Megan G. Behringer

Assistant Professor
Vanderbilt University
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EDUCATION

2011 – 2015	Ph.D.	University of Georgia	Athens, GA	Genetics
2009 – 2011	M.S.	Auburn University	Auburn, AL	Biomedical Sciences
2004 – 2009	B.S.	Auburn University	Auburn, AL	Molecular Biology

PROFESSIONAL EXPERIENCE

2020 – Assistant Professor of Biological Sciences, Vanderbilt University, Nashville, TN

2020 – Secondary Appointment, Assistant Professor of Pathology, Microbiology, and Immunology, Vanderbilt University, Nashville, TN

2020 – Associate Director, Vanderbilt Microbiome Initiative, Vanderbilt University, Nashville, TN

2020 – Member, Vanderbilt Institute for Infection, Immunology and Inflammation, Vanderbilt University, Nashville, TN

2015 – 2020 Postdoctoral Research Associate, Center for Mechanisms of Evolution, The Biodesign Institute, Arizona State University, Tempe, AZ; Department of Biological Sciences, Indiana University, Bloomington, IN (Mentored by Michael Lynch and Jay T. Lennon)

RESEARCH SUPPORT

Active Grants:

2020 – 2022 Mayo Clinic Center for Regenerative Medicine
"Fractional CO2 Vaginal LASER Therapy for Recurrent Urinary Tract Infection"
Role: Co-I, Award Total: $146,323, Subaward to ASU: $61,253

Previous Grants:

2017 – 2019 NIH Postdoctoral National Research Service Award (F32)
"Genetic and Environmental Determinants of Population Structure During *Escherichia coli* Experimental Evolution"
Role: PI, Award Total: $116,232

2016 PacBio SMRT Grant – Genome Galaxy Initiative
"Illuminating the Firefly Genome"
Role: Co-I, Award Total: Sequencing Services (10 SMRT Cells)

Grants in Review:

2021 – 2024 Army Research Office Young Investigator Program
"Effects of Recurring Resource Limitation on Present and Future Evolutionary Responses"
Role: PI, Amount Requested: $355,137 (Direct Costs: $227,197)

AWARDS

2020 SMBE Young Investigator Registration Award (Meeting Cancelled)

2018 ASM Microbe Outstanding Abstract Award, American Society for Microbiology

2017 Travel Grant, Society for the Study of Evolution

2017 Travel Grant, American Society for Microbiology

2014 – 2015 Linton and June Bishop Graduate Fellowship, University of Georgia, Department of Genetics

2013 – 2015 NIH T32 Institutional Training Grant, University of Georgia, Department of Genetics

AWARDS cont.

2011 – 2012 Ph.D. Scholars of Excellence Fellowship, University of Georgia, Graduate School
2010 Travel Grant, American Society for Microbiology

PUBLICATIONS (^ Co-first Author, ᵘ Undergraduate Author, *Corresponding Author)

