

# CURRICULUM VITAE

## SCOTT ALEXANDER BOWDRIDGE

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### **Education**

2009	Ph.D.	Animal Science	Virginia Tech
2005	M.S.	Animal Science	University of Maine, Orono
1998	B.S.	Agriculture Science	California State University, Chico

### **Professional Experience**

2011 - Present	Assistant Professor, Department of Animal and Nutritional Sciences, West Virginia University 50% Teaching 50% Research Appointment – Tenure track
2009 - 2011	NIH Postdoctoral Fellow, William C. Gause Laboratory Center for Inflammation and Immunity, New Jersey Medical School, UMDNJ Research: Helminth parasite immunology, role of B cells, macrophages and resistance-like molecules in developing host immunity
2006 - 2009	Graduate Research/Teaching Assistant Virginia Tech Research: Immunogenetics of parasite resistance in sheep Teaching assistant: Introduction to Animal Science and Sheep Production
2005 - 2006	Genetics Laboratory Manager North Carolina State University Established and managed seven in-bred moth lines, collected data and supervised employees in field work
2002 - 2005	Graduate Research/Teaching Assistant University of Maine, Orono Research: Association of microsatellite markers and parasite resistance in sheep Teaching assistant: Introduction to Animal Science, Animal Handling Techniques, and Animal Breeding
2000 - 2002	Farm Manager Kelmescott Rare Breeds Foundation, Lincolnville, ME Managed sheep flock, personnel, budget development, facility planning and building organizational partnerships
1999 - 2000	Agriculture Science Teacher East Union High School, Manteca, CA Courses taught: Natural Resource Management, Ornamental Horticulture, Animal and Plant Science
1998 - 1999	Agriculture Science Teacher Paradise High School, Paradise, CA Courses taught: Agriculture Science, Animal Science, Forestry and Natural Resources, Plant and Soil Science

## Grants

- 12/1/2016 – 11/30/2017 **National Center for Veterinary Parasitology**  
Identification of cuticular antigenic components found in third stage H. contortus larvae and immune response they elicit. PI \$14,148
- 9/1/2016 – 8/30/2018 **USDA/NIFA/AFRI**  
NIFA Postdoctoral Fellowship. Award Total \$152,000, SAB Mentor
- 9/15/2016 – 9/14/2020 **USDA/NIFA/OREI**  
Understanding Parasite Resistance in Organic Livestock and Using a Systems Approach for Control  
Co-PI Total Award \$2 Million, **Award to SAB \$484,000**
- 7/1/2016 – 6/30/2017 **WVU Davis College Faculty Enrichment Grant**  
RNA-Seq analysis of immune cells exposed to H contortus antigen. PI \$3,500
- 12/1/2015 – 11/30/2016 **National Center for Veterinary Parasitology**  
Effects of PBMC from parasite-resistant and parasite-susceptible sheep on Haemonchus contortus larval death. PI \$14,703
- 7/1/2014 – 12/31/2014 **Cooperative Research Farms**  
Effects of dietary essential oils on feeder lamb performance. PI 27,700
- 10/31/2013 – 10/30/2014 **Cooperative Research Farms**  
Measuring intake of rumensin in winter grazed beef calves. PI 21,000
- 10/01/2012 – 09/30/2014 **Vi-COR**  
Understanding the mechanism whereby Celmanax™ reduces helminth parasitism in commercial crossbred sheep. PI \$100,000
- 5/01/2012 – 08/31/2016 **USDA/NIFA 2012-51300-20320**  
Forage-based parasite control in sheep and goats in the Northeast US. The goal of this grant is to determine the mechanisms by which grazing small ruminants on birdsfoot trefoil reduces gastrointestinal nematode parasitism. Co-PI Total award \$1,850,369, **Award to SAB: \$265,420**
- 5/14/2012 – 05/14/2014 **USDA/NIFA 2011-02949**  
Development of host protective immunity during gastrointestinal nematode infection in parasite-resistant sheep. The goal of this seed grant is to determine mechanisms involved in resistance to nematode parasite infection in sheep. PI \$149,000
- 2003 **USDA-SARE**  
Development of alternative feeds directory in New England. PI \$9,000
- 2002 **Hughes Foundation**  
Evaluation of Gloucestershire Old Spot Swine performance. PI \$30,000

