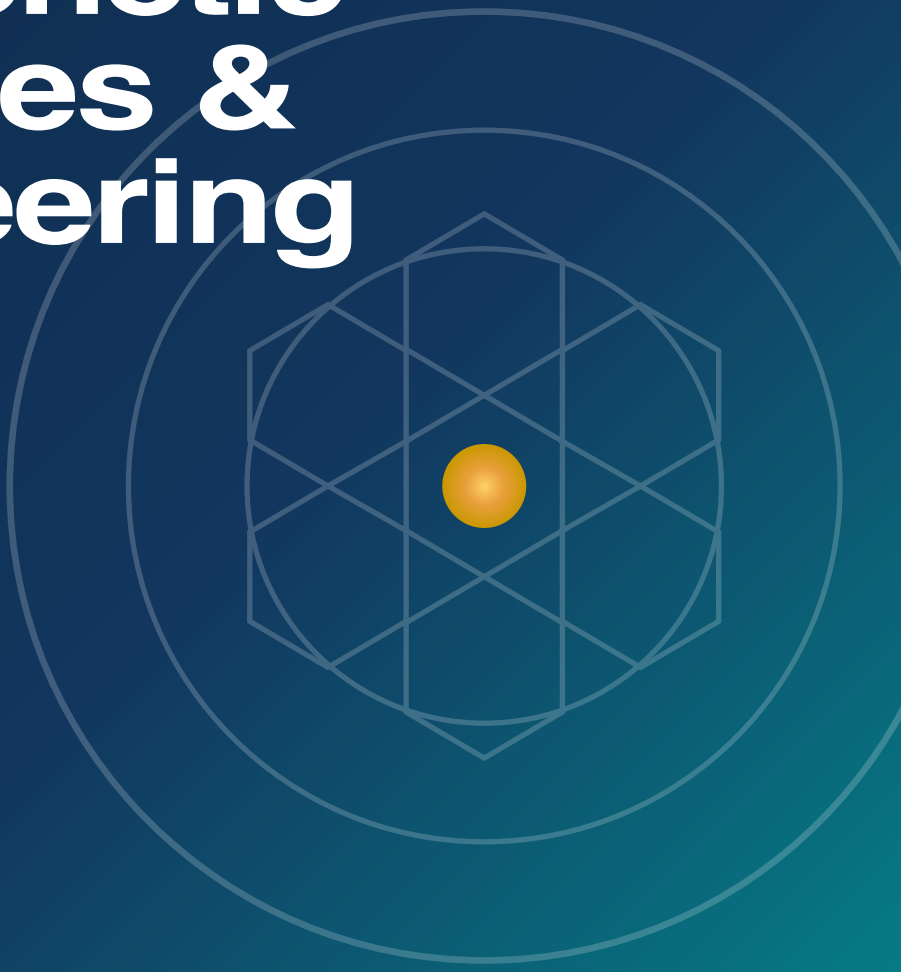
NSF EMBRIO × NSF RECODE

2026 Annual Symposium · Notre Dame

Advancing Morphogenetic Biosciences & Bioengineering



Symposium

Featured Speakers

June 25, 2025

https://www.purdue.edu/research/embrio/research/jointsymposium.php

EMBRIO · NSF · RECODE VASCULAR DIFFERENTIATION + MORPHOGENESIS

Additional Sponsors

BERTHIAUME INSTITUTE FOR PRECISION HEALTH · BELS Bioengineering & Life Sciences Initiative

Mark Alber

Distinguished Professor of Mathematics
Director, Center for Data-Driven Modeling in Biology
Department of Mathematics, University of California, Riverside

Interdisciplinary Center for Data-Driven Modeling in Biology

Dr. Alber develops multiscale mathematical and computational models of biological systems, including tissue growth, morphogenesis, and cancer. His work has significantly advanced the integration of quantitative modeling with experimental developmental biology, helping establish predictive frameworks for multicellular behavior.

