

Curriculum Vitae: Xiaowei Zhuang

Howard Hughes Medical Institute Investigator
David B. Arnold Professor of Science
Harvard University

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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

2015- Director, Center for Advanced Imaging at Harvard University
2014- David B. Arnold Professor of Science, Harvard University
2006- Professor, Department of Chemistry and Chemical Biology,
Department of Physics, Harvard University
2005- Investigator, Howard Hughes Medical Institute
2005-2006 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

Elected membership

Member, National Academy of Sciences
Member, National Academy of Medicine
Fellow, National Academy of Inventors
Member, American Academy of Arts and Sciences
Member, American Philosophical Society
Fellow, American Association of the Advancement of Science
Fellow, American Physical Society
Foreign member, Chinese Academy of Sciences
Foreign member, European Molecular Biology Organization (EMBO)
Honorary fellow, Royal Microscopical Society

Awards and honors

2022 J. Allyn Taylor International Prize in Medicine
2022 Heinrich Wieland Prize
2022 Honorary doctorate, Icahn School of Medicine at Mount Sinai
2021 FNIH Lurie Prize in Biomedical Sciences
2020 Vilcek Prize in Biomedical Science
2019 Pearl Meister Greengard Prize
2019 Breakthrough Prize in Life Sciences
2019 National Academy of Sciences Award for Scientific Discovery
2018 H.P. Heineken Prize for Biochemistry and Biophysics, Royal Netherlands Academy of Arts and Sciences (KNAW)
2017 Pittsburgh Analytical Chemistry Award
2017 Lennart Nilsson Award, Karolinska Institute, Sweden
2017 Honorary doctorate, Delft University of Technology
2016 Honorary doctorate, Stockholm University
2016 Vallee Visiting Professorship
2015 National Academy of Sciences Award in Molecular Biology

- 2015 Pearse Prize, Royal Microscopical Society
- 2011 Raymond & Beverly Sackler International Prize in Biophysics
- 2010 Max Delbruck Prize in Biological Physics, American Physical Society
- 2008 Coblentz Award
- 2006 Pure Chemistry Award, American Chemical Society
- 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 Searle Scholar
- 2003 CAREER award, National Science Foundation
- 2003 Beckman Young Investigator Award
- 2002 Young Investigator Award, Office of Naval Research

Award committee positions (current)

- 2021- Vilcek Prize Committee
- 2020- Rosenstiel Award Committee
- 2019- Breakthrough Prize Committee
- 2016- Lasker Award Committee
- 2015- Welch Award Committee

Editorial board positions (current)

- 2019- *Science*
- 2009- *Cell*

Scientific advisory board and board of trustee positions (current)

- 2021- Board of Trustees and Committee on Scientific Affairs, Rockefeller University
- 2021- Scientific and Technical Advisory Board, Vizgen, Inc
- 2019- External Advisory Council, Lewis-Sigler Institute of Integrative Genomics, Princeton University
- 2019- Scientific Advisory Board, Division of Life Sciences and Medicine, University of Science of Technology of China
- 2017- Scientific Advisory Board, Swedish Strategic Research Foundation Systems Microscopy project, Karolinska Institute
- 2017- Scientific Advisory Board, Stowers Institute for Medical Research
- 2015- Scientific Advisory Board, The Welch Foundation

Company co-founder and consultant positions (current)

- 2019- Co-founder, consultant, scientific and technical advisory board member, Vizgen Inc

Distinguished lectureship

- 2022 Peter Dervan Distinguished Lecture, University of Texas at Austin
- 2022 George Palade Memorial Lecture, Yale School of Medicine
- 2022 Haselkorn Lecture, University of Chicago
- 2021 Keynote Lecture, joint ASCB-EMBO annual Meeting
- 2021 Keynote Lecture, Keystone symposium on Higher-Order Chromatin Architecture
- 2020 Keynote Lecture, UCSD IGM Symposium on Spatial Omics
- 2020 Keynote Lecture, BRAIN Initiative Investigator Meeting
- 2019 Kathryn McCarthy Lecture, Tufts University
- 2019 Charles Cantor Lecture, Boston University
- 2019 Robert Hofstadter Lecture, Stanford University
- 2019 Keynote Lecture, Keystone meeting on Single-Cell biology
- 2019 Stanley Cohen Lecture; Vanderbilt University