## Publications

- Shepherd, E.A., J.J. Garza, S.P. Greiner, **S.A. Bowdridge**. 2017. Effects of ovine peripheral blood mononuclear cells on Haemonchus contortus larval death in vitro. Parasit. Immunol. 39:e12424
- Garza, J.J., S.P. Greiner, **S.A. Bowdridge**. 2017. Serum-mediated H. contortus larval aggregation differs by larval stage and is enhanced by complement. Parasit. Immunol. 39:e12409.
- Jacobs, J.R., K.N. Sommers, A.M. Zajac, D.R. Notter, **S.A. Bowdridge**. 2016. Early IL-4 gene expression in abomasum is a critical difference in resistance to H. contortus. Parasit. Immunol. 38:333-339.
- Holt, R.M., E.A. Shepherd, A.G. Ammer, **S.A. Bowdridge**. 2015. Effects of peripheral blood mononuclear cells on Haemonchus contortus larval motility in vitro. Parasit. Immunol. 37:553-556.
- Jacobs, J.R., S.P. Greiner, **S.A. Bowdridge**. 2015. Serum interleukin-4 (IL-4) production is associated with lower fecal egg count in parasite-resistant sheep. Vet. Parasitol. 211:102-105
- Bowdridge, S.A.**, A.M. Zajac, D.R. Notter. 2015. St. Croix sheep produce a rapid and greater cellular immune response contributing to reduced establishment of Haemonchus contortus. Vet. Parasitol. 208:204-210.
- MacKinnon, K.M., **S.A. Bowdridge**, I. Kanevsky-Mullarky, A.M. Zajac, D.R. Notter. 2015. Gene expression profiles of hair and wool sheep reveal importance of IL-13 and other Th2 immune mechanisms for increased resistance to Haemonchus contortus. J. Anim. Sci. 93:2074-2082.
- de Wolf, B.M., A.M. Zajac, K.A. Hoffer, B.L. Sartini, **S.A. Bowdridge**, T. LaRoith, K.H. Petersson. 2014. The effect of Vitamin E supplementation on an experimental Haemonchus contortus infection in lambs. Vet. Parasitol. 205:140-149.

- Bowdridge, S.A.**, K.M. Mackinnon, J. C. McCann, A.M. Zajac, D.R. Notter. **2013**. Hair-type sheep generate an accelerated and longer-lived humoral immune response to *Haemonchus contortus* infection. *Vet. Parasitol.* 196:172-178.
- Chen, F., Z. Liu, W. Wu, C. Rozo, **S.A. Bowdridge**, A. Millman, J.F. Urban Jr., T.A. Wynn, W.C. Gause. **2012**. An essential role for the Th2-type response in limiting tissue damage during helminth infection. *Nat. Med.* 18:260-266
- Bowdridge, S.** and W.C. Gause. **2010**. Regulation of alternative macrophage activation by chromatin remodeling. *Nat. Immunol.* 11:879-81.
- Liu, Q., T. Kreider, **S. Bowdridge**, Z. Liu, Y. Song, A.G. Gaydo, J.F. Urban Jr., W.C. Gause. **2010**. B- cells have distinct roles in host protection against different nematode parasites. *J. Immunol.* 184: 5213-5223.
- Groot, A., O. Inglis, **S. Bowdridge**, R. Santangelo, C. Blanco, J. Lopez, A. Teran-Vargas, F. Gould, C. Schal. **2009**. Geographic and temporal variation in chemical communication in moths due to habitat-dependant selection. *Evolution.* 63: 1987-2003.

