

# Lawrence A. David

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## CONTACT INFORMATION

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## EDUCATION

Massachusetts Institute of Technology	2005-2010
Ph.D., Computational & Systems Biology	
Thesis: Novel Phylogenetic Approaches to Problems in Microbial Genomics	
Columbia University	2001-2005
B.S., Biomedical Engineering, <i>summa cum laude</i>	

## PROFESSIONAL EXPERIENCE

Assistant Professor, Molecular Genetics & Microbiology, Duke University	2013-
Junior Fellow, Harvard Society of Fellows	2010-2013
Ph.D. student, Massachusetts Institute of Technology - <i>PI:</i> Eric Alm	2005-2010
Undergraduate research assistant, Columbia University - <i>PI:</i> Chris Wiggins	2002-2005

## PUBLICATIONS

[\* DENOTES EQUAL CONTRIBUTION]

13. S Wong, WZ Stephens, AR Burns, K Stagaman, **LA David**, BJM Bohannan, K Guillemin, JF Rawls. Life-long differences in dietary fat differentially influence microbiota assembly in the zebrafish gut. *Submitted*.
12. **LA David**, A Weil, ET Ryan, SB Calderwood, JB Harris, F Chowdhury, Y Begum, F Qadri, RC LaRocque, PJ Turnbaugh. Gut microbial succession follows acute secretory diarrhea in humans. *To appear: mBio*, **6**(2):e00381-15, Apr 2015.
11. **LA David**, AC Materna, J Friedman, I Baptista, MC Blackburn, A Perrotta, SE Erdman, EJ Alm. Host lifestyle affects human microbiota on daily timescales. *Genome Biol*, **15**:R89, Jul 2014.
10. **LA David**, CF Maurice, RN Carmody, DB Gootenberg, JE Button, BE Wolfe, AV Ling, AS Devlin, Y Varma, MA Fischbach, SB Biddinger, RJ Dutton, PJ Turnbaugh. Diet rapidly and reproducibly alters the gut microbiome. *Nature*, **505**(7484):559-563, Jan 2014.
9. G Szabo, SP Preheim, KM Kauffman, **LA David**, J Shapiro, EJ Alm, MF Polz. Reproducibility of *Vibrionaceae* Population Structure in Coastal Bacterioplankton. *ISME J*, **7**:509-519, Mar 2013.
8. CS Smillie\*, MB Smith\*, J Friedman, OX Cordero, **LA David**, EJ Alm. Ecology drives a global network of gene exchange connecting the human microbiome. *Nature*, **480**(7376):241-244, Dec 2011.

7. **LA David**, EJ Alm. Rapid evolutionary innovation during an Archean Genetic Expansion. *Nature*, **469**(7328):93-96, Jan 2011.
6. SP Preheim, Y Boucher, H Wildschutte, **LA David**, D Veneziano, EJ Alm and MF Polz. Metapopulation structure of Vibrionaceae among coastal marine invertebrates. *Environ Microbiol*, **13**:265-275, Jan 2011.
5. BJ Shapiro, **LA David**, J Friedman, EJ Alm. Looking for Darwin's footprints in the microbial world. *Trends Microbiol* **17**(5):196-204, May 2009.
4. BJ Dubin-Thaler, JM Hofman, Y Cai, H Xenias, I Spielman, AV Shneidman, **LA David**, HG Dobereiner, CH Wiggins, MP Sheetz. Quantification of Cell Edge Velocities and Traction Forces Reveals Distinct Motility Modules during Cell Spreading. *PLoS ONE*, **3**(11), Nov 2008.
3. DE Hunt\*, **LA David\***, D Gevers, SP Preheim, EJ Alm, MF Polz. Resource Partitioning and Sympatric Differentiation Among Closely Related Bacterioplankton. *Science*, **320**(5879):1081-85, May 2008.
2. **LA David**, CH Wiggins. Benchmarking of dynamic Bayesian Networks from stochastic time-series data. *Ann NY Acad Sci.*, **1115** 90-101, Dec 2007.
1. CF Glenn, DK Chow, **L David**, C Cooke, M Gami, W Iser, K Hanselman, I Goldberg and CA Wolkow. Behavioral deficits during early states of aging in *Caenorhabditis elegans* result from locomotory deficits possibly linked to muscle frailty. *J Gerontol A Biol Sci Med Sci.*, **59**(12):1251-60, Dec 2004.

