

## Kevin D. Kohl

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### **RESEARCH INTERESTS**

Digestive physiology, nutritional ecology, and symbiotic relationships between hosts and gut microbes in terrestrial vertebrates

### **EDUCATION AND TRAINING**

#### **Postdoctoral Researcher - 2014 – Present**

Vanderbilt University

Co-advisor: Dr. Seth Bordenstein

Universidad Nacional de San Luis

Co-advisor: Dr. Enrique Caviedes-Vidal

#### **Postdoctoral Researcher - 2014**

University of Utah

Co-advisors: Dr. Bob Weiss, Dr. Denise Dearing

#### **Doctor of Philosophy, Biology - 2014**

University of Utah

Advisor: Dr. Denise Dearing

#### **Bachelor of Science, Biology and Wildlife Ecology - 2009**

University of Wisconsin – Madison

Graduated with Honors in Research

### **AWARDS AND HONORS**

#### **NIH T32 Training Grant in Gastroenterology (2016)**

*“Genetic mechanisms underlying development of the gut microbiome”*

Total Costs: \$47,000

#### **NSF Conference, Symposia, and Workshop Support (2016)**

*“Meeting: Microbial Partners in Integrative and Comparative Biology, a Symposium for the Society for Integrative and Comparative Biology (SICB)”*

Total Costs: \$12,450

#### **NSF International Postdoctoral Research Fellowship in Biology (2014)**

*“The role of maternal transmission of the gut microbiota in stabilizing host-microbe interactions and facilitating co-evolution”*

Total Costs: \$140,000

#### **G. Richard Riser Award for Outstanding Graduate Research (2014)**

University of Utah - Department of Biology

#### **NSF Doctoral Dissertation Improvement Grant (2012)**

*“Biodiversity and community ecology of the gut microbiota in herbivores with respect to dietary toxins”*

Total Costs: \$14,999

#### **Best Student Oral Presentation (2011)**

Division of Comparative Physiology and Biochemistry

Society for Integrative and Comparative Biology Meeting, Salt Lake City, UT

#### **NSF Graduate Research Fellowship Award (2010)**

*“Investigating the role of intestinal microbes in the metabolism of plant toxins”*

Total Costs: \$125,500

#### **American Museum of Natural History Theodore Roosevelt Memorial Grant (2010)**

Total Costs: \$2000

#### **Sigma Xi Grant in Aid of Research (2010)**

Total Costs: \$800

#### **Southwest Association of Naturalists Howard McCarley Research Award (2010)**

Total Costs: \$1000

#### **Society for Integrative and Comparative Biology Grant in Aid of Research (2010)**

Total Costs: \$1000

## **TEACHING**

### **Mammalogy - Biology 5370 (3 cr) – University of Utah**

Instructor – Spring 2012

Instructor – Spring 2013

## **STUDENTS MENTORED**

### **Bioscience High School Summer Research Program**

Jordynn Hewitt, Elisabeth Barrows, Tyler Lee, Anderson Chang

### **ACCESS Program** (competitive science program for women in STEM at Univ. of Utah)

Chelsey Carling, Elizabeth Pitman

### **Undergraduates**

Chloe Pomies, Ashley Stengel, Melisa Magallanes

## **PUBLICATIONS**

To see impacts of publications, go to [www.tinyurl.com/Kohlstory](http://www.tinyurl.com/Kohlstory)

Google Scholar Page: [www.tinyurl.com/KohlGoogleScholar](http://www.tinyurl.com/KohlGoogleScholar)

