

Stephen D. Kachman

Professor

Department of Statistics

University of Nebraska

340 Hardin Hall

Lincoln, NE 68583-0963

(402) 472-7302, FAX: (402) 472-5179, steve.kachman@unl.edu

Education and Training

Michigan State University, East Lansing, Michigan	Microbiology	B.S.	1981
University of Illinois, Champaign/Urbana, Illinois	Animal Science	M.S.	1986
Montana State University, Bozeman, Montana	Statistics	Ph.D.	1988
Cornell University	Animal Science		1988-1990

Research and Professional Experience

2010-2013	Interim Chair. Department of Statistics, University of Nebraska-Lincoln
2005-Present	Professor. Department of Statistics, University of Nebraska-Lincoln
2003-2005	Associate Professor. Department of Statistics, University of Nebraska-Lincoln
1996-2003	Associate Professor. Department of Biometry, University of Nebraska-Lincoln
1990-1996	Assistant Professor. Department of Biometry, University of Nebraska-Lincoln

Professional Activities

Journal Review

Associate Editor for Statistics, Agronomy Journal, 2005-2010

Association Service

Secretary-Treasurer, Nebraska Chapter of the American Statistical Association, 1991-2011

Association Memberships

American Statistical Association

American Society of Animal Science

Research Coordinating Committee on Implementation and Strategies for National Beef Cattle Evaluation

Honors and Awards

2018	Research Award of Merit, Gamma Sigma Delta
2016	Continuing Service Award, Beef Improvement Federation
2005	Charles R. Henderson, Lecturer, Cornell University
1983-1984	Hunter Fellowship, College of Agriculture, University of Illinois

Research

My research is focused on the development and application of statistical methodology in the area of statistical genomics. Currently I'm working on methodology on incorporating genomic information, primarily in the form of SNP genotypes, into national beef cattle evaluation. Methodology developed by his group is being used by the American Angus Association to incorporate genomic information in their national beef cattle evaluation. The statistical methodology development includes extensions based on generalized linear mixed models and Bayesian models. Other projects include genomics of swine reproduction (Daniel Ciobanu, Department of Animal Science, UNL), modeling of the host genetics influence of their gut microbial communities (Andrew Benson, Department of Food Science and Technology, UNL), genetic components of biological responses to stress (Lawrence Harshman, School of Biological Sciences, UNL), and statistical models for the evaluation of teachers and programs (Walter Stroup, Department of Statistics, UNL). I also provide statistical assistance in the design and analysis for both faculty and graduate students at UNL.

Synergistic Activities

- Extension of MTDFREML variance component software package to remove the necessity of adding linear constraints to non-full rank models
- Extension of the Matvec software package to allow the analysis of generalized linear mixed models
- Development of the correlated trait approach for the incorporation of genomic information used in the Angus national cattle evaluation

Courses Taught

I have taught graduate courses on linear models, variance component estimation, generalized linear mixed models, statistical programming, distribution theory, statistical inference, experimental design, QTL analysis, and sequence analysis.

Advising

Postdoctoral Fellows:

Geha, Makram: 2009-2010

Sr. Strategic Data Analyst / Quantitative Geneticist at Dow AgroSciences

Nilforooshan, Mohammad: 2011-2012

Geneticist at Interbull, Sweden

Ruiz-Flores, Agustin: 2012-2013

Professor at Universidad Autónoma Chapingo, Mexico

Doctoral Students:

Xu, Jiaqi: 2017-

Olson, Sean: 2016-

Wilson-Wells, Danielle: 2013-2017

Zhang, Ling: 2015-2016

Masters Students:

Supervised a total of 25 M.S. students

Grants

Ongoing Research Support

NIH 2P20GM104320 Zempleni (PI)

08/15/19-05/31/24

NPOD COBRE Phase II

Create a nationally recognized center charged with developing and sustaining a critical mass of investigators dedicated to obesity research.

Role: Biostatistics coordinator

Completed Research Support

Internal Spangler and Kachman (PD)

10/01/16-09/30/20

Genomic Prediction Using Haplotype-based Models in Admixed Populations and For Novel Traits

Develop and evaluate methodology to enable genomic prediction in admixed populations.

Role: Co-PD

USDA/NIFA, Ciobanu (PI)

07/01/17-06/30/19

Investigation of host genetic role in PCV2 and PRRSV susceptibility

Goal: Identify functional genes, mutations, and pathways responsible for variation in susceptibility to PCV2 and PRRSV in pigs.

Role: Co-I

NIH 1P20GM104320-01A1 Zempleni (PI)

08/05/14-05/31/19

Nebraska Center for the Prevention of Obesity Diseases through Dietary Molecules

Create a nationally recognized center charged with developing and sustaining a critical mass of investigators dedicated to obesity research.

Role: Biostatistics coordinator

USDA-NIFA Benson (PI)

02/15/11-02/14/17

Composition of the GI Microbiota and Predisposition to Enterohemorrhagic *Escherichia coli* (EHEC) Colonization as Complex Polygenic Traits in Beef Cattle

Identify genomic loci that influence microbiome composition and EHEC shedding.

Role: Co-I

USDA-NIFA Ciobanu (PI)

12/1/12-11/30/17

Translational Genomics for Improving Sow Reproductive

Identify genetic markers that will predict early in life gilts with early age at puberty and superior reproductive longevity.

