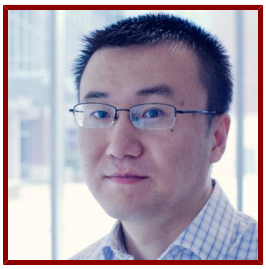
Stanford



Bo Wang

Associate Professor of Bioengineering and, by courtesy, of Developmental Biology

Bio

BIO

We are a discovery-driven research group working at the interface between developmental biology, bioengineering, and statistical physics. We combine quantitative organism-wide fluorescence imaging, functional genomics, and physical modeling to understand the fundamental rules that control collective cell behaviors to optimize tissue regeneration, adaptation, and evolution.

ACADEMIC APPOINTMENTS

- Associate Professor, Bioengineering
- Associate Professor (By courtesy), Developmental Biology
- Member, Bio-X
- Member, Wu Tsai Neurosciences Institute

HONORS AND AWARDS

- Friday Evening Lecture, Marine Biological Laboratory (2024)
- SN10: Scientists to Watch, Science News (2020)
- Young Investigator Award, Human Frontier Science Program (2019)
- Beckman Young Investigator Award, Arnold and Mabel Beckman Foundation (2017)
- Hellman Faculty Scholar Award, Hellman Fellows Fund (2017)
- Baxter Faculty Scholar Award, Donald E. and Delia B. Baxter Foundation (2016)
- Career Award at the Scientific Interface, Burroughs Wellcome Fund (2013)
- Victor K. LaMer Award, American Chemical Society (2012)
- Frank J. Padden, Jr. Award, American Physical Society (2010)

PROFESSIONAL EDUCATION

- Ph.D., University of Illinois, Urbana-Champaign , Materials Science (2011)
- M.S., B.S., Zhejiang University , Materials Science (2006)

LINKS

- https://wanglab.stanford.edu/: https://wanglab.stanford.edu/

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Research interests:

(1) Cell type evolution through the lens of single-cell multiomic sequencing analysis

(2) Systems biology of whole-body regeneration

(3) Cellular and molecular basis of animal-algal photosymbiosis

Teaching

COURSES

2026-27

- Bioengineering Department Colloquium: BIOE 293 (Win)
- Fundamentals of Regeneration Biology: BIOE 219, DBIO 219 (Win)

2025-26

- Bioengineering Department Colloquium: BIOE 293 (Win)
- Fundamentals of Regeneration Biology: BIOE 219, DBIO 219 (Win)

2024-25

- Bioengineering Department Colloquium: BIOE 293 (Spr)
- Fundamentals of Regeneration Biology: BIOE 219, DBIO 219 (Win)

2023-24

- Bioengineering Department Colloquium: BIOE 293 (Spr)
- Fundamentals of Regeneration Biology: BIOE 219, DBIO 219 (Win)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Nadia Haghani, Lauren Lubeck, Albert Marti i Sabari, Macy Vollbrecht, Mica Yang

Postdoctoral Faculty Sponsor

Pengyang Li, Souradeep Sarkar, Xiaomeng Wan, Guang Yang

Doctoral Dissertation Advisor (AC)

Abhimanyu Sharma, Sidney Vermeulen, Jeongwoong Yoon

Doctoral Dissertation Co-Advisor (AC)

Brennan McDonald

Doctoral (Program)

Yilin Chen, Isabel Goldaracena Aguirre, Esther Mozipo, Caleb Olaso, Daniel Ramos Mejia, Soham Sinha, Sean Wang, Yixin Wang

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Bioengineering (PhD Program)
- Biophysics (PhD Program)
- Developmental Biology (PhD Program)

Publications

PUBLICATIONS

- **Explosive cytotoxicity of ruptoblasts bridges hormone surveillance and immune defense.** *Cell*
  Chai, C., Sultan, E., Sarkar, S. R., Zhong, L., Nanes Sarfati, D., Gershoni-Yahalom, O., Jacobs-Wagner, C., Thiam, H. R., Rosental, B., Wang, B.
  2026