40. Kohl, K.D. (2017) An introductory 'how-to' guide for integrating microbiome research into integrative and comparative biology. *Integrative and Comparative Biology*. Accepted.
39. Kohl, K.D., Varner, J., Wilkening, J.L., Dearing, M.D. (2017) Gut microbial communities of American pikas (*Ochotona princeps*): evidence for phyllosymbiosis and adaptations to novel diets. *Journal of Animal Ecology*. Accepted.
38. Kohl, K.D., Dearing, M.D. (2017) Intestinal lymphatic transport: an overlooked pathway for understanding absorption of plant secondary compounds in vertebrate herbivores. Revisions invited at *Journal of Chemical Ecology*. 43: 290-294.
37. Kohl, K.D., Brun, A., Magallanes, M., Brinkerhoff, J.D., Laspiur, A., Acosta, J.C., Caviedes-Vidal, E., Bordenstein, S.R. (2017) Gut microbial ecology of lizards: insights into diversity in the wild, effects of captivity, variation across gut regions, and transmission. *Molecular Ecology*. 26: 1175-1189.
36. Brooks, A.W.<sup>‡</sup>, Kohl, K.D.<sup>‡</sup>, Brucker, R.M.<sup>‡</sup>, van Opstal, E., Bordenstein, S.R. (2016) Phyllosymbiosis: relationships and functional effects of microbial communities across host evolutionary history. *PLoS Biology*. 14: e2000225. (<sup>‡</sup> Co-first authors)
  - Profiled by *The Scientist* – [www.tinyurl.com/Phyllosymbiosis](http://www.tinyurl.com/Phyllosymbiosis)
35. Kohl, K.D., Carey, H.V. (2016) A place for host-microbe symbiosis in the comparative physiologist's toolbox. *Journal of Experimental Biology*. 219: 3496-3504.
34. Kohl, K.D., Ciminari, M.E., Chediack, J.G., Leafloor, J.O., Karasov, W.H., McWilliams, S.R., Caviedes-Vidal, E. (2016) Modulation of digestive enzyme activities in the avian digestive tract in relation to diet composition and quality. *Journal of Comparative Physiology – B*. Online Ahead of Print.
33. Kohl, K.D., Dearing, M.D. (2016) The woodrat gut microbiota as an experimental system for understanding microbial metabolism of dietary toxins. *Frontiers in Microbiology*. 7: 1165.
32. Kohl, K.D., Connelly, J.W., Dearing, M.D., Forbey, J.S. (2016) Microbial detoxification in the gut of a specialist avian herbivore, the Greater Sage-Grouse. *FEMS Microbiology Letters*. 363: fnw144.
31. Kohl, K.D., Brun, A., Magallanes, M., Brinkerhoff, J.D., Laspiur, A., Acosta, J.C., Bordenstein, S.R., Caviedes-Vidal, E. (2016) Physiological and microbial adjustments allow facultative herbivory in an omnivorous lizard. *Journal of Experimental Biology*. 219: 1903-1912.
  - Profiled by *Science* – [www.tinyurl.com/KohlLizardGuts](http://www.tinyurl.com/KohlLizardGuts)
30. Kohl, K.D., Sadowska, E.T., Rudolf, A., Dearing, M.D., Koteja, P. (2016) Experimental evolution on a wild mammal species results in modification of gut microbial communities. *Frontiers in Microbiology*. 7: 634
29. Kohl, K.D., Yahn, J. (2016) Effects of environmental temperature on the gut microbial communities of tadpoles. *Environmental Microbiology*. 18: 1561-1565.