Role: Co-I

Internal Kachman (PI)

08/01/14-07/31/16

Statistical methods for incorporating functional information into genetic evaluation of livestock

Develop a statistical method to incorporate genomic information from two different genotyping platforms one of which includes putative functional polymorphisms directly into the genetic evaluation.

Biographical Sketch: Stephen D. Kachman

Role: PI

NSF Grant Stroup (PI) 06/15/211-05/31/14
Data Connections: Developing a Coherent Picture of Mathematics Teaching and Learning
Develop a coherent picture of mathematics teaching and learning.
Role: Consultant

USDA-NRI Grant Van Tassel (PI) 08/01/08-07/31/13
Implementation of Whole Genome Selection in the US Dairy and Beef Cattle Industries
Incorporate DNA marker information into national genetic evaluations of cattle.
Role: Co-I

National Pork Board Ciobanu (PI) 06/01/2011-05/31/2012
Genome-Wide Association of Sow Reproduction and Life-Time Productivity
Identification of genes associated with sow reproduction. Role: Co-I

2U01CA105417-06 Subaward Benson (PI) 09/01/2009-07/31/2010
NIH-NCI/North Carolina State University
Modeling Heterogeneity for Safe Cancer Prevention and Detection
Provide a robust estimate of host genetic control of GI microbiota composition.
Role: Co-I

W911NF-07-1-0307 Harshman (PI) 08/01/2007-07/31/2010
DOD-DEPSCoR
Genome Biology of Innate Immunity
Investigate the genomics and quantitative genetics of *D. melanogaster* survival after infection by
Bacillus anthracis.
Role: Co-I

National Pork Board Ciobanu (PI) 05/01/2009-05/01/2010
Identification of Markers Associated with Sow Life Time Productivity for Whole Genomic
Selection
Estimate the effect of genes associated with sow productivity.
Role: Co-I

National Pork Board Ciobanu (PI) 05/01/2009-05/01/2010
Genome-Wide Association of Sow Reproduction and Life-Time Productivity
Identify genetic markers associated with sow reproduction and lifetime productivity.
Role: Co-I

NIH 1R01CA106584-01A1 Simpson (PI) 07/01/2005-04/30/2010
Role of Hyaluronan Matrix in Prostrate Cancer Progression
Evaluate the role of HA in tumor growth, regression, and apoptosis.
Role: Consultant

Publication Listing

1. **Kachman, S. D.** 1986. Prediction of genetic merit for growth curve parameters in outbred ICR mice, University of Illinois at Urbana-Champaign.
2. Hanford, K. J., P. J. Burfening, D. D. Kress, and **S. D. Kachman**. 1988. Interaction of Maternal Grand sire with Region of United-States and Herd for Calving Ease, Birth-Weight and 205-Day Weight. *J. Anim. Sci.* 66: 864-871.
3. **Kachman, S. D.** 1988. Inference procedures for fixed effects in multivariate mixed models, Montana State University.
4. **Kachman, S. D.**, R. L. Baker, and D. Gianola. 1988. Phenotypic and Genetic-Variability of Estimated Growth Curve Parameters in Mice. *Theor. Appl. Genet.* 76: 148-156.
5. Harris, K., V. Thomas, M. Peterson, **S. Kachman**, and M. McInerney. 1989. Influence of minerals on rate of digestion and percentage degradable in vitro neutral detergent fiber. *Nutrition Reports International* 40:219-226.
6. Stanton, T. L., L. R. Jones, R. W. Everett, and **S. D. Kachman**. 1992. Estimating milk, fat, and protein lactation curves with a test day model. *J. Dairy Sci.* 75: 1691-1700.
7. Kachman, S. D., and R. W. Everett. 1993. A Multiplicative Mixed Model When the Variances Are Heterogeneous1. *J. Dairy Sci.* 76: 859-867.
8. Boldman, K. G., L. A. Kriese, L. D. Van Vleck, C. P. Van Tassell, and **S. D. Kachman**. 1995. A manual for use of MTDFREML. A set of programs to obtain estimates of variances and covariances (Draft). United States Department of Agriculture. Agricultural Research Service. Clay Center. NE 114.
9. Holland, K. A., R. W. Gillespie, N. M. Lewis, and **S. D. Kachman**. 1995. Estimating energy needs of pediatric patients with burns. *The Journal of Burn Care & Rehabilitation* 16: 458-460.
10. Rodriguez-Almeida, F. A., L. D. Van Vleck, L. V. Cundiff, and **S. D. Kachman**. 1995. Heterogeneity of variance by sire breed, sex, and dam breed in 200- and 365-day weights of beef cattle from a top cross experiment. *J. Anim. Sci.* 73: 2579-2588.
11. Forman, M. F., M. M. Beck, and **S. D. Kachman**. 1996. N-acetyl-beta-D-glucosaminidase as a marker of renal damage in hens. *Poultry Science* 75: 1563-1568.
12. Mahmoud, K. Z., M. M. Beck, S. E. Scheideler, M. F. Forman, K. P. Anderson, and **S. D. Kachman**. 1996. Acute high environmental temperature and calcium-estrogen relationship in the hen. *Poultry Science* 75: 1555-1562.
13. Park, W., D. Shelton, C. Peterson, **S. Kachman**, and R. Wehling. 1997. The relationship of Korean raw noodle (Saeng Myon) color with wheat and flour quality characteristics. *Foods and Biotechnology* 6: 12-19.
14. Park, W., D. Shelton, C. Peterson, T. Martin, **S. Kachman**, and R. Wehling. 1997. Variation in Polyphenol Oxidase Activity and Quality Characteristics Among Hard White Wheat and Hard Red Winter Wheat Samples 1. *Cereal chemistry* 74: 7-11.
15. Park, W., D. Shelton, C. Peterson, R. Wehling, and **S. Kachman**. 1997. Evaluation of Korean raw noodle (Saeng Myon) color and cooking properties among hard red winter and hard white wheat samples. *Foods and Biotechnology* 6: 20-25.
16. Shelton, D. P., M. A. Schroeder, **S. D. Kachman**, J. A. Gosey, and P. J. Jasa. 1997. Cattle grazing influences on percentage corn residue cover. *Journal of Soil and Water Conservation* 52: 203-206.
17. Dodenhoff, J., L. D. Van Vleck, **S. D. Kachman**, and R. M. Koch. 1998. Parameter estimates for direct, maternal, and grandmaternal genetic effects for birth weight and