## FUNDED RESEARCH

### *External Support*

- 2015-2018 Searle Scholars Program (\$300,000)  
Principal Investigator  
"Manipulating human-associated microbial communities"
- 2015-2018 Hartwell Foundation, Individual Biomedical Research Award (\$300,000)  
Principal Investigator  
"Linking oxygen and bacterial ecology in necrotizing enterocolitis"
- 2015-2016 National Science Foundation DDIG, DEB-1501495 (\$13,000)  
Principal Investigator (Co-PIs: Aspen Reese, Justin Wright)  
"Quantifying nitrogen limitation in the gut microbiota"
- 2014-2015 Global Probiotics Council, Young Investigator Grant (\$50,000)  
Principal Investigator  
"A high-throughput pipeline to find probiotics that inhibit select gut microbes"
- 2014-2015 Alfred P. Sloan Foundation, Research Fellowship (\$50,000)  
Principal Investigator

### *Internal Support*

- 2015-2016 Duke Center for Genomic & Computational Biology, Pilot Grant (\$50,000)  
Co-Principal Investigator (other Co-PI: Lingchong You)  
“Discovering natural bacterial interactions within the human gut microbiota”
- 2013-2014 Duke Center for the Genomics of Microbial Systems (\$20,000)  
Co-Principal Investigator (other Co-PI: Marc Deshusses)  
“Measurement and manipulation of environmental oxygen and the human gut microbiome”
- 2011-2012 Harvard University, Milton Fund (\$39,000)  
Principal Investigator  
“The human gut microbiota and *Vibrio cholerae* infection.”
- 2011-2012 Harvard Center for AIDS Research, Feasibility Grant (\$78,000)  
Co-Principal Investigator (other Co-PI: Douglas Kwon)  
“The gut microbiota and microbial translocation in early HIV-1 infection.”

### FELLOWSHIPS & AWARDS

- 2015 Searle Scholar  
2015 Hartwell Investigator  
2014 Travel Grant, Duke-NUS Graduate Medical School  
2014 Alfred P. Sloan Research Fellow  
2013 Whitehead Scholar, Duke University  
2010 Elected Junior Fellow, Harvard Society of Fellows  
2009 MIT Whitaker Health Sciences Fund Fellowship  
2005 National Defense Science and Engineering Graduate Fellowship  
2005 Dept. of Energy Computational Science Graduate Fellowship [declined]  
2005 Ford Foundation Diversity Predoctoral Fellowship [declined]  
2005 Thomas “Pop” Harrington Award, Columbia University  
2005 Robert E. and Claire S. Reiss Graduate Prize, Columbia University  
2004 Elected, Tau Beta Pi  
2004 Barry M. Goldwater Scholarship  
2002 Westchester Filipino-American Scholarship  
2001 Columbia C.P. Davis Scholar

### MEDIA

Print and online media coverage of research includes: the BBC, Bloomberg, Boston Globe, the Daily Mail, GenomeWeb, HealthDay, LiveScience, MSNBC, National Geographic: Phenomena, the New Scientist, NPR, Prevention Magazine, Radio In Vivo (WCOM), Science Daily, Science News, The Scientist, Scientific American, StoryCollider, USA Today, and Wired.

## SERVICE

- Referee: *Biology Letters*, *BMC Bioinformatics*, *Clinical Infectious Diseases*, *eLife*, *Genome Biology*, *Genome Research*, *InnoCentive*, *ISMEJ*, *mBio*, *National Science Foundation*, *PLoS One*, *PLoS Pathogens*, *PNAS*, *Scientific Reports*.
- Founding member: ASM General Meeting Junior Advisory Group, 2011-2013.
- Instructor (1 of 4): ideSHi Genomics Workshop, International Centre for Diarrhoeal Disease Research, Bangladesh, March 3-5, 2014
- Co-organizer: Duke GeMS Symposium, 2014.
- Co-organizer: Duke GeMS Microbiome Service, 2013-.
- Committee member: Duke CBB Graduate Admissions 2013-2014; Duke MGM Graduate Admissions 2014-2015.