28. Kohl, K.D., Samuni-Blank, M., Izhaki, I., Gerchman, Y., Lymberakis, P., Kurnath, P., Arad, Z., Karasov, W.H., Dearing, M.D. (2016) Effects of fruit toxins on intestinal and microbial  $\beta$ -glucosidase activities of seed-predating and seed-dispersing rodents (*Acomys* spp.). *Physiological and Biochemical Zoology*. 89: 198-205.
27. Kohl, K.D., Stengel, A., Dearing, M.D. (2016) Inoculation of tannin-degrading bacteria into novel hosts increases performance on tannin-rich diets. *Environmental Microbiology*. 18: 1720-1729.
26. Skopec, M.M., Kohl, K.D., Schramm, K., Halpert, J.R., Dearing, M.D. (2015) Using the specialization framework to determine the degree of dietary specialization in a herbivorous woodrat. *Journal of Chemical Ecology*. 41: 1059-1068.
25. Kohl, K.D., Coogan, S.C.P., Raubenheimer, D. (2015) Do wild carnivores forage for prey or for nutrients?: Evidence for nutrient specific foraging in vertebrate predators. *BioEssays*. 37: 701-709.
24. Chalmers, J.W., Mock, K.E., Kohl, K.D., Madsen, K.J., Nadkarni, N.M. (2015) Clonality and dynamics of leaf abscission of Gambel oaks at small spatial scales in Utah. *Forest Science*. 61: 829-833.
23. Kohl, K.D., Luong, K., Dearing, M.D. (2015) Validating the use of trap-collected feces for studying the gut microbiome of a small mammal (*Neotoma lepida*). *Journal of Mammalogy*. 96: 90-93.
22. Kohl, K.D., Cary, T.L., Karasov, W.H., Dearing, M.D. (2015) Larval exposure to polychlorinated biphenyl 126 (PCB-126) causes persistent alteration of the amphibian gut microbiota. *Environmental Toxicology and Chemistry*. 34: 1113-1118.
21. Kohl, K.D., Pitman, E., Robb, B.C., Connelly, J.W., Dearing, M.D., Forbey, J.S. (2015) Monoterpenes as inhibitors of digestive enzymes and counter-adaptations in a specialist avian herbivore. *Journal of Comparative Physiology – B*. 185: 425-434.
20. Kohl, K.D., Miller, A.W., Dearing, M.D. (2015) Evolutionary irony: evidence that “defensive” plant spines act as a proximate cue to attract a mammalian herbivore. *Oikos*. 124: 835-841.
  - Profiled on New Scientist – [www.tinyurl.com/KohlCactus](http://www.tinyurl.com/KohlCactus)
19. Kohl, K.D., Marón, C.F., Chirife, A., Di Martino, M., Dearing, M.D., Rowntree, V.J. (2015) Intestinal lactase activity in southern right whale calves (*Eubalaena australis*). *Marine Mammal Science*. 31: 398-403.
18. Kohl, K.D., Amaya, J., Passemont, C.A., Dearing, M.D., McCue, M.D. (2014) Unique and shared responses of the gut microbiota to prolonged fasting: a comparative study across five classes of vertebrate hosts. *FEMS Microbiology Ecology*. 90: 883-894.
17. Kohl, K.D., Weiss, R.B., Cox, J., Dale, C., Dearing, M.D. (2014) Gut microbes of mammalian herbivores facilitate intake of plant toxins. *Ecology Letters*. 17: 1238-1247.
  - Science Editor’s Choice article
  - Profiled on National Geographic – [www.tinyurl.com/KohlWoodrat](http://www.tinyurl.com/KohlWoodrat)
  - Featured in popular science book “*I Contain Multitudes*” by Ed Yong
16. Kohl, K.D., Miller, A.W., Marvin, J.E., Mackie, R., Dearing, M.D. (2014) Herbivorous rodents (*Neotoma* spp.) harbor abundant and active foregut microbiota. *Environmental Microbiology*. 16: 2869-2878.
15. Kohl, K.D., Skopec, M.M., Dearing, M.D. (2014) Captivity results in disparate loss of gut microbial diversity in closely related hosts. *Conservation Physiology*. 2: cou009.
14. Miller, A.W., Kohl, K.D., Dearing, M.D. (2014) The gastrointestinal tract of the white-throated woodrat (*Neotoma albigula*) harbors distinct consortia of oxalate-degrading bacteria. *Applied and Environmental Microbiology*. 80: 1595-1601.
13. Kohl, K.D., Dearing, M.D. (2014) Wild-caught rodents retain a majority of their natural gut microbiota upon entrance into captivity. *Environmental Microbiology Reports*. 6: 191-195.
12. Brzęk, P., Kohl, K.D., Caviedes-Vidal, E., Karasov, W.H. (2013) Activity of intestinal carbohydrases responds to multiple dietary signals in nestling House sparrows. *Journal of Experimental Biology*. 216: 3981-3987.

