

Lawrence A. David

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

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|--|-----------|
| 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]

17. JD Silverman, A Washburne, S Mukherjee, **LA David**. A phylogenetic transform enhances analysis of compositional microbiota data. *Submitted*, 2016.
16. AD Washburne, J Silverman, JW Leff, DJ Bennett, J Darcy, S Mukherjee, N Fierer, **L David**. Phylogenetic factorization of microbiome data. *Submitted*, 2016.
15. AT Reese, K Lulow, **LA David**, JP Wright. Plant community and soil conditions individually affect soil microbial community assembly in experimental old-field microcosms. *Submitted*, 2016.
14. J Boursier, O Mueller, M Barret, M Machado, L Fizanne, F Araujo-Perez, C Guy, P Seed, J Rawls, **LA David**, G Hunault, F Oberti, P Cales, AM Diehl. The severity of NAFLD is associated with gut dysbiosis and shift in the metabolic function of the gut microbiota. *Hepatology*, **63**(3):764-775, Mar 2016.
13. S Wong, WZ Stephens, AR Burns, K Stagaman, **LA David**, BJM Bohannon, K Guillemin, JF Rawls. Ontogenetic Differences in Dietary Fat Influence Microbiota Assembly in the Zebrafish Gut. *mBio*, **6**(5):e00687-15, Sept 2015.
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. *mBio*, **6**(3):e00381-15, May 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

2015-2019 Beckman Young Investigator Program (\$750,000)

Principal Investigator

2015-2018 Searle Scholars Program (\$300,000)

Principal Investigator

2015-2018 Hartwell Foundation, Individual Biomedical Research Award (\$300,000)

Principal Investigator

“Linking oxygen and bacterial ecology in necrotizing enterocolitis”

- 2015-2017 National Science Foundation DDIG, DEB-1501495 (\$19,706)
Principal Investigator (Co-PIs: Aspen Reese, Justin Wright)
“Quantifying nitrogen limitation in the gut microbiota”
- 2014-2016 Alfred P. Sloan Foundation, Research Fellowship (\$50,000)
Principal Investigator
- 2014-2015 Global Probiotics Council, Young Investigator Grant (\$50,000)
Principal Investigator
“A high-throughput pipeline to find probiotics that inhibit select gut microbes”

Internal Support

- 2016-2017 Provost’s Intellectual Community Planning Grant (\$3,600)
Co-Principal Investigator (Organizer of 10 Co-PIs)
“Triangle Microbial Ecology Supergroup”
- 2016-2017 Collaborative Quantitative Approaches to Problems in Basic and Clinical Sciences, Pilot Grant (\$50,000)
Co-Principal Investigator (other Co-PI: Sayan Mukherjee)
“A geometric approach to modeling human microbiota dynamics”
- 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

- 2016 SN10: ScienceNews 10 Scientists to Watch
- 2015 Beckman Young Investigator (1 of 8 nationwide)
- 2015 Searle Scholar (1 of 15 nationwide)
- 2015 Hartwell Investigator (1 of 12 nationwide)
- 2014 Travel Grant, Duke-NUS Graduate Medical School
- 2014 Alfred P. Sloan Research Fellow (1 of 12 biologists nationwide)
- 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: *Bioinformatics, Biology Letters, BMC Bioinformatics, Biotechnology & Bioengineering, Cell Host & Microbe, Cell Reports, Clinical Infectious Diseases, eLife, Environmental Microbiology, Genome Biology, Genome Research, InnoCentive, ISMEJ, mBio, National Science Foundation, PLoS One, PLoS Pathogens, PNAS, Science Translational Medicine, Scientific Reports, Trends in Microbiology.*
- Committee member: Duke CBB Graduate Admissions 2013-2014; Duke MGM Graduate Admissions 2014-2015; Duke UPGG Graduate Admissions 2015-2016.
- Co-organizer: Duke GeMS Microbiome Service 2013-
- Co-organizer: Duke MGM Retreat 2015-2016
- Panel member: Discussion on Interdisciplinary Training, Burroughs Wellcome Fund, 2016.
- Faculty liason: CBB Seminar Series, 2016.
- Co-organizer: Duke GeMS Symposium, 2014.
- Instructor (1 of 4): ideSHi Genomics Workshop, International Centre for Diarrhoeal Disease Research, Bangladesh, March 3-5, 2014
- Founding member: ASM General Meeting Junior Advisory Group, 2011-2013.

