

Daniel Bryan Goodman

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Current position

Post-doctoral Fellow, Wyss Institute for Bioinspired Engineering

Areas of specialization

Synthetic Biology · Genome Engineering · Systems Biology · Bioinformatics and Computational Biology · Technology Development for Multiplex Molecular Biology · Oligonucleotide Library Synthesis · Pooled genetic selections and screens · Comparative Genomics and Evolution · Data Visualization

Education

- 2016 PhD in Bioinformatics and Integrative Genomics,
Massachusetts Institute of Technology
— Thesis: *Understanding Genetic Systems through Multiplexed Design, Synthesis, and Measurement*
— NSF Graduate Research Fellow
- 2008 Whitaker International Bioengineering Fellow, University of Cambridge.
— Project title: *Image Recognition and Microfluidics for Bead-based DNA Sequencing*
- 2008 BS in Bioengineering w/ specialization in Bioinformatics,
University of California at San Diego
— Senior Thesis: *Viral Genome Rearrangements in Baculoviridae inform phylogeny and function*

Honors & awards

- 2015 Martha Gray Prize, Harvard-MIT Division of Health Science and Technology
- 2012 SynBERC Practices Fellow, Six Parties Synthetic Biology Symposium

- 2009-2014 National Science Foundation Graduate Research Fellowship
- 2008-2009 Whitaker International Bioengineering Fellow
- 2003-2007 Provost Honors, Eleanor Roosevelt College at UCSD
- 2006 Pacific Rim Undergraduate Experience (PRIME) Award Recipient
- 2005 Google Summer of Code Award

Publications & talks

JOURNAL ARTICLES

- 2016 Luhan Yang, Adrian Briggs, Wei Leong Chew, Prashant Mali, Marc Guell, John Aach, *Daniel B. Goodman*, David Cox, Yinan Kan, Emal Lesha, Venkataramanan Soundararajan, Feng Zhang, and George M. Church. Genome editing with targeted deaminases. *bioRxiv*, page 066597, 2016.
- 2016 Nili Ostrov*, Matthieu M. Landon*, Marc Guell, Gleb Kuznetsov, Jun Teramoto, Natalie Cervantes, Minerva Zhou, Kerry Singh, Michael G. Napolitano, Mark Moosburner, Ellen Shrock, Benjamin W. Pruitt, Nicholas Conway, *Daniel B. Goodman*, Cameron L. Gardner, Garry Tyree, Alexandra Gonzales, Barry L. Wanner, Julie E. Norville, Marc J. Lajoie, and George M. Church. Design, synthesis and testing towards a 57-codon genome. *Science (in press)*, 2016.
- 2016 Michael G. Napolitano*, Matthieu M. Landon*, Christopher J. Gregg*, Marc J. Lajoie*, Lakshmi N. Govindarajan, Joshua A. Mosberg, Gleb Kuznetsov, *Daniel B. Goodman*, Oscar Vargas-Rodriguez, Farren J. Isaacs, Dieter Söll, and George M. Church. Emergent rules for codon choice elucidated by editing rare arginine codons in escherichia coli. *Proceedings of the National Academy of Sciences (in press)*, 2016.
- 2014 Christopher J. Gregg, Marc J. Lajoie, Michael G. Napolitano, Joshua A. Mosberg, *Daniel B. Goodman*, John Aach, Farren J. Isaacs, and George M. Church. Rational optimization of tolC as a powerful dual selectable marker for genome engineering. *Nucleic Acids Research*, 42(7):4779-4790, 2014.
- 2013 *Daniel B. Goodman*, George M. Church, and Sriram Kosuri. Causes and effects of N-terminal codon bias in bacterial genes. *Science*, 342(6157):475-479, 2013.
- 2013 Sriram Kosuri*, *Daniel B. Goodman**, Guillaume Cambray, Vivek K. Mutalik, Yuan Gao, Adam P. Arkin, Drew Endy, and George M. Church. Composability of regulatory sequences controlling transcription and translation in e. coli. *Proceedings of the National Academy of Sciences*, 110(34):14024-14029, 2013.
- 2013 Marc J. Lajoie, Alexis J. Rovner, *Daniel B. Goodman*, Hans-Rudolf Aerni, Adrian D. Haimovich, Gleb Kuznetsov, Jaron A. Mercer, Harris H. Wang, Peter A. Carr, Joshua A. Mosberg, Nadin Rohland, Peter G. Schultz, Joseph M. Jacobson, Jesse Rinehart, George M.

- Church, and Farren J. Isaacs. Genomically recoded organisms expand biological functions. *Science*, 342(6156):357–360, 2013.
- 2011 Farren J. Isaacs, Peter A. Carr, Harris H. Wang, Marc J. Lajoie, Bram Sterling, Laurens Kraal, Andrew C. Tolonen, Tara A. Gianoulis, *Daniel B. Goodman*, Nikos B. Reppas, Christopher J. Emig, Duhee Bang, Samuel J. Hwang, Michael C. Jewett, Joseph M. Jacobson, and George M. Church. Precise manipulation of chromosomes in vivo enables genome-wide codon replacement. *Science*, 333(6040):348–353, 2011.
- 2009 Irene Tiemann-Boege, Christina Curtis, Deepali N. Shinde, Daniel B Goodman, Simon Tavaré, and Norman Arnheim. Product length and dye choice and and detection chemistry in the bead-emulsion amplification of millions of single dna molecules in parallel. *Analytical Chemistry*, 81(14):5770–5776, 2009.
- 2008 Nitin Gupta, Jamal Benhamida, Vipul Bhargava, *Daniel B. Goodman*, Elisabeth Kain, Ian Kerman, Ngan Nguyen, Noah Ollikainen, Jesse Rodriguez, Jian Wang, Mary S. Lipton, Margaret Romine, Vineet Bafna, Richard D. Smith, and Pavel A. Pevzner. Comparative proteogenomics: combining mass spectrometry and comparative genomics to analyze multiple genomes. *Genome Research*, 18(7):1133–1142, 2008.
- 2007 *Daniel B. Goodman*, Noah Ollikainen, and Chris Sholley. Baculovirus phylogeny based on genome rearrangements. In *Comparative Genomics*, pages 69–82. Springer Berlin Heidelberg, 2007.