- **A genetic and microscopy toolkit for manipulating and monitoring regeneration in Macrostomum lignano.** *Cell reports*
  Hall, R. N., Li, H., Chai, C., Vermeulen, S., Bigasin, R. R., Song, E. S., Sarkar, S. R., Gibson, J., Prakash, M., Fire, A. Z., Wang, B.
  2024; 43 (11): 114892

- **Adaptive robustness through incoherent signaling mechanisms in a regenerative brain.** *Cell reports*
  Bray, S. R., Wyss, L. S., Chai, C., Lozada, M. E., Wang, B.
  2024; 43 (8): 114580

- **Coordinated wound responses in a regenerative animal-algal holobiont.** *Nature communications*
  Nanes Sarfati, D., Xue, Y., Song, E. S., Byrne, A., Le, D., Darmanis, S., Quake, S. R., Burlacot, A., Sikes, J., Wang, B.
  2024; 15 (1): 4032

- **Ultrafast distant wound response is essential for whole-body regeneration.** *Cell*
  Fan, Y., Chai, C., Li, P., Zou, X., Ferrell, J. E., Wang, B.
  2023

- **Expansion spatial transcriptomics.** *Nature methods*
  Fan, Y., Andrusivova, Z., Wu, Y., Chai, C., Larsson, L., He, M., Luo, L., Lundeberg, J., Wang, B.
  2023

- **Heterologous reporter expression in the planarian Schmidtea mediterranea through somatic mRNA transfection.** *Cell reports methods*
  Hall, R. N., Weill, U., Drees, L., Leal-Ortiz, S., Li, H., Khariton, M., Chai, C., Xue, Y., Rosental, B., Quake, S. R., Sanchez Alvarado, A., Melosh, N. A., Fire, et al
  2022; 2 (10): 100298

- **Mapping single-cell atlases throughout Metazoa unravels cell type evolution.** *eLife*
  Tarashansky, A. J., Musser, J. M., Khariton, M., Li, P., Arendt, D., Quake, S. R., Wang, B.
  2021; 10

- **Single-cell deconstruction of stem-cell-driven schistosome development.** *Trends in parasitology*
  Nanes Sarfati, D., Li, P., Tarashansky, A. J., Wang, B.
  2021

- **Single-cell analysis of Schistosoma mansoni identifies a conserved genetic program controlling germline stem cell fate.** *Nature communications*
  Li, P., Nanes Sarfati, D., Xue, Y., Yu, X., Tarashansky, A. J., Quake, S. R., Wang, B.
  2021; 12 (1): 485

- **Chromatic neuronal jamming in a primitive brain.** *NATURE PHYSICS*
  Khariton, M., Kong, X., Qin, J., Wang, B.
  2020; 16 (5): 553-557

- **Mechanically resolved imaging of bacteria using expansion microscopy.** *PLoS biology*
  Lim, Y., Shiver, A. L., Khariton, M., Lane, K. M., Ng, K. M., Bray, S. R., Qin, J., Huang, K. C., Wang, B.
  2019; 17 (10): e3000268

- **Self-assembling manifolds in single-cell RNA sequencing data.** *ELIFE*
  Tarashansky, A. J., Xue, Y., Li, P., Quake, S. R., Wang, B.
  2019; 8: e48994

- **Stem cell heterogeneity drives the parasitic life cycle of Schistosoma mansoni** *ELIFE*
  Wang, B., Lee, J., Li, P., Section, A., Yang, H., Liu, C., Zhao, M., Newmark, P. A.