Recent Selected Publications:

Kumar, Nilay, Jennifer Rangel Ambriz, Kevin Tsai, Mayesha Sahir Mim, Marycruz Flores-Flores, Weitao Chen, Jeremiah J. Zartman, and Mark Alber. "Balancing competing effects of tissue growth and cytoskeletal regulation during Drosophila wing disc development." Nature Communications 15, no. 1 (2024): 2477. https://doi.org/10.1038/s41467-024-46698-7

Alireza Ramezani, Samuel Britton, Roya Zandi, Mark Alber, Ali Nematbakhsh and Weitao Chen. A multiscale chemical-mechanical model predicts impact of morphogen spreading on tissue growth. npj Syst Biol Appl 9, 16 (2023). https://doi.org/10.1038/s41540- 023-00278-5

Selected Honors & Awards:

AAAS Fellow; Fulbright Scholar (2024); UC Riverside Outstanding Global Ambassador Award

Sharon Gerecht

Paul M. Gross Distinguished Professor
Chair, Department of Biomedical Engineering
Duke University

The Gerecht Lab

Dr. Gerecht is known for her pioneering research in biomaterials, vascular biology, and regenerative medicine, focusing on how microenvironmental cues shape cell behavior. Her work has transformed understanding of stem cell niche engineering and tissue regeneration, influencing both fundamental biology and translational medicine.

Recent Selected Publications:

Wei, Z., Lei, M., Wang, Y., Xie, Y., Xie, X., Lan, D., Jia, Y., Liu, J., Ma, Y., Cheng, B., Gerecht, S., Xu, F. (2023). Hydrogels with tunable mechanical plasticity regulate endothelial cell outgrowth in vasculogenesis and angiogenesis. Nature Communications. https://doi.org/10.1038/s41467-023-43768-0

Song, J., Shah, S., Bushold, M., Crouch, M., Sarkar, S., Hanson, N., Samanta, B., Guan, Y., Eggleston, M., Gerecht, S. (2026). Multimodal OCT with deep learning reveals healing dynamics. Cell Biomaterials. https://doi.org/10.1016/j.celbio.2026.100422

Selected Honors & Awards:

AAAS Fellow; American Heart Association Fellow; AIMBE Fellow; NSF CAREER Award

Edwin M. Munro

Professor of Molecular Genetics and Cell Biology
University of Chicago

The Munro Lab

Dr. Munro studies how biochemical signaling and mechanical forces coordinate to drive morphogenesis and cell polarity. His research has been foundational in establishing mechanochemical principles governing embryonic development and tissue organization.

Recent Selected Publications:

Li Y, Munro E. Filament-guided filament assembly provides structural memory of filament alignment during cytokinesis. Dev Cell. 2021 09 13; 56(17):2486-2500.e6. https://doi.org/10.1016/j.devcel.2021.08.009

Munro E, Heemskerk I, Warmflash A, Bocanegra-Moreno L, Kishi K, Kicheva A, Saunders TE, Michaut A, Gros J, Maroudas-Sacks Y, Keren K, Hannezo E, Gartner ZJ, Stormo B, Gladfelter A, Rodrigues A, Shyer A, Di Talia S, Khamaisi B, Sprinzak D, Tlili S, Lenne PF, Long Y, Fruleux A, Boudaoud A, Caldarelli P, Minc N, Maître JL. Roadmap for the multiscale coupling of biochemical and mechanical signals during development. Phys Biol. 2021 04 14; 18(4). doi: 10.1088/1478-3975/abd0db

Selected Honors & Awards:

Nikon Fellow

Noah P. Mitchell

Assistant Professor of Molecular Genetics and Cell Biology
University of Chicago

The Mitchell Lab

Dr. Mitchel combines physics, computation, and biology to study how tissues acquire form through collective cellular dynamics. His work is advancing quantitative frameworks linking gene activity to tissue geometry and mechanics.

