

**EDUCATION**

<b>Vanderbilt University</b> , Nashville, TN; <b>PhD</b>	2008-2013
Thesis - Speciation Microbiotas: A Cause of Hybrid Mortality in <i>Nasonia</i> ?	
<b>Mount Union College</b> , Alliance, OH; <b>Bachelor of Science</b>	2003-2007

**RESEARCH EXPERIENCE**

<b>The Rowland Institute at Harvard University</b> – Junior Fellow	2014-Present
<b>Vanderbilt University</b> – Postdoc	2013-2014
PI: Dr. Seth Bordenstein	
<b>Vanderbilt University</b> – Graduate Student	2009-2013
PI: Dr. Seth Bordenstein	
<b>Smithsonian Research Institute</b> – Consultant	2008-2009
PI: Dr. Brian Gratwicke	
<b>James Madison University</b> – Research Faculty	2007-2008
PI: Dr. Reid Harris & Dr. Kevin Minbiole	
<b>Mount Union College</b> – Undergraduate Researcher & Laboratory Manager	2005-2007
PI: Dr. Brandon Sheafor & Dr. John Scott	

**ADDITIONAL TRAINING**

<b>Vanderbilt University</b> , Nashville, TN; <b>Certificate in University Teaching</b>	May 2012
Thesis – The impact of student directed content and long-term retention	
<b>Marine Biological Laboratories</b> , Woods Hole, MA; <b>Statistical Analysis of Microbial Populations</b>	August 2011

**GRANTS AND FUNDING**

<b>Harmony Institute</b> - The behavioral effects of pesticide exposure on the microbiome – Harvard University	2016-2017
PI: Robert Brucker Award: \$6K	
<b>Gilson Project Award</b> – Metagenomic sequencing and host-microbe evolution – Harvard University	2015
PI: Robert Brucker Award: \$35K	
<b>Rowland Junior Fellowship</b> – The silent majority, how microbiomes and the environment cause evolutionary changes – Harvard University	2014-Current
PI: Robert Brucker Award: 5 years, \$1.25M	
<b>NSF Dimensions in Biodiversity</b> – The microbial bias of animal speciation – Vanderbilt University	2010-2016
PI: Seth Bordenstein; coauthor Brucker Award: \$1.27M	
<b>Vanderbilt Discovery Grant</b> – The infections basis for hybrid mortality in and insect model – Vanderbilt University	2010-2012
PI: Seth Bordenstein; coauthor Brucker Award: \$50K	
<b>Jeffress Memorial Trust</b> – Amphibian protection: Beneficial effects of amphibian skin bacteria – James Madison University	2008-2009
PI: K. Minbiole & R. Harris; coauthor Brucker Award: \$50K	

**TEACHING EXPERIENCE**

<b>Harvard University</b>	
Varsity Tutor – Undergraduate tutor in Math and Science	
	2014-2016
<b>Vanderbilt University</b> – Teaching Assistant (TA)	
PAVE – Molecular biology, Laboratory instructor & Lecturer: Ethics of Human Genetics	
	2011-2013
TAO – Teaching Assistant Orientation instructor and organizer	
	2010-2012
BSCI 229 – Intro to Zoology, Laboratory instructor & Lecturer: Vertebrates	
	2010-2011
BSCI 234 – Microbial Population Biology, Guest lecture: Animal Symbiosis	
	2010-2011
<b>Mount Union College</b> – TA & Academic Coach	2006-2007
BI 127 – The Environment, Laboratory instructor	
BI 201, 202, & 203 – Introduction to Cellular, Molecular, Organismal, Ecology, and Academic Coach – Science tutor	
<b>Ohio Department of Jobs and Family Services</b> – Respite Care Provider	2004-2006
In home tutoring and assistance for children with autism	
<b>Alliance City Public Schools</b> – Math and Science Tutor, Grades 7 <sup>th</sup> -9 <sup>th</sup>	2003-2007