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- **Memoryless self-reinforcing directionality in endosomal active transport within living cells** *NATURE MATERIALS*
  Chen, K., Wang, B., Granick, S.
  2015; 14 (6): 589-593
- **Functional genomic characterization of neoblast-like stem cells in larval Schistosoma mansoni** *ELIFE*
  Wang, B., Collins, J. J., Newmark, P. A.
  2013; 2
- **When Brownian diffusion is not Gaussian** *NATURE MATERIALS*
  Wang, B., Kuo, J., Bae, S. C., Granick, S.
  2012; 11 (6): 481-485
- **Anomalous yet Brownian** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Wang, B., Anthony, S. M., Bae, S. C., Granick, S.
  2009; 106 (36): 15160-15164
- **Nanoparticle-induced surface reconstruction of phospholipid membranes** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Wang, B., Zhang, L., Bae, S. C., Granick, S.
  2008; 105 (47): 18171-18175
- **The Biodiversity Cell Atlas: mapping the tree of life at cellular resolution.** *Nature*
  Sebé-Pedrós, A., Tanay, A., Lawniczak, M. K., Arendt, D., Aerts, S., Archibald, J., Arnone, M. I., Blaxter, M., Cleves, P., Coelho, S. M., Dias, M., Dunn, C., Elek, et al
  2025; 645 (8082): 877-885
- **A molecular cell atlas of mouse lemur, an emerging model primate.** *Nature*
  Ezran, C., Liu, S., Chang, S., Ming, J., Botvinnik, O., Penland, L., Tarashansky, A., de Morree, A., Travaglini, K. J., Zhao, J., Wang, G., Hasegawa, K., Sin, et al
  2025
- **Mouse lemur cell atlas informs primate genes, physiology and disease.** *Nature*
  Ezran, C., Liu, S., Chang, S., Ming, J., Guethlein, L. A., Wang, M. F., Dehghannasiri, R., Olivieri, J., Frank, H. K., Tarashansky, A., Koh, W., Jing, Q., Botvinnik, et al
  2025
- **Regeneration in the absence of canonical neoblasts in an early branching flatworm.** *Nature communications*
  Gąsiorowski, L., Chai, C., Rozanski, A., Purandare, G., Ficze, F., Mizi, A., Wang, B., Rink, J. C.
  2025; 16 (1): 1232
- **Split Luciferase Molecular Tension Sensors for Bioluminescent Readout of Mechanical Forces in Biological Systems.** *ACS sensors*
  Zhong, B. L., Elliot, J. M., Wang, P., Li, H., Hall, R. N., Wang, B., Prakash, M., Dunn, A. R.
  2024
- **Alleviating Cell Lysate-Induced Inhibition to Enable RT-PCR from Single Cells in Picoliter-Volume Double Emulsion Droplets.** *Analytical chemistry*
  Khariton, M., McClune, C. J., Brower, K. K., Klemm, S., Sattely, E. S., Fordyce, P. M., Wang, B.
  2023
- **mRNA Transfection ofS. mediterraneafor Luminescence Analysis.** *Methods in molecular biology (Clifton, N.J.)*
  Weill, U., Hall, R. N., Drees, L., Wang, B., Rink, J. C.
  2023; 2680: 263-275
- **Multicellularity in animals: The potential for within-organism conflict.** *Proceedings of the National Academy of Sciences of the United States of America*
  Howe, J., Rink, J. C., Wang, B., Griffin, A. S.
  2022; 119 (32): e2120457119
- **Cellular diversity and developmental hierarchy in the planarian nervous system.** *Current opinion in genetics & development*

Wyss, L. S., Bray, S. R., Wang, B.
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- **Transcriptional and functional motifs defining renal function revealed by single-nucleus RNA sequencing.** *Proceedings of the National Academy of Sciences of the United States of America*
  Xu, J., Liu, Y., Li, H., Tarashansky, A. J., Kalicki, C. H., Hung, R., Hu, Y., Comjean, A., Kolluru, S. S., Wang, B., Quake, S. R., Luo, L., McMahon, et al
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- **Comparisons of cell proliferation and cell death from tornaria larva to juvenile worm in the hemichordate Schizocardium californicum.** *EvoDevo*
  Bump, P., Khariton, M., Stubbert, C., Moyen, N. E., Yan, J., Wang, B., Lowe, C. J.
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- **Single cell biology-a Keystone Symposia report.** *Annals of the New York Academy of Sciences*
  Cable, J., Elowitz, M. B., Domingos, A. I., Habib, N., Itzkovitz, S., Hamidzada, H., Balzer, M. S., Yanai, I., Liberali, P., Whited, J., Streets, A., Cai, L., Stergachis, et al
  2021

