Jeff Hasty

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Research Focus: Systems and Synthetic Biology

Development of a theoretical understanding of living systems
Transitioning synthetic biology towards diagnostics and therapeutics for cancer
Systems engineering of water treatment for the generation of feedstock, energy and clean water
Development of biosensors for continuous monitoring of industrial processes
Transforming education for the next generation of biologists
Integration of new technologies into K6 science education

Education

1992–1997 **Ph.D. Physics**, *Georgia Institute of Technology*, Research Area: Statistical Physics, Advisor: Kurt Wiesenfeld

Academic Appointments

2010–present **Professor (Primary)**, *Department of Bioengineering*, UC San Diego
2010–present **Professor**, *Department of Molecular Biology*, UC San Diego
2009–present **Director**, *Synthetic Biology Institute*, UC San Diego
2009–2010 **Associate Professor**, *Molecular Biology Section*, UC San Diego
2006–2010 **Associate Professor**, *Department of Bioengineering*, UC San Diego
2002–2006 **Assistant Professor**, *Department of Bioengineering*, UC San Diego
2001–2002 **Research Assistant Professor**, *Department of Bioengineering*, Boston University
1998–2001 **Postdoc with Jim Collins**, *Department of Bioengineering*, Boston University

Selected Publications (from over 165)

Full publication list available on ORCID

[1] Paige Steppe, Camilo Rey-Bedón, Shalni Kumar, Emerald Forrest, Niklas Van Der Wagt, Arnav Tayal, Lev Tsimring, and Jeff Hasty. Phenotypic patterning through copy number adaptation to environmental gradients. *ACS Synthetic Biology*, 2024.

[2] Shalni Kumar, Andrew Lezia, and Jeff Hasty. Engineering plasmid copy number heterogeneity for dynamic microbial adaptation. *Nature Microbiology*, pages 1–12, 2024.

[3] Richard O'Laughlin, Quoc Tran, Andrew Lezia, Wasu Ngamkanjanarat, Philip Emmanuele, Nan Hao, and Jeff Hasty. A standardized set of moclo-compatible inducible promoter systems for tunable gene expression in yeast. *ACS Synthetic Biology*, 13(1):85–102, 2023.

[4] Arianna Miano, Kevin Rychel, Andrew Lezia, Anand Sastry, Bernhard Palsson, and Jeff Hasty. High-resolution temporal profiling of e. coli transcriptional response. *Nature Communications*, 14(1):7606, 2023.

[5] Robert M Cooper, Josephine A Wright, Jia Q Ng, Jarrad M Goyne, Nobumi Suzuki, Young K Lee, Mari Ichinose, Georgette Radford, Feargal J Ryan, Shalni Kumar, and Jeff Hasty. Engineered bacteria detect tumor dna. *Science*, 381(6658):682–686, 2023.

[6] Alyssa J Chiang and Jeff Hasty. Design of synthetic bacterial biosensors. *Current Opinion in Microbiology*, 76:102380, 2023.

[7] Andrew Lezia, Nicholas Csicsery, and Jeff Hasty. Design, mutate, screen: multiplexed creation and arrayed screening of synchronized genetic clocks. *Cell Systems*, 13(5):365–375, 2022.

[8] Robert M Cooper, Taishi Tonooka, Andriy Didovyk, and Jeff Hasty. Rapid, affordable, and uncomplicated production of bacterial cell-free lysate. *JoVE (Journal of Visualized Experiments)*, (176):e62753, 2021.

[9] Robert M Cooper and Jeff Hasty. Rapid assembly of multiplex natural crispr arrays. In *CRISPR-Cas Methods*, pages 73–81. Humana, New York, NY, 2021.

[10] Michael J Liao, Arianna Miano, Chloe B Nguyen, Lin Chao, and Jeff Hasty. Survival of the weakest in non-transitive asymmetric interactions among strains of e. coli. *Nature Communications*, 11(1):1–8, 2020.

Ph.D. Students (Defense Date; Current Position)

1. Jennifer Marciniak (Fall, 2005; Project Scientist – Moores Cancer Center)
2. Lee Pang (Winter, 2007; Cirro Bio)
3. Ting Lu (Spring, 2007; Professor – University of Illinois – Urbana-Champaign)
4. Scott Cookson (Fall, 2008; COO – Quantitative BioSciences)
5. Diane Longo (Spring, 2009; Scientist – DILIsym Services Inc)
6. Natalie Ostroff Cookson (Fall, 2009; President – Quantitative BioSciences)
7. Sujata Nayak (Winter, 2010)
8. Mike Ferry (Fall, 2010; CSO – Quantitative BioSciences)
9. Tal Danino (Spring, 2010; Associate Professor – Columbia University)
10. Martin Kolnik (Spring, 2012; Applications Scientist – Miltenyi Biotech)
11. Octavio Mondragón (Spring, 2012; Postdoc – Caltech)
12. Ivan Razinkov (Spring, 2013; Research Engineer – Synthego Inc.)
13. Jangir Selimkhanov (Spring, 2014; Takeda Pharmaceuticals)
14. Arthur Prindle (Spring, 2014; Associate Professor – Northwestern University)
15. Phillip Samayoa (Summer, 2014; Co-Founder/CSO – Generation Bio)
16. Brooks Taylor (with Alex Hoffmann, Winter, 2015; Postdoc – Stanford)
17. Joyce Luke (Spring, 2016)
18. Spencer Scott (Fall, 2016; Kite Pharma)
19. Chia-Yi Wu (Winter, 2016; Thermo Fisher Scientific)
20. Diana Quach (with Kit Pogliano, Spring, 2016; Linnaeus Bioscience)
21. Leo Baumgart (Spring, 2016; Postdoc – Joint Genome Institute)
22. Megan Dueck (Spring, 2016; Co-Founder and CSO – COMBiNATi)