## MENTORSHIP

### *Doctoral Students*

- 2015- Justin Silverman  
MD/PhD Student, Computational Biology & Bioinformatics
- 2014- Firas Midani  
PhD Student, Computational Biology & Bioinformatics
- 2014- Rachael Bloom  
PhD Student, University Program in Genetics & Genomics  
UPGG Marcy Speer Fellowship (2014)  
NSF Graduate Research Fellowship (2014)
- 2013- Aspen Reese  
PhD Candidate, University Program in Ecology  
NSF Doctoral Dissertation Improvement Grant (2015)  
NSF Graduate Research Fellowship (2014)  
Department of Defense NDSEG Fellowship (2014, declined)

### *Undergraduate Students*

- 2014- Anchi Wu, Biomedical Engineering  
GCB Summer Research Fellowship (2015)
- 2013- Sai Nimmagadda, Biomedical Engineering  
IGSP Summer Research Fellowship (2014)  
SMIF Undergraduate User Program (2014)
- 2013-2015 Eric Mastrolonardo, Biology
- 2013-2014 Calvin Lau, Biology
- 2013-2014 Olivia Lin, Biology
  - 2012 Noah Apthorpe (*at Harvard, supervised by Peter Turnbaugh*)
  - 2010 Shirley Galbiati (*at MIT, supervised by Eric Alm*)
- 2008-2010 Albert Wang (*at MIT, supervised by Eric Alm*)
  - 2008 Alexandra Konings (*at MIT, supervised by Eric Alm*)
- 2008-2010 MacGregor F Entry (*at MIT, Graduate Resident Tutor*)

## PRESENTATIONS

39. "Perturbing the human microbiome." Student Research Symposium, University of Richmond, Richmond, VA, Sep 2015 (Invited Keynote Talk)
38. "How human gut microbiota resist and respond to cholera infection." Infectious Disease Seminar, NC State College of Veterinary Medicine, Raleigh, NC, Apr 2015 (Talk)
37. "Cholera and the ecology of human gut microbial communities." Duke / Duke-NUS Symposium, Duke-NUS Graduate Medical School, Singapore, Mar 2015 (Talk)
36. "Microbiome." Alumni Association Board Meeting, Duke University, Durham, NC, Feb 2015 (Talk)
35. "Perturbing the human microbiome." Biology of Populations Colloquium, Princeton University, Princeton, NJ, Dec 2014 (Invited Talk)
34. "Microbiome." Board of Trustees Meeting, Duke University, Durham, NC, Sep 2014 (Talk)
33. "How gut microbes resist and respond to cholera infection." The Human and Environmental Microbiome Symposium, Duke University, Durham, NC, Sep 2014 (Talk)
32. "Response of human microbiota to perturbation." The 20<sup>th</sup> International Microbial Genomes Conference, UCLA Conference Center, Lake Arrowhead, CA, Sept 2014 (Invited talk)
31. "Perturbing the human microbiome." Grand Rounds, Department of Pediatrics, Duke University School of Medicine, Durham, NC, Sept 2014 (Talk)
30. "Perturbing the human microbiome." Oral Biology Seminar Series, School of Dentistry, University of North Carolina, Chapel Hill, NC, Sept 2014 (Talk)
29. "Perturbing the human microbiome." Grand Rounds, Department of Gastroenterology, Duke University School of Medicine, Durham, NC, Sept 2014 (Talk)
28. "Manipulating the human microbiome." Bollum Symposium, University of Minnesota, Minneapolis, MN, May 2014 (Invited talk)
27. "Manipulating the human microbiome." DCEG Fellows Training Symposium, NIH/NCI, Bethesda, MD, Mar 2014 (Invited talk)
26. "Perturbing the human microbiome." LadHyX Seminar, Ecole Polytechnique, Palaiseau, France, Feb 2014 (Talk)
25. "Perturbing the human microbiome." Pasteur Fellowship Visiting Scholar, Institut Pasteur, Paris, France, Feb 2014 (Invited talk)
24. "Daily changes to human-associated microbial communities." Duke University Program in Ecology Seminar, Durham, NC, Nov 2013 (Talk)
23. "Daily changes to human-associated microbial communities." Duke Marine Lab Fall Seminar, Beaufort, NC, Sep 2013 (Talk)
22. "Daily changes to human-associated microbial communities." Duke Computational Biology & Bioinformatics Seminar, Durham, NC, Sep 2013 (Talk)
21. "Daily changes to human-associated microbial communities." Duke Genomic and Personalized Medicine Forum, Durham, NC, Sep 2013 (Talk)