- weaning weight in Hereford cattle. *J. Anim. Sci.* 76: 2521-2527.
18. Haddad, S. G., R. J. Grant, and **S. D. Kachman**. 1998. Effect of wheat straw treated with alkali on ruminal function and lactational performance of dairy cows. *J. Dairy Sci.* 81: 1956-1965.
 19. Obaidi, M., B. E. Johnson, L. D. Van Vleck, **S. D. Kachman**, and O. S. Smith. 1998. Family per se response to selfing and selection in maize based on testcross performance: A simulation study. *Crop Sci.* 38: 367-371.
 20. **Kachman, S. D.** 1999. Applications in survival analysis. *J. Anim. Sci.* 77 Suppl 2: 147-153.
 21. Brown-Brandl, T., R. Eigenberg, J. Nienaber, and **S. Kachman**. 2000. Acute heat stress effects on total heat production, respiration rate, and core body temperature in growing-finishing swine. *Transactions of the American Society of Agricultural Engineers*: 253-260.
 22. Elston, J. J., M. M. Beck, **S. D. Kachman**, and S. E. Scheideler. 2000. Laying hen behavior. 1. Effects of cage type and startle stimuli. *Poultry science* 79: 471-476.
 23. Guo, Q. F., J. H. Brown, T. J. Valone, and **S. D. Kachman**. 2000. Constraints of seed size on plant distribution and abundance. *Ecology* 81: 2149-2155.
 24. Panning, J. W., M. F. Kocher, J. A. Smith, and **S. D. Kachman**. 2000. Laboratory and field testing of seed spacing uniformity for sugarbeet planters. *Appl. Eng. Agric.* 16: 7-13.
 25. Brown-Brandl, T. M., R. A. Eigenberg, J. A. Nienaber, and **S. D. Kachman**. 2001. Thermoregulatory profile of a newer genetic line of pigs. *Livestock production Science* 71: 253-260.
 26. Eigenberg, R. A., J. A. Nienaber, G. L. Hahn, and **S. D. Kachman**. 2002. Swine response to misting synchronized with meal events *Appl. Eng. Agric.* 18: 347-350.
 27. Hargrave, K. M., C. Li, B. J. Meyer, **S. D. Kachman**, D. L. Hartzell, M. A. Della-Fera, J. L. Miner, and C. A. Baile. 2002. Adipose depletion and apoptosis induced by trans-10, cis-12 conjugated linoleic Acid in mice. *Obesity Res.* 10: 1284-1290.
 28. **Kachman, S. D.**, and R. L. Fernando. 2002. Analysis of generalized linear mixed models with MATVEC Proceedings of the 7th World Congress on Genetics Applied to Livestock Production. CD-ROM communication No. 28-04.
 29. Elo, A., A. Lyznik, D. O. Gonzalez, **S. D. Kachman**, and S. A. Mackenzie. 2003. Nuclear genes that encode mitochondrial proteins for DNA and RNA metabolism are clustered in the Arabidopsis genome. *Plant Cell* 15: 1619-1631.
 30. Hargrave, K. M., M. J. Azain, **S. D. Kachman**, and J. L. Miner. 2003. Conjugated linoleic acid does not improve insulin tolerance in mice. *Obesity Res.* 11: 1104-1115.
 31. Moser, D. W., L. R. Totir, R. L. Fernando, **S. D. Kachman**, M. E. Dikeman, and E. J. Pollak. 2003. Carcass Merit Project: DNA marker validation Proceedings of the 8th Genetic Prediction Workshop, Beef Improvement Federation. p 5-15, Kansas City, MO.
 32. Wang, T., R. L. Fernando, and **S. D. Kachman**. 2003. Matvec User's Guide. Version 1.03.
 33. Zhang, C., M. Zhang, J. Ju, J. Nietfeldt, J. Wise, P. M. Terry, M. Olson, **S. D. Kachman**, M. Wiedmann, M. Samadpour, and A. K. Benson. 2003. Genome diversification in phylogenetic lineages I and II of *Listeria monocytogenes*: identification of segments unique to lineage II populations. *J. Bacteriol.* 185: 5573-5584.
 34. Berberov, E. M., Y. Zhou, D. H. Francis, M. A. Scott, **S. D. Kachman**, and R. A.