- **Mechanical expansion microscopy.** *Methods in cell biology*
  Fan, Y. n., Lim, Y. n., Wyss, L. S., Park, S. n., Xu, C. n., Fu, H. n., Fei, J. n., Hong, Y. n., Wang, B. n.
  2021; 161: 125–46

- **Profiling cellular diversity in sponges informs animal cell type and nervous system evolution.** *Science (New York, N.Y.)*
  Musser, J. M., Schippers, K. J., Nickel, M., Mizzon, G., Kohn, A. B., Pape, C., Ronchi, P., Papadopoulos, N., Tarashansky, A. J., Hammel, J. U., Wolf, F., Liang, C., Hernández-Plaza, et al
  2021; 374 (6568): 717-723

- **Double Emulsion Picoreactors for High-Throughput Single-Cell Encapsulation and Phenotyping via FACS.** *Analytical chemistry*
  Brower, K. K., Khariton, M., Suzuki, P. H., Still, C. 2., Kim, G., Calhoun, S. G., Qi, L. S., Wang, B., Fordyce, P. M.
  2020

- **Forecasting unprecedented ecological fluctuations.** *PLoS computational biology*
  Bray, S. R., Wang, B.
  2020; 16 (6): e1008021

- **Identification of anisomycin, prodigiosin and obatoclax as compounds with broad-spectrum anti-parasitic activity.** *PLoS neglected tropical diseases*
  Ehrenkaufer, G. n., Li, P. n., Stebbins, E. E., Kangussu-Marcolino, M. M., Debnath, A. n., White, C. V., Moser, M. S., DeRisi, J. n., Gisselberg, J. n., Yeh, E. n., Wang, S. C., Company, A. H., Monti, et al
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- **Phase transitions in mutualistic communities under invasion** *PHYSICAL BIOLOGY*
  Bray, S. R., Fan, Y., Wang, B.
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- **Deep line-temporal focusing with high axial resolution and a large field-of-view using intracavity control and incoherent pulse shaping** *OPTICS LETTERS*
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- **Nanomedicine Approaches Against Parasitic Worm Infections.** *Advanced healthcare materials*
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- **Biomimetic Virulomics for Capture and Identification of Cell-Type Specific Effector Proteins.** *ACS nano*
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- **Bursts of Active Transport in Living Cells** *PHYSICAL REVIEW LETTERS*
  Wang, B., Kuo, J., Granick, S.
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  Chen, K., Wang, B., Guan, J., Granick, S.
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- **Modular Stitching To Image Single-Molecule DNA Transport** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*
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- **Adult somatic stem cells in the human parasite Schistosoma mansoni** *NATURE*
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- **Automated Single-Molecule Imaging To Track DNA Shape** *LANGMUIR*
  Guan, J., Wang, B., Granick, S.
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- **Single-Molecule Methods in Polymer Science** *JOURNAL OF POLYMER SCIENCE PART B-POLYMER PHYSICS*
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- **Confining Potential when a Biopolymer Filament Reptates** *PHYSICAL REVIEW LETTERS*
  Wang, B., Guan, J., Anthony, S. M., Bae, S. C., Schweizer, K. S., Granick, S.
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  Wang, B., Zhao, Q. H., Wang, F., Gao, C. Y.
  2006; 45 (10): 1560-1563
- **Irreversible compression of polyelectrolyte multilayers** *MACROMOLECULES*
  Gao, C. Y., Wang, B., Feng, J., Shen, J. C.
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- **Selective adsorption of microcapsules on patterned polyelectrolyte multilayers** *ADVANCED MATERIALS*
  Feng, J., Wang, B., Gao, C. Y., Shen, J. C.
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