11. Kohl, K.D., Cary, T.L., Karasov, W.H., Dearing, M.D. (2013) Restructuring of the amphibian gut microbiota through metamorphosis. *Environmental Microbiology Reports*. 5: 899-903.
10. Samuni-Blank, M., Izhaki, I., Dearing, M.D., Karasov, W.H., Gerchman, Y., Kohl, K.D., Lymberakis, P., Kurnath, P., Arad, Z. (2013) Physiological and behavioural effects of fruit toxins on seed-predating versus seed-dispersing congeneric rodents. *Journal of Experimental Biology*. 216: 3667-3673.
9. Kohl, K.D., Stengel, A., Samuni-Blank, M., Dearing, M.D. (2013) Effects of anatomy and diet on gastrointestinal pH in rodents. *Journal of Experimental Zoology Part A*. 319:225-229.
8. Brzęk, P., Ciminari, M.E., Kohl, K.D., Lessner, K., Karasov, W.H., Caviedes-Vidal, E. (2013) Effect of age and diet composition on activity of pancreatic enzymes in birds. *Journal of Comparative Physiology - B*. 183:685-697.
7. Kohl, K.D., Dearing, M.D. (2012) Experience matters: prior exposure to plant toxins enhances diversity of gut microbes in herbivores. *Ecology Letters*. 15:1008-1015.
6. Kohl, K.D. (2012) Diversity and function of the avian gut microbiota. *Journal of Comparative Physiology B*. 182:591-602.
5. Kohl, K.D., Dearing, M.D. (2011) Induced and constitutive responses of digestive enzymes to plant toxins in an herbivorous mammal. *Journal of Experimental Biology*. 214:4133-4140.
4. Kohl, K.D., Weiss, R.B., Dale, C., Dearing, M.D. (2011) Diversity and novelty of the gut microbial community of an herbivorous rodent (*Neotoma bryanti*). *Symbiosis*. 47:47-54.
3. Brzęk, P., Kohl, K.D., Caviedes-Vidal, E., Karasov, W.H. (2011) Fully reversible phenotypic plasticity of digestive physiology in young House sparrows: lack of long-term effect of early diet composition. *Journal of Experimental Biology*. 214:2755-2760.
2. Kohl, K.D., Brzęk, P., Caviedes-Vidal, E., Karasov, W.H. (2011) Pancreatic and intestinal carbohydrases are matched to dietary starch level in wild passerine birds. *Physiological and Biochemical Zoology*. 84:195-203.
1. Brzęk, P., Kohl, K.D., Caviedes-Vidal, E., Karasov, W.H. (2009) Developmental adjustments of House sparrow (*Passer domesticus*) nestlings to diet composition. *Journal of Experimental Biology*. 212:1284-1293.

#### **MANUSCRIPTS UNDER REVIEW**

43. Knutie, S.A., Wilkinson, C.L., Kohl, K.D., Rohr, J.R. Early-life disruption of host microbiota decreases later-life resistance to infections. Revisions under review at *Nature Communications*
42. Kohl, K.D., Oakeson, K., Meyerholz, D.K., Dale, C., Weiss, R.B., Dearing, M.D. Patterns of host gene expression associated with harboring a foregut microbial community. Under review at *BMC Genomics*.
41. Nadkarni, N., Kohl, K.D. The amputated limb study: experiments on the elements of disturbance that affect epiphyte vitality in a temperate rainforest. Under review at *Botany*.

#### **INVITED PRESENTATIONS**

- 2017 University of Oregon, Eugene, OR
- 2017 Gordon Research Conference on Plant-Herbivore Interactions, Ventura, CA
- 2017 University of Minnesota, Minneapolis, MN
- 2017 University of South Florida, Tampa, FL
- 2016 University of Pittsburgh, Pittsburgh, PA
- 2016 University of Alberta, Edmonton, AB
- 2016 University of Mississippi, Oxford, MS
- 2016 Austin Peay State University, Clarksville, TN
- 2015 Early Career Scientists Symposium – University of Michigan, Ann Arbor, MI
- 2014 Iowa State University, Ames, IA
- 2014 Workshop on Microbiology of Animals in the Built Environment – University of California, Davis, CA

**PROFESSIONAL SERVICE**

- 2017 Organized a symposium on host-microbe interactions at annual meeting for Society for Integrative and Comparative Biology – <http://tinyurl.com/KohlSICB>
- 2016 Invited Speaker chair for “Inequality in Biosciences” group at Vanderbilt University
- 2016 Ad hoc reviewer for NSF – Division of Integrative Organismal Systems
- 2015 Review Editor for *Frontiers in Microbiology*
- 2015 Ad hoc reviewer for NSF – Division of Environmental Biology
- 2011-12 Chair of the Biology Graduate Student Advisory Committee
- 2009-11 Coordinated Biology Graduate Student research in progress seminar series
- 2010 Biology representative on ‘Science Day at the U’ organizational committee

**Peer Reviewer** - See my Publons profile at [www.tinyurl.com/Kohlpublons](http://www.tinyurl.com/Kohlpublons)