- Moxley. 2004. Relative importance of heat-labile enterotoxin in the causation of severe diarrheal disease in the gnotobiotic piglet model by a strain of enterotoxigenic *Escherichia coli* that produces multiple enterotoxins. *Infect. Immun.* 72: 3914-3924.
35. Sherman, G. B., **S. D. Kachman**, L. L. Hungerford, G. P. Rupp, C. P. Fox, M. D. Brown, B. M. Feuz, and T. R. Holm. 2004. Impact of candidate sire number and sire relatedness on DNA polymorphism-based measures of exclusion probability and probability of unambiguous parentage. *Anim. Genet.* 35: 220-226.
36. Thallman, R. M., K. J. Hanford, **S. D. Kachman**, and L. D. Van Vleck. 2004. Sparse inverse of covariance matrix of QTL effects with incomplete marker data. *Statistical applications in genetics and molecular biology* 3: Article30.
37. Martin, J. L., R. J. Rasby, D. R. Brink, R. U. Lindquist, D. H. Keisler, and **S. D. Kachman**. 2005. Effects of supplementation of whole corn germ on reproductive performance, calf performance, and leptin concentration in primiparous and mature beef cows. *J. Anim. Sci.* 83: 2663-2670.
38. Martinez, G. E., R. M. Koch, L. V. Cundiff, K. E. Gregory, **S. D. Kachman**, and L. D. Van Vleck. 2005. Genetic parameters for stayability, stayability at calving, and stayability at weaning to specified ages for Hereford cows. *J. Anim. Sci.* 83: 2033-2042.
39. Sawalha, R. M., J. F. Keown, **S. D. Kachman**, and L. D. Van Vleck. 2005. Evaluation of autoregressive covariance structures for test-day records of Holstein cows: estimates of parameters. *J. Dairy Sci.* 88: 2632-2642.
40. Sawalha, R. M., J. F. Keown, **S. D. Kachman**, and L. D. Van Vleck. 2005. Genetic evaluation of dairy cattle with test-day models with autoregressive covariance structures and with a 305-d model. *J. Dairy Sci.* 88: 3346-3353.
41. Tarkalson, D. D., G. W. Hergert, W. B. Stevens, D. L. McCallister, and **S. D. Kachman**. 2005. Fly, ash as a liming material for corn production. *Soil Science* 170: 386-398.
42. Bormann, J. M., L. R. Totir, **S. D. Kachman**, R. L. Fernando, and D. E. Wilson. 2006. Pregnancy rate and first-service conception rate in Angus heifers. *J. Anim. Sci.* 84: 2022-2025.
43. LaRosa, P. C., J. Miner, Y. Xia, Y. Zhou, **S. Kachman**, and M. E. Fromm. 2006. Trans-10, cis-12 conjugated linoleic acid causes inflammation and delipidation of white adipose tissue in mice: a microarray and histological analysis. *Physiol Genomics* 27: 282-294.
44. Wang, Y., D. Pot, **S. D. Kachman**, S. V. Nuzhdin, and L. G. Harshman. 2006. A quantitative trait locus analysis of natural genetic variation for *Drosophila melanogaster* oxidative stress survival. *The Journal of Heredity* 97: 355-366.
45. DeGroot, B. J., J. F. Keown, L. D. Van Vleck, and **S. D. Kachman**. 2007. Estimates of genetic parameters for Holstein cows for test-day yield traits with a random regression cubic spline model. *Genetics and Molecular Research* 6: 434-444.
46. **Kachman, S. D.**, and L. D. Van Vleck. 2007. Technical note: Calculation of standard errors of estimates of genetic parameters with the multiple-trait derivative-free restricted maximal likelihood programs. *J Anim Sci* 85: 2375-2381.
47. Plantz, B. A., K. Nickerson, **S. D. Kachman**, and V. L. Schlegel. 2007. Evaluation of metals in a defined medium for *Pichia pastoris* expressing recombinant beta-galactosidase. *Biotechnol Prog* 23: 687-692.
48. Russell, F. L., S. M. Louda, T. A. Rand, and **S. D. Kachman**. 2007. Variation in herbivore-mediated indirect effects of an invasive plant on a native plant. *Ecology* 88: 413-423.