### **Conference Proceedings**

- Weaver, A.R., D.L. Wright, D.R. Notter, A.M. Zajac, **S.A. Bowdridge**, S.P. Greiner. **2017**. Evaluation of pre-weaning and grazing performance of terminal sire breeds for hair sheep production systems. *J. Anim. Sci.* 95:supp 1.
- Bowdridge, S.A.**, J.J. Garza, E.A. Shepherd, B. Russ, A.M. Zajac, S.P. Greiner. **2017**. Effect of sire breed on gain, carcass characteristics and parasite resistance of Katahdin crossbred feedlot-finished lambs: year 2. *J. Anim. Sci.* 95: Supp 1.
- Elkins, C., **S.A. Bowdridge**. **2016**. Infection with *H. contortus* shifts genera diversity of fecal microbiome. 61<sup>st</sup> Annual Meeting AAVP San Antonio, TX
- Garza, J., **S.A. Bowdridge**. **2016**. Serum induces *H. contortus* larval aggregation via complement and antibody complexes that differ by larval stage. 61<sup>st</sup> Annual Meeting AAVP San Antonio, TX
- Garza, J., **S.A. Bowdridge**. **2016**. *Haemonchus contortus* induced neutrophil extracellular trap formation differs between resistant and susceptible breeds of sheep. 61<sup>st</sup> Annual Meeting AAVP San Antonio, TX
- Garza, J., **S.A. Bowdridge**. **2016**. *Haemonchus contortus* fourth stage larval excretory/secretory protein inhibits serum-mediated larval aggregation. 61<sup>st</sup> Annual Meeting AAVP San Antonio, TX
- Jacobs, J., **S.A. Bowdridge**. **2016**. Interleukin-4 and its downstream targets are rapidly upregulated in immune cells of St. Croix sheep exposed to *H. contortus* larval antigen in vitro. 61<sup>st</sup> Annual Meeting AAVP San Antonio, TX
- Jacobs, J., J. Garza, **S.A. Bowdridge**. **2016**. RNA-seq analysis of immune cells cultured with *H. contortus* larval antigen reveals differential gene expression in parasite resistant and susceptible sheep. 61<sup>st</sup> Annual Meeting AAVP San Antonio, TX
- Middleton, D., J. Keenan, J. Garza, **S.A. Bowdridge**. **2016**. RNA-seq reveals differential gene expression in abomasal lymph node during *H. contortus* infection. 61<sup>st</sup> Annual Meeting AAVP San Antonio, TX
- Russ, B., J. Garza, **S.A. Bowdridge**. **2016**. Isolation of third stage *H. contortus* cuticle and cuticle protein. 61<sup>st</sup> Annual Meeting AAVP San Antonio, TX
- Shepherd, E.A., J. Garza, **S.A. Bowdridge**. **2016**. Quantification of *H. contortus* larval death after culture with host immune cells by measuring larval ATP. 61<sup>st</sup> Annual Meeting AAVP San Antonio, TX
- Weaver, A.R., D.L. Wright, M.A. McCann, A.M. Zajac, **S.A. Bowdridge**, S.P. Greiner. **2016**. Evaluation of terminal sire breeds for hair sheep production systems on lamb birth, weaning, and grazing performance. ASAS Southern Section Meeting San Antonio TX.
- Bowdridge, S.A.**, D. Mata-Padrino, D.P. Belesky. **2016**. Effect of fish meal supplementation rate on parasitism and performance of grazing lambs. ASAS Southern Section Meeting. San Antonio, TX.
- Bowdridge, S.A.**, C.S. Sotomaior, M.A. McCann, A.M. Zajac, S.P. Greiner. **2016**. Effect of sire breed on gain, carcass characteristics and parasite resistance of Katahdin crossbred feedlot-finished lambs. ASAS Southern Section Meeting San Antonio, TX.
- Graham, M.R., E.C. Bowdridge, **S.A. Bowdridge**, I. Holoskova, T.H. Elsasser, R.A. Dailey. **2015**. Effects of lipopolysaccharide (LPS)-induced inflammatory response on early embryo survival in ewes. *J. Anim. Sci.* Vol 93 E-Suppl. 3.
- Garza, J., **S.A. Bowdridge**. **2015**. Texel crossbred lambs show increased resistance *Haemonchus contortus*. 60<sup>th</sup> Annual Meeting AAVP, Boston, MA.
- Jacobs, J.R., **S.A. Bowdridge**. **2015**. Peripheral immune cells of St. Croix sheep rapidly produce IL-4 in response to *Haemonchus contortus* antigen in vitro. 60<sup>th</sup> Annual Meeting AAVP, Boston, MA.

