

# Benjamin H Good, PhD

Department of Applied Physics, Stanford University  
Clark Center S231, 318 Campus Drive, Stanford, CA 94305  
bhgood@stanford.edu | 650-497-2575  
<https://bgoodlab.github.io>

## Education

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**Harvard University**, Cambridge, MA 2010-2016  
Ph.D. (2016) in Physics  
Thesis: Molecular evolution in rapidly evolving populations  
Advisor: Michael M. Desai

**Swarthmore College**, Swarthmore, PA 2006-2010  
B.A. (2010) in Physics and Mathematics with Highest Honors

## Employment and Research Experience

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**Stanford University**, Stanford, CA 2019-present  
*Assistant Professor of Applied Physics*

**University of California at Berkeley**, Berkeley, CA 2016-2019  
*Miller Research Fellow, Departments of Physics and Bioengineering*  
Advisor: Oskar Hallatschek

**Harvard University**, Cambridge, MA 2016  
*Postdoctoral Fellow, Department of Organismic and Evolutionary Biology*  
Advisor: Michael M. Desai

**Harvard University**, Cambridge, MA 2010-2016  
*Graduate student, Department of Physics and FAS Center for Systems Biology*  
Advisor: Michael M. Desai

**Santa Fe Institute**, Santa Fe, NM 2008-2010  
*Undergraduate researcher*  
Advisor: Aaron Clauset

**Gettysburg College**, Gettysburg, PA 2004-2005  
*Research Assistant, Department of Computer Science*  
Advisor: Rodney S. Tosten

## Fellowships and Awards

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**Terman Fellowship**, Stanford University ..... 2019-2022

**Miller Postdoctoral Fellowship**, Miller Institute for Basic Research in Science ..... 2016-2019

<b>Walter M. Fitch Award Finalist</b> , Society for Molecular Biology and Evolution.....	2015
<b>Certificate of Distinction in Teaching</b> , Harvard University.....	2015
<b>NSF Doctoral Dissertation Improvement Grant</b> .....	2015
<b>NSF Graduate Research Fellowship</b> .....	2011-2014
<b>Leroy Apker Award Finalist</b> , American Physical Society.....	2010
<b>Lang Award</b> , Swarthmore College .....	2010
<b>William C. Elmore Prize in Physics</b> , Swarthmore College.....	2010
<b>Phi Beta Kappa</b> .....	2010
<b>Goldwater Scholar</b> .....	2009-2010
<b>National Merit Scholar</b> .....	2006

## Publications

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(in anti-chronological order, \*=equal contribution, ordered alphabetically)

1. Garud, N.R.\*, **B.H. Good\***, O. Hallatschek, and K.S. Pollard. Evolutionary dynamics of bacteria in the gut microbiome within and across hosts. *PLoS Biology* **17**(1):e3000102 (2019).
2. **Good, B.H.** and O. Hallatschek. Effective models and the search for quantitative principles in microbial evolution. *Current Opinions in Microbiology* **45**:203-212 (2018).
3. **Good, B.H.**, S. Martis, and O. Hallatschek. Adaptation limits ecological diversification and promotes ecological tinkering during the competition for substitutable resources. *Proc. Natl. Acad. Sci. USA* **115**:E10407–E10416 (2018).
4. Cvijovic, I., **B.H. Good**, and M.M. Desai. The effect of strong purifying selection on genetic diversity. *Genetics*, **209**:1235–1278 (2018).
5. **Good, B.H.\***, M. J. McDonald\*, J. E. Barrick, R. E. Lenski, and M. M. Desai. The Dynamics of Molecular Evolution Over 60,000 Generations. *Nature*, **551**:45–50 (2017).
6. **Good, B. H.** and M. M. Desai. Evolution of mutation rates in rapidly adapting asexual populations. *Genetics*, **204**:1249–1266 (2016).
7. Cvijovic, I.\*, **B.H. Good\***, E.R. Jerison, and M.M. Desai. The fate of a mutation in a fluctuating environment. *Proc. Natl. Acad. Sci. USA* **112**:E5021-E5028 (2015).
8. Rice, D. P., **B.H. Good**, and M.M. Desai. The evolutionarily stable distribution of fitness effects. *Genetics* **200**:321–329 (2015).
9. **Good, B. H.** and M. M. Desai. The impact of macroscopic epistasis on long-term evolutionary dynamics. *Genetics* **199**:177–190 (2015).
10. **Good, B. H.** and M. M. Desai. Deleterious passengers in adapting populations. *Genetics* **198**:1183-1208 (2014).