49. Chen, C. Y., **S. D. Kachman**, R. K. Johnson, S. Newman, and L. D. Van Vleck. 2008. Estimation of genetic parameters for average daily gain using models with competition effects. *J Anim Sci* 86: 2525-2530.
50. Erume, J., E. M. Berberov, **S. D. Kachman**, M. A. Scott, Y. Zhou, D. H. Francis, and R. A. Moxley. 2008. Comparison of the contributions of heat-labile enterotoxin and heat-stable enterotoxin b to the virulence of enterotoxigenic *Escherichia coli* in F4ac receptor-positive young pigs. *Infect Immun* 76: 3141-3149.
51. **Kachman, S. D.** 2008. Incorporation of marker scores into national genetic evaluation Proceedings of the 9th Genetic Prediction Workshop, Beef Improvement Federation. p 92-98, Kansas City, MO.
52. Chen, C. Y., R. K. Johnson, S. Newman, **S. D. Kachman**, and L. D. Van Vleck. 2009. Effects of social interactions on empirical responses to selection for average daily gain of boars. *J Anim Sci* 87: 844-849.
53. Hooks, T., D. Marx, **S. Kachman**, and J. Pedersen. 2009. Optimality Criteria for Models with Random Effects. *Revista Colombiana de Estadística* 32: 17-31.
54. Prokupek, A. M., **S. D. Kachman**, I. Ladunga, and L. G. Harshman. 2009. Transcriptional profiling of the sperm storage organs of *Drosophila melanogaster*. *Insect Mol Biol* 18: 465-475.
55. Thallman, R. M., K. J. Hanford, R. L. Quaas, **S. D. Kachman**, R. J. Tempelman, R. L. Fernando, and E. J. Pollak. 2009. Estimation of the Proportion of Genetic Variation Accounted for by DNA Tests. Proceedings of the 41st Annual research symposium and annual meeting, Beef Improvement Federation: 184-209.
56. Yang, Z., J. Kim, C. Zhang, M. Zhang, J. Nietfeldt, C. M. Southward, M. G. Surette, **S. D. Kachman**, and A. K. Benson. 2009. Genomic instability in regions adjacent to a highly conserved pch prophage in *Escherichia coli* O157:H7 generates diversity in expression patterns of the LEE pathogenicity island. *J Bacteriol* 191: 3553-3568.
57. Benson, A. K., S. A. Kelly, R. Legge, F. R. Ma, S. J. Low, J. Kim, M. Zhang, P. L. Oh, D. Nehrenberg, K. J. Hua, **S. D. Kachman**, E. N. Moriyama, J. Walter, D. A. Peterson, and D. Pomp. 2010. Individuality in gut microbiota composition is a complex polygenic trait shaped by multiple environmental and host genetic factors. *Proceedings of the National Academy of Sciences of the United States of America* 107: 18933-18938.
58. Harshman, L. G., K. D. Song, J. Casas, A. Schuurmans, E. Kuwano, **S. D. Kachman**, L. M. Riddiford, and B. D. Hammock. 2010. Bioassays of compounds with potential juvenoid activity on *Drosophila melanogaster*: juvenile hormone III, bisepoxide juvenile hormone III and methyl farnesoates. *J Insect Physiol* 56: 1465-1470.
59. Kocher, M. F., J. M. Coleman, J. A. Smith, and **S. D. Kachman** . 2011. Corn Seed Spacing Uniformity as Affected by Seed Tube Condition. *Appl. Eng. Agric.* 27: 177-183.
60. Ma, J., A. K. Benson, **S. D. Kachman**, Z. Hu, and L. G. Harshman. 2012. *Drosophila melanogaster* Selection for Survival of *Bacillus cereus* Infection: Life History Trait Indirect Responses. *International Journal of Evolutionary Biology* 2012: 12.
61. McKnite, A. M., M. E. Perez-Munoz, L. Lu, E. G. Williams, S. Brewer, P. A. Andreux, J. W. M. Bastiaansen, X. Wang, **S. D. Kachman**, J. Auwerx, R. W. Williams, A. K. Benson, D. A. Peterson, and D. C. Ciobanu. 2012. Murine Gut Microbiota Is Defined by Host Genetics and Modulates Variation of Metabolic Traits. *Plos One* 7: e39191.
62. Schwasinger-Schmidt, T. E., **S. D. Kachman**, and L. G. Harshman. 2012. Evolution of starvation resistance in *Drosophila melanogaster*: measurement of direct and correlated