2019 Keynote Lecture, Keystone meeting on Leveraging the Revolution in Resolution
 2018 Emilio Segré Lecture, University of California, Berkeley
 2018 Keynote Lecture, Gordon Research Conference on Molecular and Cellular Neurobiology
 2018 Keynote Lecture, CSHA conference on Systems Biology of Genome Regulation and Engineering
 2018 Keynote Lecture, Royal Swedish Academy of Engineering Sciences (IVA) Symposium
 2018 Harkins Lecture, University of Chicago
 2018 Keynote Lecture, H Foundation Basic Science Symposium, Northwestern University
 2018 Keynote Lecture, Single-Cell Biology Conference, Cambridge, UK
 2018 John Kendrew Lecture, MRC Laboratory of Molecular Biology, Cambridge, UK
 2017 Presidential Lecture, Society for Neuroscience annual meeting
 2017 Rinehart Lecture, University of Illinois at Urbana Champaign
 2017 Franklin Lecture, Rice University
 2017 Keynote Lecture, Frontiers in Neurophotonics, Bordeaux, France
 2017 Keynote Lecture, EMBO/EMBL Symposium on Seeing is Believing
 2017 Keynote Lecture, ChinaNANO 2017 Conference, Beijing, China
 2017 Svedberg Lecture, Uppsala University, Sweden
 2017 Hooke Lecture, CYTO2017 conference
 2017 Keynote Lecture, Gordon Research Conference on Chromosome Dynamics
 2017 Keynote Lecture, EMBO Symposium on Chromatin and Epigenetics
 2017 Keynote Lecture, British Society of Cell Biology, Dev. Biology and Genetics Meeting
 2017 Keynote Lecture, Cold Spring Harbor Meeting on System Biology: Global gene regulation
 2017 Sigman Lecture, University of California at Los Angeles
 2016 Alexander M. Cruickshank Keynote Lecture, Gordon Research Conference on Synaptic Transmission
 2016 Keynote Lecture, Gordon Research Conference on Single-molecule approaches to biology
 2016 Herbert Lecture, Vollum Institute
 2016 Commencement speech, Departments of Physics and Astronomy, UC Berkeley
 2016 Kavli Lecture, American Physical Society Annual Meeting
 2016 Keynote Lecture, ASBMB Annual Meeting
 2016 University Lecture, UT Southwestern Medical Center
 2016 Honors Lecture, New York University School of Medicine
 2015 Andrew Huxley Lecture, Cambridge Neuroscience Symposium, University of Cambridge
 2015 IUBMB Lecture, FEBS Congress
 2015 Astbury Lecture, Astbury Center for Structural Molecular Biology, University of Leeds
 2015 Pearse Prize Lecture, Microsciences Microscopy Conference
 2015 Ferry Lecture, University of Wisconsin, Madison
 2015 Keynote Lecture, Gordon Research Conference on 3D Electron Microscopy
 2015 Keynote Lecture, Gordon Research Conference on Proteins
 2014 Harvey Lecture, Harvey Society
 2014 President's Plenary Lecture, American College of Neuropsychopharmacology Meeting
 2014 Krimm Lecture, University of Michigan
 2014 Huck Distinguished Lecture, Penn State University
 2014 Laureate Lecture, University of Pittsburg
 2014 McLean Lecture, Baylor College
 2014 Caspar Lecture, Florida State University
 2014 Keynote Lecture, Conference on Labeling and Nanoscopy
 2013 Dow Lecture, University of British Columbia
 2013 Global Lecture, Peking University
 2013 Keynote Lecture, American Society of Virology Annual Meeting
 2012 Danny Thomas Lecture, St Jude Research Hospital
 2012 Sproul Lecture, Cornell University
 2012 Wang Ying-Lai Lecture, University of Texas Medical Branch
 2012 Leica Scientific Forum Lectures, California (UCSF, UCLA, UCSD)