Recent Selected Publications:

Mitchell, N.P., Cislo, D.J. (2023). TubULAR: tracking in toto deformations of dynamic tissues via constrained maps. Nature Methods 20, 1980–1988. https://doi.org/10.1038/s41592-023-02081-w

Mitchell, Noah P., Dillon J. Cislo, Suraj Shankar, Yuzheng Lin, Boris I. Shraiman, and Sebastian J. Streichan. "Visceral organ morphogenesis via calcium-patterned muscle constrictions." Elife 11 (2022): e77355. https://doi.org/10.7554/eLife.77355

Selected Honors & Awards:

NIH K99/R)) Award, NICHD; Helen Hay Whitney Foundation Fellowship; Yodh Prize, for top experimentalist, University of Chicago.

Mary C. Mullins

Professor of Cell and Developmental Biology
Perelman School of Medicine, University of Pennsylvania

The Mullins Lab

A pioneer in developmental genetics, Dr. Mullins' work using zebrafish has defined molecular mechanisms of Bone Morphogenetic Protein (BMP) signaling and embryonic axis formation. Her research has fundamentally shaped the field's understanding of morphogen gradients and early vertebrate development.

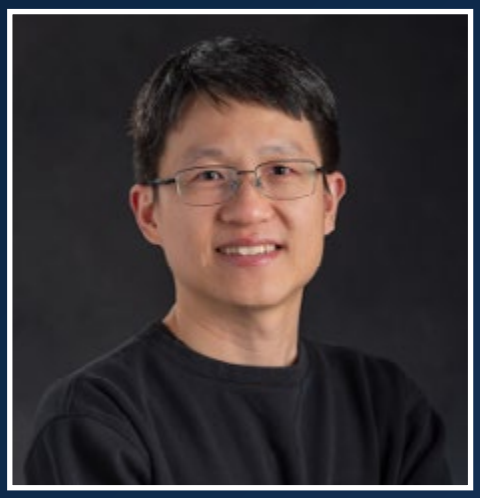
Recent Selected Publications:

Fuentes, R., Marlow, F. L., Abrams, E. W., Zhang, H., Kobayashi, M., Gupta, T., Kapp, L. D., DiNardo, Z., Heller, R. S., Cisternas, R., García-Castro, P., Segovia-Miranda, F., Montecinos-Franjola, F., Vought, W., Vejnar, C. E., Giráldez, A. J., & Mullins, M. C. (2024). Maternal regulation of the vertebrate oocyte-to-embryo transition. Plos Genetics, 20(7), e1011343. https://doi.org/10.1371/journal.pgen.1011343

Greenfeld H, Lin J, Mullins MC (2021) The BMP signaling gradient is interpreted through concentration thresholds in dorsal–ventral axial patterning. PLoS Biol 19(1): e3001059. https://doi.org/10.1371/journal.pbio.3001059

Selected Honors & Awards:

AAAS Fellow; Christiane Nüsslein-Volhard Award; CAMB Community Service Award; Alexander von Humboldt Research Fellowship



Jitao Zhang

Assistant Professor of Biomedical Engineering
Faculty, Institute for Quantitative Health Science & Engineering
Michigan State University

Zhang Lab – Brillouin Optics

Dr. Zhang develops Brillouin microscopy and advanced optical techniques to quantify mechanical properties of living tissues. His work is enabling non-invasive measurement of biomechanics, transforming how mechanical cues are studied in development and disease.

Recent Selected Publications:

Kabakova, I., Zhang, J., Xiang, Y., Caponi, S., Bilenca, A., Guck, J., Scarcelli, G. (2024). Brillouin microscopy. Nature Reviews Methods Primers. https://doi.org/10.1038/s43586-023-00286-z

Zhang, J. et al. (2020). Nuclear mechanics within intact cells is regulated by cytoskeletal networks. Small. https://doi.org/10.1002/smll.201907688

Honors & Awards:
NSF CAREER Award (NSF); NIH K25 Career Development Award (NIH); Doctoral Dissertation Excellence Award; Marcy Speer Award