MENTORSHIP

Post-doctoral Associates

2015- Dr. Max Villa
 PhD, Materials Science & Engineering
 Burroughs Wellcome Fund Postdoctoral Enrichment Program (2016)

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

- 2015- Vivek Sriram, Computer Science
- 2015- Andrew Grover, Biochemistry
- 2015- Lionel Watkins, Biomedical Engineering
- 2014- Anchi Wu, Biomedical Engineering
Duke Pratt Fellow (2015-2016) 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*)

INVITED PRESENTATIONS

- 50. Molecular Pathogenesis & Host Response Meeting, Cold Spring Harbor Laboratory, Cold Spring, NY, Sep 2017
- 49. Pharmaceutical Sciences Conference, UNC Chapel Hill, Chapel Hill, NC, May 2017
- 48. Inflammation, Immunity, and Infectious Diseases Seminar, University of Utah, Salt Lake City, UT, May 2017
- 47. Hartwell Foundation Symposium, Case Western University, Cleveland, OH, Sep 2016
- 46. Food-Microbiome Interaction: Implications for Human Health and Disease, Royal Society, London, UK, May 2016
- 45. BASF Plant Science, Research Triangle Park, NC May 2016
- 44. Bioinformatics and Genomics Seminar, UNC Charlotte, Charlotte, NC, Apr 2016

43. Microbiome Research in Progress Seminar, UNC Chapel Hill, Chapel Hill, NC, Mar 2016
42. First Workshop on Statistical and Algorithmic Challenges in Microbiome Data Analysis, New York, NY, Feb 2016
41. US Probiotics Scientific Board Meeting, New York, NY, Feb 2016
40. Department of Microbiology and Immunology Seminar, McGill University, Montreal, Canada, Dec 2015
39. Digestive Disease Lecture Series, University of Chicago, Chicago, IL, Nov 2015
38. Symposium on Biotechnology, University of Missouri, St. Louis, MO, Nov 2015
37. Hartwell Foundation Symposium, University of Wisconsin, Madison, WI, Sep 2015
36. HHMI Science Symposium, University of Richmond, Richmond, VA, Sep 2015 (Keynote)
35. Infectious Disease Seminar, NC State College of Veterinary Medicine, Raleigh, NC, Apr 2015
34. Duke-NUS Symposium, Duke-NUS Graduate Medical School, Singapore, Mar 2015
33. Alumni Association Board Meeting, Duke University, Durham, NC, Feb 2015
32. Biology of Populations Colloquium, Princeton University, Princeton, NJ, Dec 2014
31. Board of Trustees Meeting, Duke University, Durham, NC, Sep 2014
30. The Human and Environmental Microbiome Symposium, Duke University, Durham, NC, Sep 2014
29. The 20th International Microbial Genomes Conference, UCLA Conference Center, Lake Arrowhead, CA, Sep 2014
28. Grand Rounds, Department of Pediatrics, Duke University School of Medicine, Durham, NC, Sep 2014
27. Oral Biology Seminar Series, School of Dentistry, University of North Carolina, Chapel Hill, NC, Sep 2014
26. Grand Rounds, Department of Gastroenterology, Duke University School of Medicine, Durham, NC, Sep 2014
25. Bollum Symposium, University of Minnesota, Minneapolis, MN, May 2014
24. DCEG Fellows Training Symposium, NIH/NCI, Bethesda, MD, Mar 2014
23. LadHyX Seminar, Ecole Polytechnique, Palaiseau, France, Feb 2014
22. Pasteur Fellowship Visiting Scholar, Institut Pasteur, Paris, France, Feb 2014
21. Duke University Program in Ecology Seminar, Durham, NC, Nov 2013
20. Duke Marine Lab Fall Seminar, Beaufort, NC, Sep 2013
19. Duke Computational Biology & Bioinformatics Seminar, Durham, NC, Sep 2013
18. Duke Genomic and Personalized Medicine Forum, Durham, NC, Sep 2013
17. Duke University Program in Genetics & Genomics Seminar, Durham, NC, Sep 2013
16. Genomics Standards Consortium 15, Bethesda, MD, Apr 2013
15. Museum of Science, Boston, MA, Mar 2013
14. National Institute of Health, Manila, Philippines, Feb 2013

13. Civil & Environmental Engineering Seminar, Duke University, Durham, NC, Dec 2012
12. icddr,b Seminar, Dhaka, Bangladesh, Aug 2012
11. International Research in Infectious Diseases Annual Meeting, Bethesda, MD, May 2012
10. MIT Synthetic Biology Lunch, Cambridge, MA, Apr 2012
9. Northeastern University, Boston, MA, Mar 2012
8. Memorial Sloan-Kettering Cancer Center, New York, NY, Feb 2012
7. Duke University, Durham, NC, Feb 2012
6. University of North Carolina, Chapel Hill, NC, Feb 2012
5. Microbiome Research in the Boston Area Seminar, Boston, MA, Oct 2011
4. Microbiome Seminar, New York University, New York, NY, Oct 2011
3. Paleobiology in the Genomics Era Conference, JCVI, San Diego, CA, May 2011
2. Quantitative Biology Workshop, MIT, Jan 2011
1. Ginkgo BioWorks, Boston, MA, Mar 2010