20. **Behringer, M.G.***, Meraz, J.ᵘ, Miller, S.F., Choi, B.I.ᵘ, Lynch, M. and D.A. Drummond. Transcriptomic and proteomic profiling of *Escherichia coli* populations adapted to long-term starvation. (*in prep*)
19. **Behringer, M.G**.*, Lehmkuhl, B.K., Schwartz, D., and J.T. Lennon. Biofilm regulation is a mutational target in an extreme nutrient-deprived *Bacillus subtillis* population. (in prep)
18. **Behringer, M.G**.* and D.W. Hall. Rates and biases of mitotic loss of heterozygosity in *Saccharomyces cerevisiae*. (*in prep*)
17. Boyer, G.F.ᵘ, Lynch, M., and **M.G. Behringer***. Effects of Methyl-Directed Mismatch Repair on Adenine Methylation in *Escherichia coli*. (*in prep*)
16. Ho, W.C., **Behringer, M.G.**, Miller, S.F., Gonzales, J., Nguyen, A. Allahwerdy, M. Boyer, G.F., and M. Lynch. Evolutionary dynamics of prokaryotic hypermutators adapting to a complex environment. (*in prep*)
15. Kucukyidrim, S., Sung, W., **Behringer, M.G.**, Brock, D.A., Doak, T.G., Mergan, H., Queller, D.C., Strassmann, J.E., and M. Lynch. Low base-substitution mutation rate but high rate of slippage mutations in the sequence repeat-rich genome of *Dictyostelium discoideum*. (*in revision*)
14. **Behringer, M.G.**^*, Ho, W-C.^, Boyer, G.ᵘ, Meraz, J.ᵘ, Miller, S.F., and M. Lynch. Antagonism in Evolutionary Opportunities Results in Non-Monotonic Evolution Across an Environmental Gradient. (*in revision*)
13. Fritts, R.K., Bird, J.T., **Behringer, M.G.**, Lipzen, A., Martin, J., Lynch, M., and J.B. McKinlay. Enhanced nutrient uptake is sufficient to drive emergent cross-feeding between bacteria. ISME J. (Accepted – 7/23/2020)
12. Kucukyildirim, S., **Behringer, M.G.**, Williams, E. M., Doak, T. G., & Lynch, M. (2020). Estimation of the Genome-Wide Mutation Rate and Spectrum in the Archaeal Species Haloferax volcanii. Genetics. (Early Online)
11. Fallon, T.E, Lower, S.E.S., …, **Behringer, M.G**, et al., (2018) Firefly genomes illuminate parallel origins of bioluminescence in beetles. eLife 2018;7:e36495
10. McCully, A.L., **Behringer, M.G.**, Gliessman, J.R., Pilipenko, E.V., Mazny, J.L., Lynch, M., Drummond, D.A., and J.B. McKinlay. (2018) An *Escherichia coli* nitrogen starvation response is important for mutualistic coexistence with *Rhodopseudomonas palustris*. Applied and Environmental Microbiology. AEM. 00404-18
9. **Behringer, M.G.***, Choi, B.I.ᵘ, Miller, S.F., Doak, T.G., Karty, J.A., and M. Lynch. (2018) *Escherichia coli* populations maintain stable subpopulation structure during long-term evolution. Proceedings of the National Academy of Sciences. 115:E4642-E4650
8. **Behringer, M.G.**, Boothe, D.M., and Thungrat, K.T. (2018) Evaluation of a FRET-qPCR assay for identification of *gyrA* mutations conferring enrofloxacin resistance in canine urinary *Escherichia coli* isolates and canine urine specimens. American Journal of Veterinary Research. 79:755-761
7. Tincher, C.L.ᵘ, Long, H., **Behringer, M.G.**, Walker, N.ᵘ, and M. Lynch. (2017) The glyphosate-based herbicide Roundup® does not elevate genome-wide mutagenesis of *Escherichia coli*. G3: Genes, Genomes, Genetics. 7:3331-3335.
6. Long, H., **Behringer, M.G.**, Williams, E., Te, R.ᵘ, and M. Lynch. (2016). Similar mutation rates but highly diverse mutation spectra in ascomycete and basidiomycete yeasts. Genome Biology and Evolution. 8:3815-3821.

PUBLICATIONS (cont.)

5. **Behringer, M.G.*** and D.W. Hall. (2016). Selection on position and context of nonsense codons in introns. Genetics. 204:1239-1248.
4. **Behringer, M.G.*** and D.W. Hall. (2016) The repeatability of genome-wide mutation rate and spectrum estimates. Current Genetics. 62:507-512.
3. **Behringer, M.G**.* and D.W. Hall. (2016) Genome-wide estimates of mutation rates and spectrum in *Schizosaccharomyces pombe* indicate CpG sites are highly mutagenic despite the absence of DNA methylation. G3: Genes, Genomes, Genetics. 6:149-60.
2. **Behringer, M.G**u., Oyarzabal, O.A., and W.G. Miller. (2011) Typing of *Campylobacter jejuni* and *Campylobacter coli* isolated from live broilers and retail broiler meat by *flaA*-RFLP, MLST, PFGE and REP-PCR. Journal of Microbiological Methods. 84:194-201.
1. Miller, R.S., Miller, W.G., **Behringer, M.G**u**.**, Hariharan, H., Matthew, V., and O.A. Oyarzabal. (2010) DNA identification and characterization of *Campylobacter jejuni* and *Campylobacter coli* isolated from caecal samples of chickens in Grenada. Journal of Applied Microbiology. 108:1041-1049.

Invited Talks:

2019 Army Research Office, Annual MURI Evaluation Meeting
2019 Vanderbilt University, Department of Biological Sciences
2019 University of Kentucky, Department of Biology
2018 University of Central Florida, Genomics and Bioinformatics Cluster
2017 International Association for Food Protection Annual Meeting, Tampa, FL
Symposium: A Paradigm Shift in Understanding and Controlling Salmonella of the Future
2017 Broad Institute of MIT and Harvard, Bacterial Genomics Group
2014 University of Maryland – College Park, Evolutionary Biology Interest Group

Contributed Talks:

2018 Transcription termination is a mutational target during extreme feast/famine cycles in *Escherichia coli*. ASM Microbe, Atlanta, GA
ASM Microbe Outstanding Abstract Award
2017 *Escherichia coli* virulence genes are a primary evolutionary target in maintaining long-term subpopulation structure. Clinically Relevant Population Genetics Workshop, Arizona State University, Tempe, AZ
2017 Systems analysis of subpopulation structure in long-term cultures of *Escherichia coli K-12*. Evolution, Portland, OR
2014 Selection on position and context of nonsense codons in introns. Evolution, Raleigh, NC
2012 Evidence of selection on premature stop codons in introns. Southeastern Population, Ecology, and Evolutionary Genetics, Clemson, SC
2010 Evaluation of REP-PCR*, flaA*-RFLP, PFGE, and MLST for the subtyping of *Campylobacter coli* and *Campylobacter jejuni*. American Society of Microbiology-Southeastern Branch Meeting, Montgomery, AL