11. Frenkel, E. M., **B.H. Good**, and M. M. Desai. The fates of mutant lineages and the distribution of fitness effects of beneficial mutations in laboratory budding yeast populations. *Genetics* **196**:1217-1226 (2014).
12. **Good, B. H.**, A.M. Walczak, R. A. Neher, and M. M. Desai. Genetic diversity in the interference selection limit. *PLoS Genetics* **10**:e1004222 (2014).
13. **Good, B. H.** and M. M. Desai. Fluctuations in fitness distributions and the effects of weak selection on sequence evolution. *Theoretical Population Biology* **85**:86-102 (2013).
14. Smith, D. E., D. K. Foley, and **B. H. Good**. Unhedgeable shocks and statistical economic equilibrium. *Economic Theory* **52**: 187-235.
15. **Good, B. H.**, I. M. Rouzine, D. J. Balick, O. Hallatschek, and M. M. Desai. Distribution of fixed beneficial mutations and the rate of adaptation in asexual populations. *Proc. Natl. Acad. Sci. USA* **109**:4950-4955 (2012).
16. **Good, B. H.**, Y.-A. de Montjoye, and A. Clauset. The performance of modularity maximization in practical contexts. *Phys. Rev. E* **81**, 046106 (2010).

## Talks and Seminars

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Out-of-Equilibrium Processes in Evolution and Ecology, CMO-BIRS, Oaxaca, Mexico, 8/21/19.

Microbiome Meeting, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY, 7/19/19.

From Molecular Basis to Predictability and Control of Evolution, Nordita Institute, Stockholm, Sweden, 7/15/19.

Miller Lunch Talk, Berkeley, CA, 3/26/19.

American Physical Society March Meeting, Boston, MA, 3/7/19.

Ecology and Evolution Seminar, University of Chicago, Chicago, IL, 3/4/19.

CME Seminar, Arizona State University, Tempe, AZ, 2/18/19.

Mathematics Colloquium, University of Pittsburgh, Pittsburgh, PA, 2/12/19.

Computational Biology Seminar, Cornell University, Ithaca, NY, 2/7/19.

Special Seminar, Cold Spring Harbor Laboratory, Cold Spring Harbor, NY, 1/30/19.

Condensed Matter Physics Seminar, Stanford University, Palo Alto, CA, 1/17/19.

Microbial Eco-Evo Seminar, Stanford University, Palo Alto, CA, 1/17/19.

Physics Colloquium, Gettysburg College, Gettysburg PA, 10/19/18.

Condensed Matter and Biological Physics Seminar, Washington University in St. Louis, St. Louis MO, 9/17/18.

Physical Principles Governing the Organization of Microbial Communities, Aspen Center for Physics, Aspen, CO, 6/8/18.

Ecology and Evolution of Microbial Populations, IGC, Lisbon, Portugal, 4/12/18.

*Escherichai coli*: The model microbe. Microbiology Society 2018, Birmingham, UK, 4/10/18.

Special Seminar, KITP, Santa Barbara, CA, 2/15/18.

Biophysics Seminar, Princeton University, Princeton, NJ, 2/5/18.

Eco-Evolutionary Dynamics in Nature and the Lab, KITP, Santa Barbara, CA, 9/11/17.

Eco-Evolutionary Dynamics in Nature and the Lab, KITP, Santa Barbara, CA, 9/5/17.

Probing Microbiome Dynamics, SMBE 2017, Austin, TX, 7/4/17.

qBio Seminar, University of California, San Diego, 10/10/16.

Bay Area Population Genomics XIV, San Francisco State University, 9/17/16.

Evolutionary Dynamics Seminar, PED, Harvard University, 3/22/16.

Populations, Evolution, and Physics, Aspen Center for Physics, 1/3/16

Condensed Matter Theory Kids Seminar, Harvard University, 10/13/15.

Walter M. Fitch Symposium, SMBE 2015, Vienna, Austria, 7/15/15.

Boston Evolutionary Genomics Retreat, Broad Institute, 8/30/13.

FAS Center for Systems Biology Groupmeeting, Harvard University, 7/3/13.

American Physical Society March Meeting, Baltimore, MD, 3/18/2013.

Condensed Matter Theory Kids Seminar, Harvard University, 9/18/2012.

Evolution Ottawa, 7/10/2012.

FAS Center for Systems Biology Groupmeeting, Harvard University, 4/25/12.

## Teaching Experience

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**Harvard University**, Department of Physics

*Teaching Fellow*, Applied Math 126 / Physics 141: Statistics and Inference in Biology 2015

**Swarthmore College**, Department of Physics

*Teaching Assistant*, Physics 14: Introduction to Quantum Mechanics 2010

*Teaching Assistant*, Physics 7: Introductory Mechanics 2009

*Lab teaching assistant*, Physics 50: Mathematical Methods in Physics 2009

**Gettysburg College**, Department of Physics

*Lab teaching assistant*, Physics 211: Electricity and Magnetism 2006

## Professional Activities

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Referee for *Nature Ecology and Evolution*, *Genetics*, *PLoS Genetics*, *PLoS Computational Biology*, *The American Naturalist*, *Evolution*, *Bioinformatics*, *BMC Evolutionary Biology*, *PLoS ONE*, *Physical Review Letters*, *Physical Review E*, *Journal of Statistical Mechanics: Theory and Experiment*, *Journal of Statistical Physics*

## Outreach

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Research supervisor for student in STEM Research Program at College Prep High-School, Oakland, CA (Summer 2017 and Summer 2018).

Co-organizer for Harvard Science Weeks public outreach event (4/12/2012).