## **Conference Proceedings cont'**

- Shepherd, E., J. Garza, **S.A. Bowdridge**. 2015. Quantification of *Haemonchus contortus* larval death after culture with host immune cells by measuring larval ATP. 60<sup>th</sup> Annual Meeting AAVP, Boston, MA.
- Crawford, C., D.J. Mata-Padrino, D.P. Belesky, E.E. Felton, **S.A. Bowdridge**. 2015. Effects of protein supplementation on parasitism in grazing lambs. ASAS Southern Section Meeting, Atlanta, GA.
- Crawford, C.D., D. Mata-Padrino, D. Belesky and **S.A. Bowdridge**. 2014. Effects of protein supplementation on growth of parasitized organic lambs while grazing. ASAS Southern Section Meeting Dallas, TX.
- Jacobs, J., K.N. Sommers, **S.A. Bowdridge**. 2014. Delayed immune responses of parasite-resistant sheep during *Haemonchus contortus* infection are associated with greater larval burden. 59th Annual Meeting AAVP, Denver, CO.
- Holt, R., A.G. Ammer, **S.A. Bowdridge**. 2014. Effects of peripheral blood mononuclear cells on larval motility of *Haemonchus contortus* in vitro. 59th Annual Meeting AAVP, Denver, CO.
- Houdijk, J., and **S.A. Bowdridge**. 2014. Can protein supplementation reduce reliance on anthelmintics in small ruminant production systems? 13th Intl Congress of Parasitology (ICOPA). Mexico City, MX .
- Holt, R., A. Bay, R.C. Price, J. Jacobs, K. Sommers, and **S.A. Bowdridge**. 2013. Effect of a single dose of Safe-Guard prior to weaning on parasite load of beef calves during the backgrounding phase. Proc. 58th Meeting Am. Assoc. Vet. Parasitol. Chicago, IL.
- Sommers, K., D.R. Notter and **S.A. Bowdridge**. 2013. Abomasal gene expression of parasite-resistant sheep during a challenge *Haemonchus contortus* infection. Proc. 58th Meeting Am. Assoc. Vet. Parasitol. Chicago, IL.
- Price, R.C., M. Graham, R. Holt, J. Jacobs, K. Sommers, and **S.A. Bowdridge**. 2013. Effects of feeding Celmanax on peripheral cellular responses of commercial crossbred lambs during a *H. contortus* primary infection. Proc. 58th Meeting Am. Assoc. Vet. Parasitol. Chicago, IL.
- Jacobs, J., R. Holt, R.C. Price, K.N. Sommers and **S.A. Bowdridge**. 2013. Cellular immune response to *Haemonchus contortus* in challenged sheep following an extended rest period. Proc. 58th Meeting Am. Assoc. Vet. Parasitol. Chicago, IL.
- Bowdridge, S.A.**, D. Mata-Padrino, W. Bryan. 2013. Mitigating effects of gastrointestinal parasitism in organic sheep using protein supplementation. Proc. 58th Meeting Am. Assoc. Vet. Parasitol. Chicago, IL.
- Jacobs, J., **S. A. Bowdridge**. 2012. Increased peripheral cellular immune responses are associated with FEC reduction in parasite-resistant St. Croix sheep during *H. contortus* infection. Proc. 57<sup>th</sup> Meeting Am. Assoc. Vet. Parasitol. San Diego, CA
- Mata, D., **S. Bowdridge**, C. Moore, J. Jacobs, J. Kotcon, W. Bryan. 2012. Response of weaned, spring-born grass-fed organic lambs to dewormer and grain supplement. NE Org. Res. Symp. Saratoga Springs, NY
- Bowdridge, S.**, T. Kreider, W. Wu, F. Chen and W.C. Gause. 2010. Inducible nitric oxide synthase plays an essential role in developing protective immunity against intestinal helminth parasites. 2nd Annual Symposium on Inflammation, Immunity and Infectious Disease, UMDNJ, Newark, NJ.
- Chen, F., Z. Liu, W. Wu, **S. Bowdridge**, W.C. Gause. 2010. An essential role for Th2-type response in limiting tissue damage during helminth infection. 2nd Annual Symposium on Inflammation, Immunity and Infectious Disease, UMDNJ, Newark, NJ
- Wu, W., **S. Bowdridge**, F. Chen, W.C. Gause. 2010. The localization and function of memory T cell populations during intestinal helminth infection. 2nd Annual Symposium on Inflammation, Immunity and Infectious Disease, UMDNJ, Newark, NJ
- Bowdridge, S.**, Q. Liu, T. Kreider, Z. Liu, Y. Song, A.G. Gaydo, J.F. Urban Jr., and W.C. Gause. 2010. Antibody can mediate protective immunity at early tissue-dwelling stages of intestinal helminth infection. J. Immunol. 184: 37.27.
- Chen, F., Z. Liu, Q. Liu, W. Wu, **S. Bowdridge**, A. Millman, C. Roza, and W. Gause. 2010. IL-4 $\alpha$  signaling may enhance resolution of parasite-induced lung damage by inhibiting inflammation and mediating acute wound healing. J. Immunol. 184: 37.38.
- Bowdridge, S.**, G. P. Smith, S. P. Greiner, A. M. Zajac, and D. R. Notter. 2009. Performance of Katahdin lambs is improved by strategic de-worming followed by grazing pasture with lower nematode parasite contamination. J. Anim. Sci. Vol. 87 E-Suppl. 3.
- Smith, G.P., **S. Bowdridge**, and D. R. Notter. 2009. Comparing the cost of parasite resistance in crossbred Katahdin lambs using strategic versus selective deworming regimes. Meeting of the Minds Undergrad. Res. Symp. Raleigh, NC.

