. Nano-imaging with STORM. ***Nat. Photon.*** **3**, 365-367 (2009)

Huang, M. Bates, X. Zhuang. Super-resolution fluorescence microscopy. ***Annu. Rev. Biochem.*** **78**, 993 – 1016 (2009)

E. Abbondanzieri, X. Zhuang. Concealed enzyme coordination. ***Nature*** **457**, 392-393 (2009).

H. M. van der Schaar, M. J. Rust, C. Chen, H. van der Ende-Metselaar, J. Wilschut, X. Zhuang, J. M. Smit. Dissecting the cell entry pathway of single Dengue virus particles in living cells. ***PLoS Pathogen*** **4**, e1000244 (2009)

S. Liu, E. Abbondanzieri, J. W. Rausch, S. F. J. Le Grice, X. Zhuang. Slide into action: dynamic shuttling of HIV reverse transcriptase on nucleic acid substrate. ***Science*** **322**, 1092-1097 (2008).

B. Huang, S. Jones, B. Brandenburg, X. Zhuang. Whole cell 3D STORM reveals interactions between cellular structures with nanometer-scale resolution. ***Nat. Meth.*** 5, 1047 - 1052 (2008).

M. Bates, B. Huang, X. Zhuang. Super-resolution microscopy by nanoscale localization of photo-switchable fluorescent probes. ***Curr. Opin. Chem. Biol.*** **208**, 1-10 (2008)

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J. Zheng, X. Zhuang. Luminescent and Raman active silver nanoparticles with polycrystalline structure. ***J. Am. Chem. Soc.*** **130**, 10472-10473 (2008)

E. Abbondanzieri, G. Bokinsky, J. W. Rausch, J. X. Zhang, S. F. J. Le Grice, X. Zhuang. Dynamic binding orientations direct activity of HIV reverse transcriptase. ***Nature*** **453**, 184-189 (2008).

B. Huang, W. Wang, M. Bates, X. Zhuang. Three-dimensional super-resolution imaging by stochastic optical reconstruction microscopy. ***Science*** **319**, 810-813 (2008).

M. Bates, B. Huang, G. Dempsey, X. Zhuang. Multicolor super-resolution imaging with photo-switchable fluorescent probes. ***Science*** **317**, 1749-1753 (2007).

S. Liu, G. Bokinsky, N. G. Walter, X. Zhuang. Dissecting the multi-step reaction pathway of an RNA enzyme by single-molecule kinetic fingerprinting. ***Proc. Natl. Acad. Sci. USA*** **104**, 12634-12639 (2007).

M. D. Stone, M. Mihalusova, C. M. O'Connor, R. Prathapam, K. Collins, X. Zhuang. Stepwise protein-mediated RNA folding directs assembly of telomerase ribonucleoprotein. ***Nature*** **446**, 458-461 (2007).

B. Brandenburg, L. Y. Lee, M. Lakadamyali, M. J. Rust, X. Zhuang, and J. M. Hogle. Imaging poliovirus entry in live cells. ***PLoS Biol.*** **5**, 1543-1555 (2007).

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Y. Zhou, X. Zhuang. Kinetic analysis of sequential multi-step reactions. ***J. Phys. Chem. B***, **111**, 13600-13610, 2007 (2007).

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G. Bokinsky, X. Zhuang. Single-molecule RNA folding. ***Acct. Chem. Res.*** **38**, 566-573 (2005).

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X. Wei, S. Hong, X. Zhuang, T. Goto, Y. R. Shen. Nonlinear optical studies of liquid crystal alignment on a rubber polyvinyl alcohol surface. ***Phys. Rev. E*** **62**, 5160-5172, (2000).

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T. Qian, X. Zhuang, Y. R. Shen. Surface-monolayer-induced bulk alignment of liquid crystals: from nematic to smectic-a phase. ***Phys. Rev. E*** **59**, 1873-1879 (1999).

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J. J. Ge, G.Xue, K. W. McCreight, S. Wang, F. W. Harris, S. Z. D. Cheng, X. Zhuang, S. Hong, Y. R. Shen. Surface studies of polyimide thin films via surface enhanced Raman scattering and second harmonic generation. ***Macromol. Rapid Comm.*** **19**, 619-623 (1998).

R. Muenster, M. Jarasch, X. Zhuang, Y. R. Shen. Enhanced optical kerr effect of dye-doped isotropic liquid. ***Phys. Rev. Lett.*** **78**, 42-45 (1997).

X. Zhuang and Y. R. Shen. The application of nonlinear optics to the study of polymers at interfaces. ***Trends Polym. Sci.*** **4**, 258-264 (1996).

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X. Zhuang, H. S. Lackritz, and Y. R. Shen. Photo-isomerization of polymer monolayers and multi-layers on water. ***Chem. Phys. Lett.*** **246**, 279-284 (1995).

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X. Zhuang, L. Marrucci, D. Johannsmann, and Y. R. Shen. Dependence of liquid crystal bulk alignment on its surface monolayer. ***Mole. Cryst. Liq. Cryst.*** **262**, 35-43 (1995).

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