- 2011 Leica Scientific Forum Lectures, Germany (Munich, Heidelberg, Berlin)
- 2011 Greenfield Lecture, Case Western University
- 2011 Fredric Fay Lecture, University of Massachusetts School of Medicine
- 2011 Closs Lecture, University of Chicago
- 2011 Max Delbruck Prize Lecture, American Physical Society Annual Meeting
- 2011 Maggie & Nick DeWolf Public Lecture, Aspen Center for Physics
- 2010 Director's WALs Lecture, National Institutes of Health
- 2010 Magomedov-Shcherbinina Memorial Prize Lecture, University of Rochester
- 2009 Keynote Lecture, Annual Dutch Meeting on Molecular & Cellular Biophysics
- 2009 Keynote Lecture, Cold Spring Harbor Conference on Single Cell Analysis
- 2008 ST Huang Memorial Lecture, Hong Kong University
- 2008 Brockman Lecture, University of Michigan
- 2008 Morrison Lecture, Cornell University
- 2008 Coblenz Award Lecture, International Symposium on Molecular Spectroscopy
- 2006 Seymour Rothchild Lecture, University of Rochester
- 2004 Gunnar and Gunnel Kallén Memorial Lecture, Lund University, Sweden
- 2004 Jean-Francois Lefèvre Lecture, Ecole Supérieure de Biotechnologie de Strasbourg, France

Publications

1. M. Zhang, X. Pan, W. Jung, A. Halpern, S. W. Eichhorn, Z. Lei, L. Cohen, K. A. Smith, B. Tasic, Z. Yao, H. Zeng, X. Zhuang. A molecularly defined and spatially resolved cell atlas of the whole mouse brain. *bioRxiv*, <https://doi.org/10.1101/2023.03.06.531348> (2023).
2. Z. Yao, C. T. J. van Velthoven, M. Kunst, M. Zhang, D. McMillen, C. Lee, W. Jung, J. Goldy, A. Abdelhak, P. Baker, E. Barkan, D. Bertagnolli, J. Campos, D. Carey, T. Casper, A. B. Chakka, R. Chakrabarty, S. Chavan, M. Chen, M. Clark, J. Close, K. Crichton, S. Daniel, T. Dolbeare, L. Ellingwood, J. Gee, A. Glandon, J. Gloe, J. Gould, J. Gray, N. Guilford, J. Guzman, D. Hirschstein, W. Ho, K. Jin, M. Kroll, K. Lathia, A. Leon, B. Long, Z. Maltzer, N. Martin, R. McCue, E. Meyerdierks, T. N. Nguyen, T. Pham, C. Rimorin, A. Ruiz, N. Shapovalova, C. Slaughterbeck, J. Sulc, M. Tieu, A. Torkelson, H. Tung, N. V. Cuevas, K. Wadhwani, K. Ward, B. Levi, C. Farrell, C. L. Thompson, S. Mufti, C. M. Pagan, L. Kruse, N. Dee, S. M. Sunkin, L. Esposito, M. J. Hawrylycz, J. Waters, L. Ng, K. A. Smith, B. Tasic, X. Zhuang, H. Zeng. A high-resolution transcriptomic and spatial atlas of cell types in the whole mouse brain. *bioRxiv*, <https://www.biorxiv.org/content/10.1101/2023.03.06.531121v1> (2023).
3. W. E. Allen, T. R. Blosser, Z. A. Sullivan, C. Dulac, X. Zhuang. Molecular and spatial signatures of mouse brain aging at single cell resolution. *Cell* **186**, 194-208 (2023). <https://doi.org/10.1016/j.cell.2022.12.010>. (Open Access Article).
4. T. Lu, C. E. Ang, X. Zhuang. Spatially resolved epigenomic profiling of single cells in complex tissues. *Cell* **185**, 4448-4464 (2022).
5. R. Fang, C. Xia, J. L. Close, M. Zhang, J. He, Z. Huang, A. R. Halpern, B. Long, J. A. Miller, E. S. Lein, X. Zhuang. Conservation and divergence of cortical cell organization in human and mouse revealed by MERFISH. *Science* **377**, 56-62 (2022).
6. J. A. Osterhout, V. Kapoor, S. W. Eichhorn, E. Vaughn, J. D. Moore, D. Liu, D. Lee, L. A. DeNardo, L. Luo, X. Zhuang, C. Dulac. A Preoptic neuronal population controls fever and appetite during sickness. *Nature* **606**, 937-944 (2022).
7. E. Vaughn, S. Eichhorn, W. Jung, X. Zhuang, C. Dulac. Three-dimensional interrogation of cell types and instinctive behavior in periaqueductal gray. *bioRxiv*, <https://doi.org/10.1101/2022.06.27.497769> (2022).
8. R. Zhou, B. Han, R. Nowak, Y. Lu, E. Heller, C. Xia, A. H. Chishti, V. M. Fowler, X. Zhuang. Proteomic and functional analyses of the periodic membrane skeleton in neurons. *Nature Communications* **13**, 3196 (2022).
9. M. Zhang, S. W. Eichhorn, B. Zingg, Z. Yao, K. Cotter, H. Zeng, H. Dong, X. Zhuang. Spatially resolved cell atlas of the mouse primary motor cortex by MERFISH. *Nature* **598**, 137-143 (2021).