Internal Talks:

2020 Applying and getting offers in academia. Postdoc Career Conference, Arizona State University, Tempe AZ
2018 How to find a postdoctoral position. Molecular Cellular Biology Colloquium and Neuroscience Research Seminar Series, Arizona State University, Tempe, AZ

SCIENTIFIC COMMUNITY INVOLVEMENT

Review

Journal Articles: Environmental Microbiology (1), Evolution (2), Genome Biology and Evolution (2), FEMS Yeast Research (1), Frontiers (1), ISME (1), mBio (1), PLoS Genetics (1), Proceedings of the National Academy of Sciences USA (1), The American Naturalist (1), The Biological Bulletin (1)
Grants: National Science Foundation (1)

Advisory Board Memberships:

2020 – National Center for Genome Analysis Support (NCGAS)

Professional Memberships:

Scientific Societies: American Society of Microbiology, Genetics Society of America, Society of Molecular Biology and Evolution, Society for the Study of Evolution

TEACHING RELATED ACTIVITIES

Formal Coursework

- Biological Sciences 3234 – Microbiology – Vanderbilt University – Instructor (50%)
  General microbiology course directed at Biological Science and Pre-Health majors. Covers a broad range of microbiological topics including: origin of microbial life, general microbial physiology, microbial ecology and evolution, microbial genetics and genomics, microbial communities, and the role of the microbiome in human health. Planned for Spring 2021
- Biology 495 – Undergraduate Research – Arizona State University – Instructor (100%)
  Directed independent research experiences for undergraduate students. Work completed typically results in authorships on manuscripts, and presentation at conferences. Techniques mentored include bioinformatics, microbial population genetics, and general microbiology. Instructor of Record: Spring 2018; Spring 2019; Spring 2020
- Biology 492 – Honors Directed Study – Arizona State University – Instructor (100%)
  Independent research experiences for undergraduate students enrolled in the Barrett Honors College at Arizona State University. Work completed typically results in authorships on manuscripts, and the successful defense of an honors thesis. Techniques mentored include bioinformatics and microbial genomics. Instructor of Record: Spring 2019
- Genetics 3000 – Evolutionary Biology – University of Georgia – Teaching Assistant
  Introductory course directed at Biological Science and Ecology majors. Covers a broad range of topics associated with evolution including: origin of life, population genetics, evolutionary genetics, fundamental forces of evolution, microevolution, and human evolution. Lead three recitation periods/ wk. Fall 2012

Workshops

- Campylobacter Workshop – Auburn University – Instructor
  Workshop aimed at food safety professionals and investigators new to *Campylobacter* research. Instructed on topics including: culture and isolation of *Campylobacter spp.*, rapid detection of *Campylobacter spp.*, molecular characterization of *Campylobacter spp.* including PulseNet protocols.

Graduate student dissertation committees

Hamilton Green	2020 –	Dept. of Microbe-Host Int.	Vanderbilt University
Anne Hatmaker	2020 –	Dept. of Biological Sciences	Vanderbilt University
Yakov Pichkar	2020 –	Dept. of Biological Sciences	Vanderbilt University

TEACHING RELATED ACTIVITIES (cont.)

Graduate students mentored (non-thesis)

Ting Wang	2020 –	Biomedical Sciences	Vanderbilt University

Undergraduate student honors thesis committees (*student directly mentored by MGB)

Gwyneth Boyer* 2017 – 2020 Biology Arizona State Univ.

- Co-author on publication on **bioRxiv**, 2020

Brian Choi* 2015 – 2017 Microbiology Indiana University

- Co-author on publication in **PNAS**, 2018
- Awarded Summer Research Fellowship from Hutton Honors College
- Awarded Roessler Microbiology Scholarship – Indiana University Dept. of Biology
- Awarded Travel Grant – American Society of Microbiology – 2017
- Awarded Travel Grant – Genetics Society of America – 2016

Undergraduate students mentored

Logan Graham 2019 – 2020 Arizona State Univ.

Angelica Urquidez 2018 – 2020 Arizona State Univ.

John Meraz 2017 – 2020 Arizona State Univ.

- Co-author on publication on **bioRxiv**, 2020
- Accepted into the Microbe Academy for Professional Development – American Society for Microbiology – 2019
- Awarded Travel Grant – Society for Advancement of Chicanos/Hispanics and Native Americans in Science – 2018

Aneesh Kalya	2017 – 2019	Arizona State Univ.
Jessica Zellinger	2017	Indiana University
Rohini Kalluri	2016 - 2017	Indiana University
Cameron Story	2014 - 2015	University of Georgia
Ian Milton	2013 - 2014	University of Georgia
Katherine Korones	2013 - 2014	University of Georgia
Moon-Tae Kim	2012 - 2013	University of Georgia

SERVICE

Service to Department:

i. 2020 – 2021, Biological Sciences Seminar Committee