## PEER-REVIEWED PUBLICATIONS

\*indicate co-first author

- Saulsbury, A., Pinchas, M., Noll, A., Lynch, J.A., Bosrdenstein, S.R., Brucker, R.M. Establishment of F1 Hybrid Mortality in Real Time. *BMC Evolutionary Biology*. (In Press, 2017: first three authors were undergraduates)
- Novakova, E., Woodhams, D.C., Brucker, R.M., Leff, J., Maharaj, A., Fierer, N., Knight, R., Scott, J. Mosquito-Specific Microbiomes Including Wolbachia Linked to Seasonality of West Nile Virus. *Nature Frontiers' Microbiology*. (In Press, 2017)
- Brooks, A.W., Kohl, K.D.\* , Brucker, R.M.\*, Opstal, E.V., Bordenstein, S.R. Phylosymbiosis: Relationships and Functional Effects of Microbial Communities across Host Evolutionary History. *PLoS Biology*. 14(11) e2000225. 2016.
- Dittmer, J., Opstal, E.V., Shropshire, J.D., Bordenstein, S.R., Hurst, GDD, Brucker, R.M. Disentangling a Holobiont – Recent Advances and Perspectives in *Nasonia* Wasps. *Nature Frontiers' Microbiology*. 2016. 7:1478.
- Long, J., Shrubsole, M., Shu, X.O., Cai, O., Pei, Z., Brucker, R.M., Sonderman, J., Steinwandel, M., Bordenstein, S., Blot, W.,; Zheng, W. Oral Microbiome Profiles: Associations with Demographic Characteristics and Lifestyle Factors. *Molecular Oral Microbiology*. 2016
- Richmond, B.W., Brucker, R.M., Han, W., Du, R., Zhang, Y., Cheng, D., Gleaves, L., Abdolrasulnia, R., Polosukhina, R., Clark, P.E., Bordenstein, S.R., Blackwell, TS, Polosukhin, V. Airway bacteria drive a progressive COPD-like phenotype in mice with polymeric immunoglobulin receptor deficiency. *Nature Communications*. 7:1240. 2016.
- Theis, K., Dheilly, N.M., Klassen, J.L., Brucker, R.M., Baines, J.F., Bosch, T., Cryan, J.F., Gilbert, S.F., Goodnight, C.J., Lloyd, E.A., Sapp, J., Vandenkoornhuyse, P., Zilber-Rosenberg, I., Rosenberg, E., Bordenstein, S.R., Getting the Hologenome Concept Right: an Eco-Evolutionary Framework for Hosts and Their Microbiomes. *mSystems*. 1 (2) DOI: 10.1128/mSystems.00028-16. 2016
- Rebollar, E.A., Antwis, R.E., Becker, M.H., Belden, L.K., Bletz, M.C., Brucker, R.M., Harrison, X., Hughey, M., Kueneman, J. G., Loudon, A. H. Using “omics” and integrated multi-omics approaches to guide probiotic selection to mitigate chytridiomycosis and other emerging infectious diseases. *Nature Frontiers in Microbiology*. 7(68). 2016.
- Yin, D.P., Xu, R., R.M. Brucker, C. Zhu, S.R. Bordenstein, W.W. Yan, P.E. Williams, N. Abumrad. Stable weight loss and improvement in glucose control in a mouse model of biliary diversion. *Nature Communications*. 6:7715. 2015.
- Brucker, R.M., S.R. Bordenstein. Response to commentary on The Phylosymbiotic Basis of Speciation: Gut Bacteria are Required for Hybrid Lethality. *Science*. 345:6200, 1011. 2014.
- Romano-Keeler, J., D.J. Moore, C. Wang, R.M. Brucker, C. Fonnesebeck, J.C. Slaughter, H. Li, H. Correa, H.N. Lovvorn, Y.W. Tang, S. Bordenstein, A.L. George, J.H. Early life establishment of site-specific microbial communities in the gut. *Gut Microbe*. 5:2, 192-201. 2014.
- Brucker, R.M., S.R. Bordenstein. The Capacious Hologenome. *Zoology*. 116(5):260-261. 2013.
- Woodhams, D.C., R.M. Brucker. Disease defense through generations: leaf-cutter ants and their symbiotic bacteria. *Molecular Ecology* 22:4141-4143. 2013. Perspective, co-first author.
- Brucker, R.M., S.R. Bordenstein. The Phylosymbiotic Basis of Speciation: Gut Bacteria are Required for Hybrid Lethality. *Science*. 341:667-668. 2013.
- Brucker, R.M., S.R. Bordenstein. In vitro cultivation of the Hymenoptera genetic model, *Nasonia*. *PLoS One*. 2012.
- Brucker, R.M., L.J. Funkhouser, S. Setia, R. Pauly, S.R. Bordenstein. Insect Innate Immunity Database (IIID): An annotation tool for identifying immune genes in insect genomes. *PLoS One*. 2012.
- Brucker, R.M., S.R. Bordenstein. Speciation by symbiosis. *Trends in Ecology and Evolution*. 27(8):443-451 2012. Review
- Brucker, R.M., S.R. Bordenstein. The roles of host evolutionary relationships (genus: *Nasonia*) and development in structuring microbial communities. *Evolution*. 66(2):349-62. 2012.
- Becker, M.H., R.N. Harris, K.P.C. Minbiole, C.R. Schwantes, L.A. Rollins-Smith, L.K. Reinert, R.M. Brucker, R.J. Domangue, B. Gratwicke. Towards a better understanding of the use of probiotics for preventing Chytridiomycosis in Panamanian golden frogs. *EcoHealth*. 8:501-506. 2011.
- Rosengaus, R.B., C.N. Zecher, K.F. Schultheis, R.M. Brucker, S.R. Bordenstein. Prolonged fitness costs associated with the disruption of gut microbiota in termites. *Applied and Environmental Microbiology*. 77(13):4303-4312. 2011.
- Becker, M.H., R.M. Brucker, C.R. Schwantes, R.N. Harris, K.P.C. Minbiole. The bacterially-produced metabolite violacein is associated with survival in amphibians infected with a lethal disease. *Applied and Environmental Microbiology*. 75:6635-6638. 2009.
- Harris, R.N., R.M. Brucker, J.B. Walke, M.H. Becker, C.R. Schwantes, D.C. Flaherty, B.A. Lam, D.C. Woodhams, C.J. Briggs, V.T. Vredenburg, K.P.C. Minbiole. Skin microbes on frogs prevent morbidity and mortality caused by a lethal skin fungus. *ISME Journal*. 3:818-824. 2009.
- Brucker, R.M., R.N. Harris, C.R. Schwantes, T.N. Gallaher, D.C. Flaherty, B.A. Lam, K.P.C. Minbiole. Amphibian chemical defense: antifungal metabolites of the microsymbiont *Janthinobacterium lividum* on the salamander *Plethodon cinereus*. *Journal of Chemical Ecology* 34:1422-1429. 2008.
- Brucker, R.M., C.M. Baylor, R.L. Walters, A. Lauer, R.N. Harris, and K.P.C. Minbiole. The identification of 2,4-diacetylphloroglucinol as an antifungal metabolite produced by cutaneous bacteria of the salamander *Plethodon cinereus*. *Journal of Chemical Ecology* 34:39-43. 2008.