10. BRAIN Initiative Cell Census Network (BICCN). A multimodal cell census and atlas of the mammalian primary motor cortex. **Nature** **598**, 86-102 (2021).
11. T. Biancalani, G. Scalia, L. Buffoni, R. Avasthi, Z. Lu, A. Sanger, N. Tokcan, C. R. Vanderburg, A. Segerstolpe, M. Zhang, I. Avraham-Davidi, S. Vickovic, M. Nitzan S. Ma, A. Subramanian, M. Lipinski, J. Buenrostro, N. B. Brown, D. Fanelli, X. Zhuang, E. Z. Macosko, A. Regev. Deep learning and alignment of spatially resolved single-cell transcriptomes with Tangram. **Nature Methods** **18**, 1352-1362 (2021).
12. R. Chen, T. R. Blosser, M. N. Djekidel, J. Hao, A. Bhattacharjee, W. Chen, L. M. Tuesta, X. Zhuang, Y. Zhang. Decoding molecular and cellular heterogeneity of mouse nucleus accumbens. **Nature Neuroscience** **24**, 1757-1771 (2021).
13. H. Lee, C. -C. Yu, E. S. Boyden, X. Zhuang, Pallav Kosuri. Tetra-gel enables superior accuracy in combined super-resolution imaging and expansion microscopy. **Scientific Reports** **11**: 16944 (2021).
14. B. F. Miller, D. Bambah-Mukku, C. Dulac, X. Zhuang, J. Fan. Characterizing spatial gene expression heterogeneity in spatially resolved single-cell transcriptomics data with nonuniform cellular densities. **Genome Research** **31**, 1843-1855 (2021). DOI: 10.1101/gr.271288.120.
15. H. Huang, Q. Zhu, A. Jussila, Y. Han, B. Bintu, C. Kern, M. Conte, Y. Zhang, S. Bianco, A. M. Chiariello, M. Yu, R. Hu, M. Tastemel, I. Juric, M. Hu, M. Nicodemi, X. Zhuang, B. Ren. CTCF mediates dosage- and sequence-context-dependent transcriptional insulation by forming local chromatin domains. **Nature Genetics** **53**, 1064–1074 (2021).
16. T. Hara, R. Chanoch-Myers, N. D. Mathewson, C. Myskiw, L. Atta, L. Bussema, S. W. Eichhorn, A. C. Greenwald, G. S. Kinker, C. Rodman, L. N. G. Castro, H. Wakimoto, O. Rozenblatt-Rosen, X. Zhuang, J. Fan, T. Hunter, I. M. Verma, K. W. Wucherpfennig, A. Regev, M. L. Suvà, I. Tirosh. Interactions between cancer cells and immune cells drive transitions to mesenchymal-like states in glioblastoma. **Cancer Cell** **39**, 779-792.e11 (2021).
17. X. Zhuang. Spatially-resolved single-cell genomics and transcriptomics by imaging. **Nature Methods** **18**, 18-22 (2021).
18. A. N. Sawh, M. E. R. Shafer, J. Su, X. Zhuang, S. Wang, S. E. Mango. Lamina-Dependent Stretching and Unconventional Chromosome Compartments in Early *C. elegans* Embryos. **Mol. Cell** **78**, 96-111 (2020).
19. G. Wang, C.-E. Ang, J. Fan, A. Wang, J. R. Moffitt, X. Zhuang. Spatial organization of the transcriptome in individual neurons. **bioRxiv**, <https://doi.org/10.1101/2020.12.07.414060> (2020).
20. J. -H. Su, P. Zheng, S. S. Kinrot, B. Bintu, X. Zhuang. Genome-scale imaging of the 3D organization and transcriptional activity of chromatin. **Cell** **182**, 1641-1659 (2020).
21. Y. Fu, X. Zhuang, m⁶A-binding YTHDF proteins promote stress granule formation. **Nat. Chem. Biol.** **16**, 955–963 (2020).
22. C. Xia, J. Fan, G. Emanuel, J. Hao, X. Zhuang. Spatial transcriptome profiling by MERFISH reveals subcellular RNA compartmentalization and cell cycle-dependent gene expression. **PNAS** **116**, 19490–19499 (2019).
23. R. Zhou, B. Han, C. Xia, X. Zhuang. Membrane-associated periodic skeleton is a signaling platform for RTK transactivation in neurons. **Science** **365**, 929-934 (2019).
24. P. Kosuri, B. D. Altheimer, M. Dai, P. Yin, X. Zhuang. Rotation tracking of genome-processing enzymes using DNA origami rotors. **Nature** **572**, 136-140 (2019).
25. J. H. Trotter, J. Hao, S. Maxeiner, T. Tsetsenis, Z. Liu, X. Zhuang, T. C. Südhof. Synaptic Neurexin-1 Assembles into Dynamically Regulated Active Zone Nanoclusters. **J. Cell Biol.** **218**, 2677-2698 (2019).
26. C. Wang, T. Lu, G. Emanuel, H. P. Babcock, X. Zhuang. Imaging-based pooled CRISPR screening reveals regulators of lncRNA localization. **PNAS** **116**, 10842-10851(2019).
27. D. N. Lorenzo, A. Badea, R. Zhou, P. J. Mohler, X. Zhuang, V. Bennett. β II-spectrin promotes mouse brain connectivity through stabilizing axonal plasma membranes and enabling axonal organelle transport **PNAS** **113**, 15686-15695 (2019).

