

Stanford



Daniel Fisher

David Starr Jordan 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

2023-24

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

2021-22

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

2020-21

- Introduction to Quantitative Reasoning in Biology: BIOS 265 (Win)
- Stochastic and Nonlinear Dynamics: APPPHYS 223, BIO 223, BIOE 213, PHYSICS 223 (Aut)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

James Ferrare, Kyung-Su Kim, Zhiru Liu, John McEnany, Pavel Nosov, Akshat Pandey, Ben Sorscher, Daniel Wong

Orals Chair

Kyung-Su Kim

Postdoctoral Faculty Sponsor

Gabriel Birzu, Ivana Cvijovic, Alex Heyde, Avaneesh Narla

Doctoral Dissertation Advisor (AC)

Aditya Mahadevan, Alana Papula

Doctoral Dissertation Co-Advisor (AC)

Stefania Moroianu

Postdoctoral Research Mentor

Gabriel Birzu, Ivana Cvijovic

Doctoral (Program)

Feng Chen, Minjeong Kim, Evan Laksono, Haiwen Wang

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

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

Publications

PUBLICATIONS

- 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