Stanford



Daniel Fisher

Marjorie Mhoon Fair Professor

Applied Physics

NIH Biosketch available Online

Curriculum Vitae available Online

Bio

ACADEMIC APPOINTMENTS

- Professor, Applied Physics
- Member, Bio-X
- Member, Wu Tsai Neurosciences Institute

HONORS AND AWARDS

- Fellow, American Academy of Arts and Sciences (1999)
- Onsager Prize, American Physical Society (2013)
- Member, National Academy of Sciences (2015)

PROFESSIONAL EDUCATION

- PhD, Harvard University , Physics (1979)
- BA, Cornell University , Math and Physics (1975)

LINKS

- Applied Physics Dept. Site: https://web.stanford.edu/dept/app-physics/cgi-bin/person/fisher-daniel-s/

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Evolutionary & ecological dynamics & diversity, microbial, expt'l, & cancer

Teaching

COURSES

2026-27

- Bio by Numbers: BIOS 280 (Win)
- Renormalization Group and Randomness: APPPHYS 230 (Win)

2025-26

- Cellular Biophysics: APPPHYS 294, BIO 294, BIOPHYS 294 (Aut)
- Stochastic and Nonlinear Dynamics: APPPHYS 223, BIO 223, BIOE 213, PHYSICS 223 (Win)

2024-25

- Renormalization Group and Randomness: APPPHYS 230 (Win)

2023-24

- Cellular Biophysics: APPPHYS 294, BIO 294, BIOPHYS 294 (Win)
- Stochastic and Nonlinear Dynamics: APPPHYS 223, BIO 223, BIOE 213, PHYSICS 223 (Aut)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

James Ferrare, John McEnany, Adithya Sriram

Postdoctoral Faculty Sponsor

Federico Ghimenti, Asil Shomer, Obinna Ukogu, Qiwei Yu

Doctoral Dissertation Co-Advisor (AC)

Stefania Moroianu

Doctoral (Program)

Cady Feng, Minjeong Kim, Evan Laksono, Eric Liang, Jessica Pan, Alessandro Salvatore, Qiqi Xian

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Bioengineering (PhD Program)
- Biology (School of Humanities and Sciences) (PhD Program)
- Biophysics (PhD Program)

Publications

PUBLICATIONS

- **Hybridization breaks species barriers in long-term coevolution of a cyanobacterial population.** *bioRxiv : the preprint server for biology*
  Birzu, G., Muralidharan, H. S., Goudeau, D., Malmstrom, R. R., Fisher, D. S., Bhaya, D.
  2023
- **Spatiotemporal ecological chaos enables gradual evolutionary diversification without niches or tradeoffs.** *eLife*
  Mahadevan, A., Pearce, M. T., Fisher, D. S.
  2023; 12
- **Population genetics of polymorphism and divergence in rapidly evolving populations.** *Genetics*
  Melissa, M. J., Good, B. H., Fisher, D. S., Desai, M. M.
  2022
- **Synonymous mutations reveal genome-wide levels of positive selection in healthy tissues.** *Nature genetics*
  Poon, G. Y., Watson, C. J., Fisher, D. S., Blundell, J. R.
  2021; 53 (11): 1597-1605
- **Fundamental limits on the rate of bacterial growth and their influence on proteomic composition.** *Cell systems*
  Belliveau, N. M., Chure, G., Hueschen, C. L., Garcia, H. G., Kondev, J., Fisher, D. S., Theriot, J. A., Phillips, R.
  2021
- **Stabilization of extensive fine-scale diversity by ecologically driven spatiotemporal chaos.** *Proceedings of the National Academy of Sciences of the United States of America*
  Pearce, M. T., Agarwala, A., Fisher, D. S.
  2020
- **The evolutionary dynamics and fitness landscape of clonal hematopoiesis.** *Science (New York, N.Y.)*
  Watson, C. J., Papula, A. L., Poon, G. Y., Wong, W. H., Young, A. L., Druley, T. E., Fisher, D. S., Blundell, J. R.