## BOOKS

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**AP Biology – A guide** Publisher XAMOnline – 2015-2016, In Press

## EDITOR

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**Nature Frontiers – Microbiology**

October 2015 - current

Journal Microbial Symbiosis: Experimental models in animal-associated microbiota.

## PRESENTATIONS

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- 2016: International Congress of Entomologists, XXV, Orlando, FL, *Invited Speaker*  
2016: University of Birmingham, Birmingham UK, *Invited Speaker*  
2016: MIT, Cambridge, MA, *Invited speaker*  
2016: Clark University, Worcester, MA, *Invited speaker*  
2015: Microseminar, Youtube, *Guest speaker*  
2015: University of Massachusetts, Lowell, Lowell, MA, *Invited speaker*  
2014: University of Massachusetts, Boston, Boston, MA, *Invited speaker*  
2014: Harvard University, Department of Ecology and Evolution, Cambridge, MA, *Invited speaker*  
2014: Emory University, Department of Biology, Atlanta, GA, *Invited speaker*  
2014: Keystone Symposium: Mechanisms & Consequences of Invertebrate-Microbe Interactions (A7)  
2013: Harvard University, Cambridge, MA, Department of Systems Biology, *Invited Speaker*  
2013: University of Pennsylvania, Philadelphia, PA, Department of Chemistry and Biochemistry, *Invited Speaker*  
2013: Middle Tennessee State University, Murphysboro, TN, Department of Biology, *Invited Speaker*  
2013: Vanderbilt University, Nashville, TN, Three-Minute Thesis Competition, *Finalist*  
2013: Entomological Genomics, University of Notre Dame, Notre Dame, IN  
2013: University of North Carolina, Durham, NC, *Invited Speaker*  
2012: University of Idaho, Moscow, ID, Department of Evolution and Ecology, *Invited Speaker*  
2012: Cornell, Ithaca, NY, Department of Entomology, *Invited Speaker*  
2012: 7<sup>th</sup> International Symbiosis Society Congress. Krakow, Poland. *Abstract selected for oral presentation.*  
2012: International *Nasonia* Genome Meeting, Cologne, Germany, *Oral presentation*  
2011: International *Nasonia* Meeting, Nashville, TN, *Oral presentation, received an award*  
2011: 111<sup>th</sup> General Meeting of the American Society of Microbiology, New Orleans, LA. May 2011. *Abstract selected for oral presentation and travel award*  
2010: Ecological Genomics Symposium, Kansas City, MO, *Poster, awarded a travel fellowship*  
2010: 3<sup>rd</sup> ASM Conference on Beneficial Microbes, Miami, FL. October 2010, *Poster*  
2009: Vanderbilt University, Nashville, TN. October 2009. *Poster, awarded best student poster.*  
2009: Annual Meeting of the Tennessee Entomological Society, Nashville, TN, *Oral presentation, awarded best student presentation.*  
2009: International *Nasonia* Genome Meeting, Rochester, NY, *Oral presentation*

## PUBLISHED SCIENTIFIC ILLUSTRATIONS can be viewed at [scientificillustrations.blogspot.com](http://scientificillustrations.blogspot.com)