23. Omar Din (Spring, 2017; Co-Founder/CSO – GenCirq)
24. Liyang Xiong (Fall, 2017; Senior Bioinformatics Scientist – Guardant Health)
25. Garrett Graham (Spring, 2019; NC Institute for Climate Studies)
26. Elizabeth Stasiowski (Summer, 2019; Vertex Pharmaceuticals)
27. Nick Csicsery (Fall, 2019; Senior Scientist – Quantitative BioSciences)
28. Ricky O'Laughlin (Spring, 2020; UPenn)
29. Michael Liao (Fall, 2020; Merck Pharmaceuticals)
30. Greg Thouvenin (Spring, 2021; BBOT)
31. Ariana Miano (Spring, 2022)
32. Andrew Lezia (Spring, 2023; Port Therapeutics)
33. Shalni Kumar (Summer, 2025; UCSF)
34. Austin Doughty (Fall, 2025; UCSD)
35. Alyssa Chiang (Fall, 2025; UCSD)
36. Joanna Zhang (Winter, 2026; UCSD)

Honors and Awards

- Paul A. Libby Endowed Chair in the Jacobs School of Engineering (2024).
- Finalist, Howard Hughes Medical Institute Investigator Program (2015).
- Fellow, American Institute for Medical and Biological Engineering (2014).
- Teacher of the Year, UCSD Department of Bioengineering (2010).
- Invited Speaker – Nobel Symposium on Systems Biology (2009).
- Alfred P. Sloan Research Fellow (2003–05).
- NSF Career Award (2003–08).

Synergistic Activities

- Founder and Lead Organizer – Annual Winter Q-BIO Meeting (2012-present).
- Associate Editor, *ACS Synthetic Biology* (2011-2017)
- Organizer (with Ron Weiss), Synthetic Biology Workshop. Mathematical Biosciences Institute, Ohio State University, Columbus, OH (January, 2010).
- Editorial Board, *Biophysical Journal* (2010-2012).
- Editorial Board, *Systems and Synthetic Biology* (2006-2012).
- Editorial Board, *Chaos* (2007-2015).
- Organizer - Minisymposium: Dynamics in Gene Expression, Society for Industrial and Applied Mathematics (SIAM) 2nd Life Science Conference, Raleigh, NC (2006).
- Workshop Organizer, Columbus, OH. Genomics/proteomics/bioinformatics workshop at the NSF Mathematical Biosciences Institute (11/08/2004).
- Computational Bioengineering Track Organizer (9 sessions), Biomedical Engineering Society (BMES) annual meeting, Philadelphia, PA (10/14/2004).
- Organizer. Minisymposium on dynamics of gene regulation. Society for Industrial and Applied Mathematics (SIAM) 2nd Life Science Conference, Portland, OR (7/11/04).
- Discussion Leader: Modeling Transcriptional Control in Gene Regulatory Networks, Gordon Research Conference: Theoretical Biology & Biomathematics (6/9/04).
- Editorial Board, *IEE Systems Biology* (2004-2006).
- Scientific Advisory Committee, CIIT Centers for Health Research, Research Triangle Park, NC (2004-2006).

- Chair – Session: Noise in genetic networks. American Physical Society March Meeting, Austin, TX (2003).
- NSF Delegation Member. Served as one of three junior scientists on a US team formed to participate in the Advanced Studies Institute in Canberra Australia (2002).
- Organizer - Minisymposium: Gene regulatory networks, Society for Industrial and Applied Mathematics (SIAM) 1st Life Science Conference, Boston, MA (2002).
- Organizer - Minisymposium: Dynamics of gene networks, Society for Industrial and Applied Mathematics (SIAM) 6th Conference on Applications of Dynamical Systems, Snowbird, UT (2001).
- Chair - Session: Designer gene networks: Towards fundamental cellular control, Society for Industrial and Applied Mathematics (SIAM) 6th Conference on Applications of Dynamical Systems, Snowbird, UT (2001).

University Service

- Academic Senate Committee on Planning and Budget 2025-present
- Undergraduate Studies Committee (Dept. of Bioengineering) 2002-03.
- Jacobs School Task Force for Academic Culture Excellence (School of Engineering) 2003-2010.
- Graduate Studies Committee (Dept of Bioengineering) 2003-2010.
- Graduate Council (university-wide) 2008-2010.
- Executive Committee on qBIO Development 2012-present.
- Creation of qBIO Program (see http://qbio.ucsd.edu) 2013-15.
- Division of Biological Sciences Diversity Committee, 2014-17.
- Grad Admissions Committee service 2016-17.
- Director of Synthetic Biology Institute, 2009-present.
- Alternate, UCSD Academic Senate, 2023-24.