## **Conference Proceedings cont'**

- Bowdridge, S., G. P. Smith, A. M. Zajac, and D. R. Notter.** 2008. The early cellular immune response to *Haemonchus contortus* in resistant and susceptible sheep. 53rd Proc. Am. Assoc. Vet. Parasitol. New Orleans, LA.
- Bowdridge, S., K.M. Mackinnon, J. McCann, A.M. Zajac, and D.R. Notter.** 2008. Humoral immune response to nematode parasite infection is accelerated and longer-lived in hair-type sheep. 53rd Proc. Am. Assoc. Vet. Parasitol. New Orleans, LA.

## **Invited Symposia**

- 2016 ***Controlling internal parasites in beef cattle.*** WV Cattlemen's College, Roanoke, WV
- 2016 ***Immunity to gastrointestinal parasitism in sheep: How one breed got it right!*** University of Delaware, Department of Animal Science Seminar Series, Newark, DE
- 2016 ***Management and selection strategies for internal parasite control: An immunologist's perspective.*** Buckeye Shepherds Symposium, Wooster, OH
- 2016 ***Usefulness of Texel sheep in parasite resistance breeding programs.*** National Texel Sheep Breeders Society, Sedalia, MO
- 2016 ***Managing Parasitism in Small Ruminants.*** North Carolina Regional Sheep and Goat Producer Workshop, Greensboro, NC
- 2015 ***Insights into immune mechanisms regulating parasite resistance in sheep.*** WVU Health Sciences Center, Department of Physiology and Pharmacology Fall Seminar, Morgantown, WV
- 2015 ***Application of research in managing parasites in Katahdin sheep.*** Annual Meeting, Katahdin Hair Sheep International. Indiana, PA.
- 2015 ***Small ruminant parasitism,*** Appalachian Grazing Conference, Morgantown, WV
- 2015 ***New research in dealing with parasites in sheep,*** VA-NC Shepherds Symposium Verona, VA
- 2013 ***Managing parasites in beef cattle.*** Appalachian Grazing Conference, Morgantown, WV
- 2012 ***Future of parasite management through rose-colored glasses.*** ASI Webinar
- 2012 ***New research in parasite management*** Virginia-North Carolina Shepherds Symposium, Blacksburg, VA.
- 2010 ***Incorporating parasite resistance genetics into sheep flocks.*** SCC081: Sustainable Small Ruminant Production in the Southeastern U.S. Orlando, FL.
- 2009 ***Discovering the biology of resistance to gastro-intestinal parasitism in sheep.*** Salisbury University Biology Seminar Series, Salisbury, MD.
- 2009 ***Parasite management strategies for lambs and kids - Performance and Economics.*** Kentucky State University, Goat Production Workshop, Frankfort, KY.
- 2009 ***Parasite management strategies for grazing lambs.*** Virginia-North Carolina Shepherds Symposium, Staunton, VA.