20. "Daily changes to human-associated microbial communities." Duke University Program in Genetics & Genomics Seminar, Durham, NC, Sep 2013 (Talk)
19. "There's an app for that: Tracking the lives of humans and the microbes living inside of them." Genomics Standards Consortium 15, Bethesda, MD, Apr 2013 (Invited talk)
18. "There's an app for that: Tracking the lives of humans and the microbes living inside of them." Museum of Science, Boston, MA, Mar 2013 (Talk)
17. "Dynamics and stability of human-associated microbial communities," National Institute of Health, Manila, Philippines, Feb 2013 (Talk)
16. "Resistance and response of the human gut microbiome to perturbation," Civil & Environmental Engineering Seminar, Duke University, Durham, NC, Dec 2012 (Invited talk)
15. "Succession dynamics of the human gut microbiota following *Vibrio cholerae* infection," icddr,b Seminar, Dhaka, Bangladesh, Aug 2012 (Talk)
14. "Reproducible succession dynamics of the human gut microbiota following *Vibrio cholerae* infection," International Research in Infectious Diseases Annual Meeting, Bethesda, MD, May 2012 (Talk)
13. "Daily tracking of human health, behavior, and gut microbiota over one year," MIT Synthetic Biology Lunch, Cambridge, MA, Apr 2012 (Talk)
12. "Daily tracking of human health, behavior, and gut microbiota over one year," Northeastern University, Boston, MA, Mar 2012 (Talk)
11. "Daily tracking of human health, behavior, and gut microbiota over one year," Memorial Sloan-Kettering Cancer Center, New York, NY, Feb 2012 (Talk)
10. "Daily tracking of human health, behavior, and gut microbiota over one year," Duke University, Durham, NC, Feb 2012 (Talk)
9. "Daily tracking of human health, behavior, and gut microbiota over one year," University of North Carolina, Chapel Hill, NC, Feb 2012 (Talk)
8. "Stability of the human gut microbiota," Microbiome Research in the Boston Area Seminar, Boston, MA, Oct 2011 (Talk)
7. "Stability of the human gut microbiota," Microbiome Seminar, New York University, New York, NY, Oct 2011 (Talk)
6. "Building models of Precambrian evolution from modern-day microbial gene families," Paleobiology in the Genomics Era Conference, JCVI, San Diego, CA, May 2011 (Invited talk)
5. "Of microbes and men: A year-long study of daily changes to the human microbiome," Quantitative Biology Workshop, MIT, Jan 2011 (Talk)
4. "Learning influential host factors and dynamical properties in human-associated microbial ecosystems," Human Microbiome Research Conference, St. Louis, MO, Aug 2010 (Poster; travel grant recipient)
3. "Rapid evolutionary innovation during an Archean Genetic Expansion," Biology of Genomes Conference, Cold Spring, NY, May 2010 (Poster; travel grant recipient)

2. “The HuGE project: Daily Variation In Human Microbiome Composition Over the Course of One Year,” Merck-MIT Symposium, Boston, MA, Apr 2010 (Poster; winner best poster)
1. “Extracting insight from increasingly large microbial genomic datasets,” Ginkgo BioWorks, Boston, MA, Mar 2010 (Talk)