2020; 367 (6485): 1449–54

- **A model for the interplay between plastic tradeoffs and evolution in changing environments.** *Proceedings of the National Academy of Sciences of the United States of America*
  Tikhonov, M. n., Kachru, S. n., Fisher, D. S.
  2020
- **Rapid adaptation in large populations with very rare sex: Scalings and spontaneous oscillations**
  Pearce, M. T., Fisher, D. S.
  ACADEMIC PRESS INC ELSEVIER SCIENCE.2019: 18–40
- **Adaptive walks on high-dimensional fitness landscapes and seascapes with distance-dependent statistics.** *Theoretical population biology*
  Agarwala, A. n., Fisher, D. S.
  2019
- **The dynamics of adaptive genetic diversity during the early stages of clonal evolution.** *Nature ecology & evolution*
  Blundell, J. R., Schwartz, K., Francois, D., Fisher, D. S., Sherlock, G., Levy, S. F.
  2018
- **Hidden Complexity of Yeast Adaptation under Simple Evolutionary Conditions** *CURRENT BIOLOGY*
  Li, Y., Venkataram, S., Agarwala, A., Dunn, B., Petrov, D. A., Sherlock, G., Fisher, D. S.
  2018; 28 (4): 515-+
- **Probing the ecological and evolutionary history of a thermophilic cyanobacterial population via statistical properties of its microdiversity.** *PloS one*
  Rosen, M. J., Davison, M., Fisher, D. S., Bhaya, D.
  2018; 13 (11): e0205396
- **Rapid adaptation in large populations with very rare sex: Scalings and spontaneous oscillations.** *Theoretical population biology*
  Pearce, M. T., Fisher, D. S.
  2017
- **Development of a Comprehensive Genotype-to-Fitness Map of Adaptation-Driving Mutations in Yeast.** *Cell*
  Venkataram, S., Dunn, B., Li, Y., Agarwala, A., Chang, J., Ebel, E. R., Geiler-Samerotte, K., Hérissant, L., Blundell, J. R., Levy, S. F., Fisher, D. S., Sherlock, G., Petrov, et al
  2016; 166 (6): 1585-1596 e22
- **Fine-scale diversity and extensive recombination in a quasisexual bacterial population occupying a broad niche** *SCIENCE*
  Rosen, M. J., Davison, M., Bhaya, D., Fisher, D. S.
  2015; 348 (6238): 1019-1023
- **Quantitative evolutionary dynamics using high-resolution lineage tracking.** *Nature*
  Levy, S. F., Blundell, J. R., Venkataram, S., Petrov, D. A., Fisher, D. S., Sherlock, G.
  2015; 519 (7542): 181-186
- **Acceleration of evolutionary spread by long-range dispersal** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Hallatschek, O., Fisher, D. S.
  2014; 111 (46): E4911-E4919
- **Rapid evolution of adaptive niche construction in experimental microbial populations** *EVOLUTION*
  Callahan, B. J., Fukami, T., Fisher, D. S.
  2014; 68 (11): 3307-3316
- **Rapid evolution of adaptive niche construction in experimental microbial populations.** *Evolution; international journal of organic evolution*
  Callahan, B. J., Fukami, T., Fisher, D. S.
  2014; 68 (11): 3307-3316
- **Lineage structure of the human antibody repertoire in response to influenza vaccination.** *Science translational medicine*
  Jiang, N., He, J., Weinstein, J. A., Penland, L., Sasaki, S., He, X., Dekker, C. L., Zheng, N., Huang, M., Sullivan, M., Wilson, P. C., Greenberg, H. B., Davis, et al

2013; 5 (171): 171ra19-?

- **Lineage Structure of the Human Antibody Repertoire in Response to Influenza Vaccination** *SCIENCE TRANSLATIONAL MEDICINE*
  Jiang, N., He, J., Weinstein, J. A., Penland, L., Sasaki, S., He, X., Dekker, C. L., Zheng, N., Huang, M., Sullivan, M., Wilson, P. C., Greenberg, H. B., Davis, et al
  2013; 5 (171)
- **Genetic Diversity and the Structure of Genealogies in Rapidly Adapting Populations** *GENETICS*
  Desai, M. M., Walczak, A. M., Fisher, D. S.
  2013; 193 (2): 565-585
- **Evolutionary dynamics and statistical physics** *JOURNAL OF STATISTICAL MECHANICS-THEORY AND EXPERIMENT*
  Fisher, D., Laessig, M., Shraiman, B.
  2013
- **Asexual evolution waves: fluctuations and universality** *JOURNAL OF STATISTICAL MECHANICS-THEORY AND EXPERIMENT*
  Fisher, D. S.
  2013
- **Denoising PCR-amplified metagenome data** *BMC BIOINFORMATICS*
  Rosen, M. J., Callahan, B. J., Fisher, D. S., Holmes, S. P.
  2012; 13
- **The Balance Between Mutators and Nonmutators in Asexual Populations** *GENETICS*
  Desai, M. M., Fisher, D. S.
  2011; 188 (4): 997-1014
- **Determinism and stochasticity during maturation of the zebrafish antibody repertoire** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Jiang, N., Weinstein, J. A., Penland, L., White, R. A., Fisher, D. S., Quake, S. R.
  2011; 108 (13): 5348-5353
- **Leading the dog of selection by its mutational nose** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Fisher, D. S.
  2011; 108 (7): 2633-2634
- **The Rate of Fitness-Valley Crossing in Sexual Populations** *GENETICS*
  Weissman, D. B., Feldman, M. W., Fisher, D. S.
  2010; 186 (4): 1389-1410
- **Rate of Adaptation in Large Sexual Populations** *GENETICS*
  Neher, R. A., Shraiman, B. I., Fisher, D. S.
  2010; 184 (2): 467-481
- **The rate at which asexual populations cross fitness valleys** *THEORETICAL POPULATION BIOLOGY*
  Weissman, D. B., Desai, M. M., Fisher, D. S., Feldman, M. W.
  2009; 75 (4): 286-300
- **High-Throughput Sequencing of the Zebrafish Antibody Repertoire** *SCIENCE*
  Weinstein, J. A., Jiang, N., White, R. A., Fisher, D. S., Quake, S. R.
  2009; 324 (5928): 807-810
- **Ordered phosphorylation governs oscillation of a three-protein circadian clock** *SCIENCE*
  Rust, M. J., Markson, J. S., Lane, W. S., Fisher, D. S., O'Shea, E. K.
  2007; 318 (5851): 809-812