28. G. Wang, D. J. Simon, Z. Wu, D. M. Belsky, E. Heller, M. K. O'Rourke, N. T. Hertz, H. Molina, G. Zhong, M. Tessier-Lavigne, X. Zhuang. Structural plasticity of actin-spectrin membrane skeleton and functional role of actin and spectrin in axon degeneration. *eLife* **8**, e38730 (2019).
29. A. Sabantsev, R. F. Levandosky, X. Zhuang, G. D. Bowman, S. Deindl. Direct observation of coordinated DNA movements on the nucleosome during chromatin remodeling. *Nature Commun.* **10**, 1720 (2019).
30. C. Xia, H. P. Babcock, J. R. Moffitt, X. Zhuang. Multiplexed detection of RNA using MERFISH and branched DNA amplification. *Scientific Reports* **9**, 7721 (2019).
31. Y. M. Sigal, H. Bae, L. J. Bogart, T. K. Hensch, X. Zhuang. Structural maturation of cortical perineuronal nets and their perforating synapses revealed by super-resolution imaging. *PNAS* **116**, 7071-7076 (2019).
32. J. R. Moffitt, D. Bambah-Mukku, S. W. Eichhorn, E. Vaughn, K. Shekhar, J. D. Perez, N. D. Rubinstein, J. Hao, A. Regev, C. Dulac, X. Zhuang. Molecular, Spatial and Functional Single-Cell Profiling of the Hypothalamic Preoptic Region. *Science* **362**, eaau5324 (2018) DOI: 10.1126/science.aau5324.
33. B. Bintu, L. J. Mateo, J. Su, N. A. S.-A., M. Parker, S. Kinrot, K. Yamaya, A. N. Boettiger, X. Zhuang. Super-resolution chromatin tracing reveals domains and cooperative interactions in single cells. *Science* **362**, eaau1783 (2018) DOI: 10.1126/science.aau1783.
34. Y. M. Sigal, R. Zhou, X. Zhuang. Visualizing and discovering cellular structures with super-resolution microscopy. *Science* **361**, 880–887 (2018).
35. C. Y. Chan, A. M. Pedley, D. Kim, C. Xia, X. Zhuang, S. J. Benkovic. Microtubule-directed transport of purine metabolons drives their cytosolic transit to mitochondria. *PNAS* **115**, 13009-130014 (2018).
36. G. Wang, J. R. Moffitt, X. Zhuang. Multiplexed imaging of high density libraries of RNAs with MERFISH and expansion microscopy. *Scientific Report* **8**, 4847 (2018).
37. G. Emanuel, J. R. Moffitt, X. Zhuang. High-throughput, image-based screening of pooled genetic variant libraries. *Nature Methods* **14**, 1159-1162 (2017).
38. B. Han, R. Zhou, C. Xia, X. Zhuang. Structural Organization of the Actin-spectrin-based Membrane Skeleton in Dendrites and Soma of Neurons. *PNAS* **114**, E6678–E6685 (2017).
39. J. -J. Chung, K. Miki, D. Kim, S. -H. Shim, H. Shi, J. Y. Hwang, X. Cai, Y. Iseri, X. Zhuang, D. E. Clapham. CatSper ζ Regulates the Structural Continuity of Sperm Ca²⁺ Signaling Domains and is Required for Normal Fertility. *eLife* **6**, e23082 (2017).
40. L. A. Timashev, H. P. Babcock, X. Zhuang, and T. de Lange. The DDR at telomeres lacking intact shelterin does not require substantial chromatin decompaction. *Genes & Dev.* **31**, 578–589 (2017).
41. E. GropPELLI, H. C. Levy, E. Sun, M. Strauss, C. Nicol, S. Gold, X. Zhuang, T. J. Tuthill, J. M. Hogle, D. J. Rowlands. Picornavirus RNA is protected from cleavage by ribonuclease during virion uncoating and transfer across cellular and model membranes. *PLoS Pathogen* DOI: 10.1371/journal.ppat.1006197 (2017).
42. H. Babcock, X. Zhuang. Analyzing single molecule localization microscopy data using cubic splines. *Scientific Report* **7**, 552 (2017).
43. S. Wang, J. -H. Su, B. J. Bellevue, B. Bintu, J. R. Moffitt, C. -t. Wu, X. Zhuang. Spatial organization of chromatin domains and compartments in single chromosomes. *Science* **353**, 598-602 (2016).
44. J. R. Moffitt, J. Hao, D. Bambah-Mukku, T. Lu, C. Dulac, X. Zhuang. High-performance multiplexed fluorescence in situ hybridization in culture and tissue with matrix imprinting and clearing. *PNAS* **113**, 14456–14461 (2016)
45. C. Wang, B. Han, R. Zhou, X. Zhuang. Real-time imaging of translation on single mRNA transcripts in live cells. *Cell* **165**, 990-1001 (2016).
46. J. R. Moffitt, J. Hao, G. Wang, K. H. Chen, H. P. Babcock, X. Zhuang. High-throughput single-cell gene expression profiling with multiplexed error-robust fluorescence in situ hybridization (MERFISH). *PNAS* **113**, 11046–11051 (2016).