- responses to artificial selection. *J Evol Biol* 25: 378-387.
63. Erume, J., P. Wijemanne, E. M. Berberov, **S. D. Kachman**, D. J. Oestmann, D. H. Francis, and R. A. Moxley. 2013. Inverse relationship between heat stable enterotoxin-b induced fluid accumulation and adherence of F4ac-positive enterotoxigenic *Escherichia coli* in ligated jejunal loops of F4ab/ac fimbria receptor-positive swine. *Vet. Microbiol.* 161: 315-324.
64. Howard, J. T., **S. D. Kachman**, M. K. Nielsen, T. L. Mader, and M. L. Spangler. 2013. The effect of Myostatin genotype on body temperature during extreme temperature events. *J. Anim. Sci.* 91: 3051-3058.
65. Howard, J. T., **S. D. Kachman**, W. M. Snelling, E. J. Pollak, D. C. Ciobanu, L. A. Kuehn, and M. L. Spangler. 2013. Beef cattle body temperature during climatic stress: a genome-wide association study. *International Journal of Biometeorology*: 1-8.
66. Leach, R. J., C. G. Chitko-McKown, G. L. Bennett, S. A. Jones, **S. D. Kachman**, J. W. Keele, K. A. Leymaster, R. M. Thallman, and L. A. Kuehn. 2013. The change in differing leukocyte populations during vaccination to bovine respiratory disease and their correlations with lung scores, health records, and average daily gain. *J. Anim. Sci.* 91: 3564-3573.
67. Ma, J., A. K. Benson, **S. D. Kachman**, D. J. Jacobsen, and L. G. Harshman. 2013. *Drosophila melanogaster* Selection for Survival after Infection with *Bacillus cereus* Spores: Evolutionary Genetic and Phenotypic Investigations of Respiration and Movement. *International Journal of Evolutionary Biology* 2013: 12
PMCID:PMC3619139
68. Tart, J. K., R. K. Johnson, J. W. Bundy, N. N. Ferdinand, A. M. McKnite, J. R. Wood, P. S. Miller, M. F. Rothschild, M. L. Spangler, D. J. Garrick, **S. D. Kachman**, and D. C. Ciobanu. 2013. Genome-wide prediction of age at puberty and reproductive longevity in sows. *Anim. Genet.* 44: 387-397 doi:10.1111/age.12028
69. **Kachman, S. D.**, M. L. Spangler, G. L. Bennett, K. J. Hanford, L. A. Kuehn, W. M. Snelling, R. M. Thallman, M. Saatchi, D. J. Garrick, R. D. Schnabel, J. F. Taylor, and E. J. Pollak. 2013. Comparison of molecular breeding values based on within- and across-breed training in beef cattle. *Genet. Sel. Evol.* 45: 30. doi:10.1186/1297-9686-45-30
70. Engle, T. B., E. E. Jobman, T. W. Moural, A. M. McKnite, J. W. Bundy, S. Y. Barnes, E. H. Davis, J. A. Galeota, T. E. Burkey, G. S. Plastow, **S. D. Kachman** and D. C. Ciobanu. 2014. Variation in time and magnitude of immune response and viremia in experimental challenges with Porcine circovirus 2b. *BMC veterinary research* 10(1): 286. doi:10.1186/s12917-014-0286-4
71. Howard, J. T., **S. D. Kachman**, W. M. Snelling, E. J. Pollak, D. C. Ciobanu, L. A. Kuehn and M. L. Spangler. 2014. Beef cattle body temperature during climatic stress: a genome-wide association study. *Int J Biometeorol* 58(7): 1665-1672. doi:10.1007/s00484-013-0773-5
72. **Kachman, S.** 2014. Approximation of the Structural Forms of the Variances and Covariances between Molecular and Phenotypic Breeding Values. 10th World Congress on Genetics Applied to Livestock Production, Vancouver.
73. McKnite, A. M., J. W. Bundy, T. W. Moural, J. K. Tart, T. P. Johnson, E. E. Jobman, S. Y. Barnes, J. K. Qiu, D. A. Peterson, S. P. Harris, M. F. Rothschild, J. A. Galeota, R. K. Johnson, **S. D. Kachman** and D. C. Ciobanu. 2014. Genomic analysis of the differential response to experimental infection with porcine circovirus 2b. *Animal Genetics* 45(2):

- 205-214. doi:10.1111/age.12125
74. Saatchi, M., J. Beever, J. Decker, D. Faulkner, H. Freetly, S. Hansen, H. Yampara-Iquise, K. Johnson, **S. Kachman**, M. Kerley, J. Kim, D. Loy, E. Marques, H. Neiberger, E. Pollak, R. Schnabel, C. Seabury, D. Shike, W. Snelling, M. Spangler, R. Weaver, D. Garrick and J. Taylor. 2014. QTLs associated with dry matter intake, metabolic mid-test weight, growth and feed efficiency have little overlap across 4 beef cattle studies. *BMC Genomics* **15**(1): 1004. doi:10.1186/1471-2164-15-1004
75. Thallman, R., J. Dillon, J. Sanders, A. Herring, S. D. Kachman and D. G. Riley. 2014. Large Effects on Birth Weight Follow Inheritance Pattern Consistent with Gametic Imprinting and X Chromosome. Proceedings of the 10th World Congress on Genetics Applied to Livestock Production. Vancouver.
76. Coates, B. S., A.P. Alves, H. Wang, X. Zhou, T. Nowatzki, H. Chen, M. Rangasamy, H. M. Robertson, C. W. Whitfield, K. K. Walden, **S. D. Kachman**, B. W. French, B. W., L. J. Meinke, D. Hawthorne, C. A. Abel, T. W. Sappington, B. D. Siegfried, Miller, N. J.. 2015. Quantitative trait locus mapping and functional genomics of an organophosphate resistance trait in the western corn rootworm, *Diabrotica virgifera virgifera*. *Insect Molecular Biology*, **25**(1), 1-15 doi:10.1111/imb.12194
77. Hallen-Adams, H. E., **S. D. Kachman**, J. Kim, R. M. Legge and I. Martínez. 2015. Fungi inhabiting the healthy human gastrointestinal tract: a diverse and dynamic community. *Fungal Ecology* **15**: 9-17. doi:10.1016/j.funeco.2015.01.006
78. Kreikemeier, C. A., T. B. Engle, K. L. Lucot, **S. D. Kachman**, T. E. Burkey and D. C. Ciobanu. 2015. Genome-wide analysis of TNF-alpha response in pigs challenged with porcine circovirus 2b. *Animal Genetics* **46**(2): 205-208. doi:10.1111/age.12262
79. Lucot, K. L., M.L. Spangler, M.D. Trenhaile, **S.D. Kachman**, and D.C. Ciobanu. 2015. Evaluation of reduced subsets of single nucleotide polymorphisms for the prediction of age at puberty in sows. *Animal Genetics*, **46**(4): 403-409. doi:10.1111/age.12310
80. Schiermiester, L. N., R. M. Thallman, L. A. Kuehn, **S. D. Kachman** and M. L. Spangler. 2015. Estimation of breed-specific heterosis effects for birth, weaning, and yearling weight in cattle. *Journal of Animal Science* **93**(1): 46-52. doi:10.2527/jas.2014-8493
81. Ahlberg, C. M., L. A. Kuehn, R. M. Thallman, **S. D. Kachman**, W. M. Snelling and M. L. Spangler. 2016. Breed effects and genetic parameter estimates for calving difficulty and birth weight in a multibreed population. *J. Anim. Sci.* **94**(5): 1857-1864. doi:10.2527/jas2015-0161
82. Trenhaile, M. D., J. L. Petersen, **S. D. Kachman**, R. K. Johnson and D. C. Ciobanu. 2016. Long-term selection for litter size in swine results in shifts in allelic frequency in regions involved in reproductive processes. *Anim. Genetics* **47**(5): 534-542 doi: 10.1111/age.12448
83. Lee, J., **S. D. Kachman** and M. L. Spangler. 2017. The impact of training strategies on the accuracy of genomic predictors in United States Red Angus cattle. *Journal of Animal Science* **95**: 3406-3414. doi:10.2527/jas2017.1604
84. Gruhot, T. R., L. A. Rempel, M. L. Spangler, **S. D. Kachman** and B. E. Mote. 2018. The heritability of pampiniform plexus vessel size and varicocele in boars. *Reproduction in Domestic Animals* **0**: 1-5. doi:10.1111/rda.13350
85. He, J., J. Xu, X. L. Wu, S. Bauck, J. Lee, G. Morota, **S. D. Kachman** and M. L. Spangler. 2018. Comparing strategies for selection of low-density SNPs for imputation-