CONFERENCE PAPERS

- 2015 Gleb Kuznetsov*, *Daniel B. Goodman**, Marc J. Lajoie*, and George M. Church. Millstone: Software for iterative genome engineering. In *7th International Workshop on Bio-Design Automation*, 2015.
- 2015 *Daniel B. Goodman**, Casper Enghuus*, and George M Church. Design and characterization of genetic circuits using multiplex dna synthesis. In *7th International Workshop on Bio-Design Automation*, 2015.
- 2005 J. Collins, D. Lavigne, Y. Lin, *D. Goodman*, P. Irwan, and A. P. Lee. Automated multiplexed multidensity microfluidic (m3) cell sensing based on electrical gain measurements. In *IEEE EMBS Special Topic Conference on Microtechnologies in Medicine and Biology*, 2005.
- 2004 J. Collins, *D. Goodman*, and P. Delhaes and A.P. Lee. Nanofluidic channel engineering using laminar flow layer-by-layer deposition of polyelectrolytes. In *ASME Integrated Nanosystems & Nanotechnology Showcase*, 2004.

CONFERENCES & TALKS

- 2015 Gleb Kuznetsov*, *Daniel B. Goodman**, Marc J. Lajoie*, and George M. Church. Millstone: Software for iterative genome engineering. In *7th International Workshop on Bio-Design Automation*, 2015.
- 2014 *Daniel B. Goodman*. Millstone: A cloud-based genome engineering platform. Synthetic Biology Engineering Research Council 2014 Spring Retreat. UC Berkeley, Berkeley, CA, USA, 2014.

- 2013 *Daniel B. Goodman*. Design and interrogation of genetic elements using megabase-scale dna synthesis. Wyss Institute Annual Retreat. Boston, MA, USA, 2013.
- 2013 *Daniel B. Goodman*, Sri Kosuri, Guillaume Cambray, Vivek K. Mutalik, Yuan Gao, Adam P. Arkin, Drew Endy, and George M. Church. Composability of regulatory sequences controlling transcription and translation in *e. coli*. Synthetic Biology 6.0 Conference, University College London, London, UK, 2013.
- 2012 *Daniel B. Goodman*. Multiplex synthesis and characterization of transcriptional and translational regulatory elements in *e. coli*. Synthetic Biology Engineering Research Council 2012 Spring Retreat. UC Berkeley, Berkeley, CA, USA, 2012.
- 2008 L. Boettger, *D. Goodman*, E. O'Neill, and X. Yan. Cambridge iBrain: Foundations for an artificial nervous system using organizing electrical patterning. iGEM Jamboree 2008. Cambridge, MA, USA, 2008.
- 2007 L. Xie, J. Wang, J. Chung, *D. Goodman*, N. Ollikainen, and P. E. Bourne. Genome wide identification of off-site protein targets for major pharmaceuticals using functional site similarity and protein-ligand docking. Intelligent Systems for Molecular Biology 2007. Vienna, Austria, 2007.
- 2006 *D. Goodman*, N. Ollikainen, and C. Sholley. Genome rearrangements in baculovirus genomes. Algorithmic Biology 2006. La Jolla, CA, USA, 2006.
- 2006 *D. Goodman* and M. Levesque. High-throughput virtual screening of a novel kinase on the grid: Homology modeling and template-based techniques. Supercomputing 2006. Tampa Bay, FL, USA, 2006.

PRESS/MEDIA

- 2013 Kristy Hamilton. Science magazine podcast. September 27, 2013.
- 2013 Nicholas Wade. Synthetic Biology at the megabase scale. GetSynBio.com. October 22, 2013.
- 2011 Nicholas Wade. Genetic code of *E. coli* is hijacked by biologists. New York Times. July 14, 2011.
- 2008 Geoff Watts. BBC Radio: Leading Edge. National Radio Program. Broadcast November 8, 2008.

Teaching

- 2016 Judge, International Genetically Engineered Machines (iGEM), World Finals, Boston, MA
- 2015 Lecturer, ENG-SCI 222: Advanced Cellular Engineering, School of Engineering and Applied Sciences, Harvard University
- 2013-current Mentored PhD student Max Schubert, Harvard University

- 2013-2015 Mentored MS student Casper Enghuus, Harvard University
 Currently graduate student at MIT, Microbiology
- 2012-2014 Mentored research intern Gleb Kuznetsov, Harvard University
 Currently graduate student at Harvard, Biophysics
- 2011 Head Teaching Fellow, International Genetically Engineered Machines (iGEM) Team,
 Harvard University
- 2007-2008 Salk Mobile Science Laboratory
- 2007 Biology Teaching Assistant, University of California at San Diego.

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Papers, source code, and more information about past research can be found at my website:

<http://www.dbgoodman.com>