47. A. N. Boettiger, B. Bintu, J. R. Moffitt, S. Wang, B. J. Beliveau, G. Fudenberg, M. Imakaev, L. A. Mirny, C. -t. Wu, X. Zhuang. Super-resolution imaging reveals distinct chromatin folding for different epigenetic states. **Nature** **529**, 418-422 (2016).
48. J. B. French, S. A. Jones, H. Deng, A. M. Pedley, D. Kim, C. Y. Chan, H. Hu, R. J. Pugh, H. Zhao, Y. Zhang, T. J. Huang, Y. Fang, X. Zhuang, S. J. Benkovic. Spatial colocalization and functional link of purinosomes with mitochondria. **Science** **351**, 733-737 (2016).
49. J. He, R. Zhou, Z. Wu, M. Carrasco, P. Kurshan, J. Farley, D. Simon, G. Wang, B. Han, J. Hao, E. Heller, M. R. Freeman, K. Shen, T. Maniatis, M. Tessier-Lavigne, X. Zhuang. Prevalent presence of periodic actin-spectrin-based membrane skeleton in a broad range of neuronal cell types and animal species. **PNAS** **113**, 6029-6034 (2016).
50. J. R. Moffitt, S. Pandey, A. N. Boettiger, S. Wang, X. Zhuang. Spatial organization shapes the turnover of a bacterial transcriptome. **eLife**, e13065 (2016). DOI: 10.7554/eLife.13065.
51. B. T. Harada, W. L. Hwang, S. Deindl, N. Chatterjee, B. Bartholomew, X. Zhuang. Stepwise nucleosome translocation by RSC remodeling complexes. **eLife** e10051 (2016) DOI: 10.7554/elife.10051.
52. J. R. Moffitt, X. Zhuang. RNA Imaging with Multiplexed Error-Robust Fluorescence In Situ Hybridization (MERFISH). **Methods in Enzymology** **572**, 1 – 49 (2016)
53. S. Wang, J.H. Su, F. Zhang, X. Zhuang. An RNA-aptamer-based two-color CRISPR labeling system. **Sci. Rep.** **6**, 26857 (2016)
54. A. Wani, A. N. Boettiger, P. Schorderet, A. Ergun, C. Munger, R. Sadreyev, X. Zhuang, R. Kingston, N. Francis. Chromatin topology is coupled to Polycomb group protein subnuclear organization. **Nat. Communications** **7**: 10291(2016). DOI:10.1038/ncomms10291.
55. S. W. Hell, S. J. Sahl, M. Bates, X. Zhuang, R. Heintzmann, M. J. Booth, J. Bewersdorf, G. Shtengel, H. Hess, P. Tinnefeld, A. Honigmann, S. Jakobs, I. Testa, L. Cognet, B. Lounis, H. Ewers, S. J. Davis, C. Eggeling, D. Klenerman, K. I. Willig, G. Vicidomini, M. Castello, A. Diaspro, T. Cordes. The 2015 super-resolution microscopy roadmap. **J. Phys. D: Appl. Phys.** **48**, 443001 (2015).
56. Y. M. Sigal, C. M. Speer, H. P. Babcock, X. Zhuang. Mapping synaptic input fields of neurons with super-resolution imaging. **Cell** **163**, 493-505 (2015).