- mediated genomic prediction in U. S. Holsteins. *Genetica* **146**(2): 137-149.
doi:10.1007/s10709-017-0004-9
86. Howard, J. T., T. A. Rathje, C. E. Bruns, D. F. Wilson-Wells, **S. D. Kachman** and M. L. Spangler. 2018. The impact of selective genotyping on the response to selection using single-step genomic best linear unbiased prediction. *J Anim Sci* **96**(11): 4532-4542.
doi:10.1093/jas/sky330
87. Howard, J. T., T. A. Rathje, C. E. Bruns, D. F. Wilson-Wells, **S. D. Kachman** and M. L. Spangler. 2018. The impact of truncating data on the predictive ability for single-step genomic best linear unbiased prediction. *Journal of Animal Breeding and Genetics* **135**(4): 251-262. doi:10.1111/jbg.12334
88. Reed, J. M., S. Olson, D. F. Brees, C. E. Griffin, R. A. Grove, P. J. Davis, **S. D. Kachman**, J. Adamec and G. A. Somerville. 2018. Coordinated regulation of transcription by CcpA and the *Staphylococcus aureus* two-component system HptRS. *PLoS One* **13**(12): e0207161. doi:10.1371/journal.pone.0207161
89. Schweer, K. R., **S. D. Kachman**, L. A. Kuehn, H. C. Freetly, J. E. Pollak and M. L. Spangler. 2018. Genome-wide association study for feed efficiency traits using SNP and haplotype models. *J Anim Sci* **96**(6): 2086-2098. doi:10.1093/jas/sky119
90. Vargas Jurado, N., K. Eskridge, **S. Kachman** and R. Lewis. 2018. Using a Bayesian Hierarchical Linear Mixing Model to Estimate Botanical Mixtures. *Journal of Agricultural, Biological and Environmental Statistics* **23**(2): 190-207.
doi:10.1007/s13253-018-0318-9
91. Walker, L. R., T. B. Engle, H. Vu, E. R. Tosky, D. J. Nonneman, T. P. L. Smith, T. Borza, T. E. Burkey, G. S. Plastow, **S. D. Kachman** and D. C. Ciobanu. 2018. Synaptogyrin-2 influences replication of Porcine circovirus 2. *PLoS Genet* **14**(10): e1007750. doi:10.1371/journal.pgen.1007750
92. Gruhot TR, Rempel LA, Spangler ML, **Kachman SD**, Mote BE. The heritability of pampiniform plexus vessel size and varicocele in boars. 2019. *Reprod Domest Anim.* **54**(2):270-274. doi: 10.1111/rda.13350. Epub 2018 Oct 22. PubMed PMID: 30246894.
93. Baller JL, Howard JT, **Kachman SD**, Spangler ML. 2019. The impact of clustering methods for cross-validation, choice of phenotypes, and genotyping strategies on the accuracy of genomic predictions. *J Anim Sci.* **97**(4):1534-1549. doi: 10.1093/jas/skz055. PubMed PMID: 30721970; PubMed Central PMCID: PMC6447245.
94. Gruhot T, Gray K, Brown V, Huang Y, **Kachman SD**, Spangler ML, Mote B. 2019. Genetic relationships among sperm quality traits of Duroc boars collected during the summer season. *Anim Reprod Sci.* **85**-92. doi: 10.1016/j.anireprosci.2019.05.012. Epub 2019 May 24. PubMed PMID: 31151862.
95. Wijesena HR, Rohrer GA, Nonneman DJ, Keel BN, Petersen JL, **Kachman SD**, Ciobanu DC. 2019. Evaluation of genotype quality parameters for SowPro90, a new genotyping array for swine1. *J Anim Sci.* **97**(8):3262-3273. doi: 10.1093/jas/skz185. PubMed PMID: 31150541; PubMed Central PMCID: PMC6667256.
96. Ko L, Harshman L, Hangartner S, Hoffmann A, **Kachman S**, Black P. 2019. Changes in lipid classes of *Drosophila melanogaster* in response to selection for three stress traits. *J Insect Physiol.* **117**:103890. doi: 10.1016/j.jinsphys.2019.103890. Epub 2019 May 30. PubMed PMID: 31153895.
97. Wu XL, Xu J, Li H, Ferretti R, He J, Qiu J, Xiao Q, Simpson B, Michell T, **Kachman SD**, Tait RG Jr, Bauck S. 2019. Evaluation of genotyping concordance for commercial

