



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

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)

2022-23

- Comparative Single-cell Genomics in the Ocean: BIO 269, BIOE 269 (Sum)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

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

Postdoctoral Faculty Sponsor

Chew Chai, Pengyang Li, Souradeep Sarkar, Guang Yang

Doctoral Dissertation Advisor (AC)

Prateek Kalakuntla, Abhimanyu Sharma, Sidney Vermeulen, Jeongwoong Yoon

Doctoral Dissertation Co-Advisor (AC)

Brennan McDonald

Doctoral (Program)

Yilin Chen, Isabel Goldaracena Aguirre, Esther Mozipo, Caleb Olaso, 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.

2018; 7

- **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., Amone, 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 of *S. mediterranea* for 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.
2022; 76: 101960
- **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
2022; 119 (25): e2203179119
 - **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.
2022; 13 (1): 13
 - **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*
Ehrenkauffer, 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
2020; 14 (3): e0008150
 - **Phase transitions in mutualistic communities under invasion** *PHYSICAL BIOLOGY*
Bray, S. R., Fan, Y., Wang, B.
2019; 16 (4)
 - **Deep line-temporal focusing with high axial resolution and a large field-of-view using intracavity control and incoherent pulse shaping** *OPTICS LETTERS*
Lou, K., Wang, B., Jee, A., Granick, S., Amblard, F.
2018; 43 (20): 4919–22
 - **Nanomedicine Approaches Against Parasitic Worm Infections.** *Advanced healthcare materials*
Li, P., Rios Coronado, P. E., Longstaff, X. R., Tarashansky, A. J., Wang, B.
2018: e1701494
 - **Biomimetic Virulomics for Capture and Identification of Cell-Type Specific Effector Proteins.** *ACS nano*
Lapek, J. D., Fang, R. H., Wei, X. n., Li, P. n., Wang, B. n., Zhang, L. n., Gonzalez, D. J.
2017; 11 (12): 11831–38
 - **Even Hard-Sphere Colloidal Suspensions Display Fickian Yet Non-Gaussian Diffusion** *ACS NANO*
Guan, J., Wang, B., Granick, S.
2014; 8 (4): 3331-3336

- **Bursts of Active Transport in Living Cells** *PHYSICAL REVIEW LETTERS*
Wang, B., Kuo, J., Granick, S.
2013; 111 (20)
- **Diagnosing Heterogeneous Dynamics in Single-Molecule/Particle Trajectories with Multiscale Wavelets** *ACS NANO*
Chen, K., Wang, B., Guan, J., Granick, S.
2013; 7 (10): 8634-8644
- **Modular Stitching To Image Single-Molecule DNA Transport** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*
Guan, J., Wang, B., Bae, S. C., Granick, S.
2013; 135 (16): 6006-6009
- **Adult somatic stem cells in the human parasite *Schistosoma mansoni*** *NATURE*
Collins, J. J., Wang, B., Lambrus, B. G., Tharp, M. E., Iyer, H., Newmark, P. A.
2013; 494 (7438): 476-479
- **Automated Single-Molecule Imaging To Track DNA Shape** *LANGMUIR*
Guan, J., Wang, B., Granick, S.
2011; 27 (10): 6149-6154
- **Single-Molecule Methods in Polymer Science** *JOURNAL OF POLYMER SCIENCE PART B-POLYMER PHYSICS*
Granick, S., Bae, S. C., Wang, B., Kumar, S., Guan, J., Yu, C., Chen, K., Kuo, J.
2010; 48 (24): 2542-2543
- **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.
2010; 104 (11)
- **Stepwise interfacial self-assembly of nanoparticles via specific DNA pairing** *PHYSICAL CHEMISTRY CHEMICAL PHYSICS*
Wang, B., Wang, M., Zhang, H., Sobal, N. S., Tong, W., Gao, C., Wang, Y., Giersig, M., Wang, D., Moehwald, H.
2007; 9 (48): 6313-6318
- **Chitosan-mediated synthesis of gold nanoparticles on patterned poly(dimethylsiloxane) surfaces** *BIOMACROMOLECULES*
Wang, B., Chen, K., Jiang, S., Reincke, F., Tong, W. J., Wang, D. Y., Gao, C. Y.
2006; 7 (4): 1203-1209
- **Biologically driven assembly of polyelectrolyte microcapsule patterns to fabricate microreactor arrays** *ANGEWANDTE CHEMIE-INTERNATIONAL EDITION*
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.
2004; 37 (24): 8836-8839
- **Selective adsorption of microcapsules on patterned polyelectrolyte multilayers** *ADVANCED MATERIALS*
Feng, J., Wang, B., Gao, C. Y., Shen, J. C.
2004; 16 (21): 1940-?