57. K. H. Chen, A. N. Boettiger, J. R. Moffitt, S. Wang, X. Zhuang. Spatially resolved, highly multiplexed RNA profiling in single cells. **Science** **348**, aaa6090 (2015). DOI: 10.1126/science.aaa6090.
58. S. Viswanathan, M. E. Williams, E. B. Bloss, T. J. Stasevich, C. M. Speer, A. Nern, B. D. Pfeiffer, B. M. Hooks, W. -P. Li, B. P. English, T. Tian, G. L. Henry, J. J. Macklin, R. Patel, C. R. Gerfen, X. Zhuang, Y. Wang, G. M. Rubin, L. L. Looger. High-performance probes for light and electron microscopy. **Nat. Methods** **12**, 568-576 (2015).
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60. D. Kim, T. J. Deerinck, Y. M. Sigal, H. P. Babcock, M. H. Ellisman, X. Zhuang. Correlative Stochastic Optical Reconstruction Microscopy and Electron Microscopy. **PLoS ONE** **10**: e0124581 (2015). DOI: 10.1371/journal.pone.0124581
61. C. Y. Chan, H. Zhao, R. J. Pugh, A. M. Pedley, J. French, S. A. Jones, X. Zhuang, H. Jinnah, T. J. Huang, S. J. Benkovic. Purinosome formation as a function of the cell cycle. **PNAS** **112**, 1368-1373 (2015).
62. G. Zhong, J. He, R. Zhou, D. Lorenzo, H. P. Babcock, V. Bennett, X. Zhuang. Developmental mechanism of the periodic membrane skeleton in axons. **eLife** **3**: e04581 (2014). DOI: 10.7554/eLife.04581

63. T. Shemesh, R. W. Klemm, F. B. Romano, S. Wang, J. C. Vaughan, X. Zhuang, H. Tukachinsky, M. M. Kozlov, T. A. Rapoport. A model for the generation and interconversion of ER morphologies. *PNAS* **111**, E5243-E5251 (2014).
64. D. N. Lorenzo, A. Badea, J. Q. Davis, J. Hostettler, J. He, G. Zhong, X. Zhuang, V. Bennett. A PIK3C3–Ankyrin-B–Dynactin pathway promotes axonal growth and multiorganelle transport. *J. Cell Biol* **207**, 735-752 (2014).
65. W. L. Hwang, S. Deindl, B. T. Harada, X. Zhuang. Histone H4 tail mediates allosteric regulation of nucleosome remodelling by linker DNA. *Nature* **512**, 213-217 (2014).
66. A D. Blunk, Y. Akbergenova, R. W. Cho, J. Lee, U. Walldorf, K. Xu, G. Zhong, X. Zhuang and J. T. Littleton. Postsynaptic actin regulates active zone spacing and glutamate receptor apposition at the Drosophila neuromuscular junction. *Mol. Cell. Neurosci* **61**, 241-254 (2014).
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