- bovine SNP arrays using quality-assurance samples. *Anim Genet.* 50(4):367-371. doi: 10.1111/age.12800. Epub 2019 Jun 6. PubMed PMID: 31172566.
98. Sutton KM, Lahmers KK, Harris SP, Wijesena HR, Mote BE, **Kachman SD**, Borza T, Ciobanu DC. 2019. Detection of atypical porcine pestivirus genome in newborn piglets affected by congenital tremor and high preweaning mortality1. *J Anim Sci.* 97(10):4093-4100. doi: 10.1093/jas/skz267. PubMed PMID: 31396615; PubMed Central PMCID: PMC6776285.
99. Zhou F, Paz HA, Sadri M, Cui J, **Kachman SD**, Fernando SC, Zempleni J. 2019. Dietary bovine milk exosomes elicit changes in bacterial communities in C57BL/6 mice. *Am J Physiol Gastrointest Liver Physiol.* 317(5):G618-G624. doi: 10.1152/ajpgi.00160.2019. Epub 2019 Sep 11. PubMed PMID: 31509432; PubMed Central PMCID: PMC6879888.
100. Liu B, Lu Y, Chen X, Muthuraj PG, Li X, Pattabiraman M, Zempleni J, **Kachman SD**, Natarajan SK, Yu J. 2020. Protective Role of Shiitake Mushroom-Derived Exosome-Like Nanoparticles in D-Galactosamine and Lipopolysaccharide-Induced Acute Liver Injury in Mice. *Nutrients.* 12(2). doi: 10.3390/nu12020477. PubMed PMID: 32069862; PubMed Central PMCID: PMC7071144.
101. Abbas W, Keel BN, **Kachman SD**, Fernando SC, Wells JE, Hales KE, Lindholm-Perry AK. 2020. Rumen epithelial transcriptome and microbiome profiles of rumen epithelium and contents of beef cattle with and without liver abscesses. *J Anim Sci.* 98(12):skaa359. doi: 10.1093/jas/skaa359. PMID: 33170221.
102. Wijesena HR, **Kachman SD**, Lents CA, Riethoven JJ, Trenhaile-Grannemann MD, Safranski TJ, Spangler ML, Ciobanu DC. 2020. Fine mapping genetic variants associated with age at puberty and sow fertility using SowPro90 genotyping array. *J Anim Sci.* 98(10):skaa293. doi: 10.1093/jas/skaa293. PMID: 32888012; PMCID: PMC7568434.
103. Sadri M, Shu J, **Kachman SD**, Cui J, Zempleni J. 2020. Milk exosomes and miRNA cross the placenta and promote embryo survival in mice. *Reproduction.* 160(4):501-509. doi: 10.1530/REP-19-0521. PMID: 32621589.
104. Baller JL, **Kachman SD**, Kuehn LA, Spangler ML. 2020. Genomic prediction using pooled data in a single-step genomic best linear unbiased prediction framework. *J Anim Sci.* 98(6):skaa184. doi: 10.1093/jas/skaa184. PMID: 32497209; PMCID: PMC7314383.
105. Qu J, **Kachman SD**, Garrick D, Fernando RL, Cheng H. 2020. Exact Distribution of Linkage Disequilibrium in the Presence of Mutation, Selection, or Minor Allele Frequency Filtering. *Front Genet.* 2020 Apr 21;11:362. doi: 10.3389/fgene.2020.00362. Erratum in: *Front Genet.* 11:732. PMID: 32425975; PMCID: PMC7212447.
106. Moxley RA, Bargar TW, **Kachman SD**, Baker DR, Francis DH. 2020. Intimate Attachment of *Escherichia coli* O157:H7 to Urinary Bladder Epithelium in the Gnotobiotic Piglet Model. *Microorganisms.* 8(2):263. doi: 10.3390/microorganisms8020263. Erratum in: *Microorganisms.* 2020 Dec 17;8(12): PMID: 32075320; PMCID: PMC7074727.