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- Pieterman, C.R., et al. Thoracic and duodenopancreatic neuroendocrine tumors in multiple endocrine neoplasia type 1. *Endocrine-related cancer*. 2014. Review. *Figures*
- Bennington-Castro, J. A weird new insight into how new species evolve. *i09*. July 2013. *Cover figure, video*
- Yong, E. Gut microbes keep species apart. *Nature News*. July 2013. *Cover figure*
- Funkhouser, L.J. and Bordenstein, S.R., Mom knows best: The universality of maternal microbial transmission. *PLoS Biology*. 11(8): e 1001631. 2013. *Figure*
- LePage, D., Bordenstein, S.R. *Wolbachia*: Can we save lives with a great pandemic? *Trends in Parasitology*. 29(8), 385-393. 2013. *Cover art and Figures*
- Kent, B.N., L. Salichos, J.G. Gibbons, A. Rokas, I.L.G. Newton, M.E. Clark, and S.R. Bordenstein. Complete bacteriophage transfer in a bacterial endosymbiont (*Wolbachia*) determined by targeted genome capture. *Genome Biology and Evolution*, 3. 2011. *Cover Art*
- The Institute of Medicine of the National Academies workshop on Fungal Diseases *An Emerging Threat to Human, Animal, and Plant Health* in September of 2011 (page 33, Figure WO-11). *Book, Figure.*
- Rollins-Smith, L.A., and Woodhams D.C. 2011. Amphibian Immunity: Staying in Tune with the Environment. In: *Eco-Immunology*. Demas, G.E. and Nelson, R.J. eds. Oxford University Press, Oxford, United Kingdom. pp. 92-143. *Book chapter, Figures*
- Kent, B.N., Bordenstein, S.R. Phage WO of *Wolbachia*: lambda of the endosymbiont world. *Trends in Microbiology* 18(4) 173-181. 2010. *Review, Cover Art*
- Woodhams, D.C., Alford, R.A., Briggs, C.J., Johnson, M., Rollins-Smith, L.A. Life-History Trade-Offs Influence Disease in Changing Climates: Strategies of and Amphibian Pathogen. *Ecology*. 89(6):1627-1639. 2008.

## PEER REVIEWER

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PLoS ONE – PloS Biology – Molecular Ecology – Vanderbilt University VICTOR Grants – Environmental Microbiology – Scientific Reports – Gut Microbes – Nature Frontiers: Genetics – Nature Communications – Biological Journal of the Linnaean Society – EcoHealth – Conservation Physiology - grant panel for the International Space Life Sciences Working Group for immunology and microbiology (NASA) – Grant panel reviewer for Czech Health Research Council

## MEMBERSHIPS AND ELECTED POSITIONS

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Rowland Institute at Harvard, seminar chair - Harvard University  
Microbes and Defense Academic Society - Vanderbilt University – Graduate and Medical student honorary society  
Department of Biological Sciences Graduate Student Association, Vice President (2yr) - Vanderbilt University  
American Society for Microbiology  
Tennessee Entomological Society  
International Symbiosis Society  
Blue Key Honor Society, Vice President (1yr) - Mount Union College – Honorary service fraternity

## OUTREACH

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**Mad Science of Greater Boston** – Science demonstrations in classrooms ages 5-12.  
**ScienceCommunicationTips** – Video blog (<http://liveinsymbiosis.blogspot.com>)  
**Vanderbilt University** – Vice-president of Graduate Student Association; Led departmental and university outreach and recruitment of visiting faculty and student candidates  
**Mount Gilead High School** – “Careers In Science.” Invited career speaker.  
**Mount Union College** – “This Week In Science.” Co-hosted a weekly radio hour on WRMU; Students for Environmental Awareness; Led campus conservation initiative.

## AWARDS AND HONORS

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Keystone Symposia Future of Science Fund scholarship	2013
Finalist, 3 Minute Thesis - Vanderbilt University	2013
Abstract Selected for Oral Presentation - 7th International Symbiosis Society Congress, Krakow, Poland	2012
Hickory Stick Award for Excellence in Teaching - Vanderbilt University	2011
Awarded for Excellent Presentation - International Nasonia Conference, Nashville, TN	2011
Abstract Selected for Oral Presentation & Student Travel Fellowship - 111th General Meeting of the American Society for Microbiology, New Orleans, LA	2011
Student Travel Fellowship - 8th Ecological Genomics Symposium, Kansas City, MO	2010
Ann Bernard Martin Award for Excellence in Graduate Research - Vanderbilt University	2010
Graduate Retreat Best Poster Award - Vanderbilt University	2009
Awarded Best Student Presentation - 36 <sup>th</sup> Annual Meeting of the Tennessee Entomological Society	2009
Shumaker Physiology Prize - Mount Union College	2007