## **Graduate Students**

### **M.S.**

Jesica Jacobs - 2013  
Rush Holt - 2014  
Karen Sommers - 2014  
Rebecca Price - 2014  
Crista Crawford - 2015  
Elizabeth Shepherd – 2016  
Denzel Middleton - Current

### **Ph.D.**

Jesica Jacobs – 2016  
Brynnan Russ – Current  
Elizabeth Shepherd - Current

## **Post-Doctoral Fellows**

Dr. Javier Garza 2015 - present  
Dr. Cristina Sotomaior - 2015

## **Graduate Committees**

### **M.S.**

Megan Graham – 2014  
Melissa Wise – 2016  
Jake Engel – 2015  
Hoda Nikpour – 2017  
Taylor Harrison – 2016  
Amanda Davis - Current

### **Ph.D.**

Jessalyn Hadfield - 2017

## **Annual Teaching**

AVS 699 Graduate Seminar  
AVS 696 Graduate Colloquium  
AVS 411 Lambing Management  
AVS 593 Veterinary Immunology  
VETS 405 Parasitology Laboratory  
ANPR 338 Introduction to Live Animal Evaluation  
ANPR 339 Advanced Live Animal Evaluation  
ANPR 430 Animal Breeding and Genetics

## **National Service**

2017 President of SCC-081 Regional Coordinating Committee  
2016 Secretary of SCC-081 Regional Coordinating Committee  
2014-Present American Sheep Industry – Sheep Health Committee  
2013-2015 American Association of Veterinary Parasitology – Publications committee  
2013-Present NCERA-214 Small Ruminant Production  
2013-Present Peer-Reviewer Small Ruminant Research, Veterinary Parasitology, Parasite Immunology  
2012-Present American Consortium for Small Ruminant Parasite Control  
2011-Present SCC-081 Small Ruminant Parasite Control

## **University Service**

2017 Hosted All-East Collegiate Livestock Judging Contest  
2014 Department Chair Search Committee  
2013 Livestock Extension Specialist Search Committee  
2012-2014 College representative on Senate Student Learning Committee  
2012-Present College Farm Council

## **Division Service**

2015 Division Promotion and Tenure Committee  
2013 Division Promotion and Tenure Committee  
2011-Present Advisor for Divisional Graduate Student Organization  
2011-Present Livestock Judging Team Coach

## **Extension Activity**

2017 WV Winter Dinner Meetings – Managing parasitism in beef cattle and sheep  
2014 WV Winter Dinner Meetings – Controlling Parasitism in Sheep  
2013 WV Winter Dinner Meetings – Controlling Parasitism in Beef Cattle  
2013 WV Small Ruminant Short Course Director  
2013-Present Director of WV Ram and Buck Performance Test Program  
2011-2015 WV Small Ruminant Project

### **Memberships in Professional Societies**

American Association for the Advancement of Science  
American Association of Immunologists  
American Association of Veterinary Parasitology  
American Society of Animal Science  
International Society for Animal Genetics  
Gamma Sigma Delta

### **Honors**

2014-2015	WVU College Dean's Discretionary Merit Increase
2014	Lifetime Membership in St. Croix Hair Sheep Association
2014	Gamma Sigma Delta – Outstanding Junior Faculty Award of Merit
2014	Gamma Sigma Delta
2008	AAAS Program for excellence in science
2008	AAVP Best student paper presentation
2008	AAVP Travel Grant