NCCC-170
Research Advances in Agricultural Statistics
Joint meeting with USSES (SCC-013)
Annual meeting held at Arkansas Agricultural Experiment Station
Fayetteville, Arkansas
June 28, 2018

Members Present: Nora Bello (KS), Bruce Craig (IN, Admin.), Sara Duke (USDA-ARS), Susan Durham (UT), Ed Gbur (AR), Carla Goad (OK), Nick Keuler (WI), Alex Lipka (IL), Raul Macchiavelli (PR), Larry Madden (OH), Gayla Olbricht (MO), Guilherme Rosa (WI), Julia Sharp (SC), John Stevens (UT), Walt Stroup (NE), Rob Tempelman (MI), Kathy Yeater (USDA-ARS)

USSES Members and Others Present: Andy Bartlett (AR), Jerry Davis (GA), JungAe Lee (AR), Lin Luo (GA), Andy Mauromoustakos (AR), Kevin Thompson (AR)

2018 Officers: Ed Gbur, Chair; Susan Durham, Secretary; John Stevens, Program Chair; Ed Gbur, Local Arrangements

NCCC-170 Website: https://sites.uark.edu/ncr170/

Minutes:
Technical program: The meeting began at 8:30 a.m. on Thursday, June 28, 2018 with opening remarks by Dr. Nathan McKinney, Assistant Director of the Arkansas Agricultural Experiment Station.

Presentations ended at approximately 4:15 p.m. and were followed by two group discussions and the business meeting, ending at 5:15 p.m. The technical program consisted of the following presentations:

Alex Lipka, *Univ. of Illinois*	Quantification of the genomic contribution towards food and energy related crop traits
Nora Bello, *Kansas State Univ.*	Searching for causal networks in experimental data: A swine production application
JungAe Lee-Bartlett, *Univ. of Arkansas*	Discrete time survival analysis applied to experimental data
Walter Stroup, *Univ. of Nebraska-Lincoln*	Pseudo-likelihood or quadrature? What we thought we knew, what we think we know, and what we are still trying to figure out
Raul Macchiavelli, *Unvi. of Puerto Rico-Mayagüez*	A Bayesian semi-parametric mixed beta regression model for disease severity in plants
Rob Tempelman, *Michigan State Univ.*	Using genetic relationships to improve on the design and analysis of animal science studies
Larry Madden, *Ohio State Univ.*	Multi-treatment (“network”) meta-analysis in agriculture
Bruce Craig, Arman Sabbaghi, and Mark Ward, *Purdue Univ.*	Bayesian analysis of partial cladograms resulting from free-sorting tasks
Nicholas Keuler and Jun Zhu, *Univ. of Wisconsin*	Revising an introductory statistics curriculum from the ground up – Challenges, solutions, and lessons learned.

The first group discussion was centered on the use of error bars by researchers to visualize significant differences among treatment group means. Since the use of error bars can easily be misinterpreted, discussion centered on meaningful and easily interpreted alternatives.

The second discussion addressed the question of whether or not current journals, in particular, the Journal of Agricultural, Biological, and Environmental Statistics (JABES) which individuals from our group played a role in establishing, meet our publication needs and expectations. Agricultural applications have been almost non-existent in JABES for the last several years. The group discussed the lack of a current editorial board member who works with agricultural applications and concluded that we need to be more engaged in manuscript submissions as well as the editorial and review processes. It was suggested that the group draft the letter to the editorial board and the incoming editor-in-chief who will begin their term in January, 2019.

Business meeting: The business meeting began at about 4:50 p.m. Ed Gbur presided. The following items were discussed:

(1) The organizers were thanked for a productive and enjoyable meeting.

(2) Ed may several announcements concerning events involving project participants since last year's meeting.

On January 5, 2018 the American Statistical Association Board of Directors endorsed our position paper entitled "Statistics as a Scientific Discipline and Practical Implications for Evaluation of Faculty Excellence." Development and acceptance of the paper was led by Walt Stroup, Nora Bello, and William Bridges. The paper can be accessed using the link www.amstat.org/asa/files/pdfs/POL-Statistics-as-a-Scientific-Discipline.pdf .

The University of Maryland's student newspaper The Diamondback published an obituary for long time member Bahram Momen who died on March 13, 2018. A copy of the obituary can be found on our project website. Matt Kramer represented our group at the funeral.

The USSES project is scheduled to end in September of this year. The participants do not plan to renew the project but instead to become members of NCCC-170.

Presenters who wish to post their talk on the project website should send a pdf of the talk to Ed.

(3) The annual report and impact statement are due this Fall. Participants need to send Ed Gbur (egbur@uark.edu) accountings of all activities (workshops, papers, presentations, grants, awards, teaching related items, etc.) from October 1, 2017 to September 30, 2018 (or since last year's report) that are related to or inspired by their participation in NCCC-170 as soon as possible. Please see the July 5 e-mail from Ed for more details. A copy of the e-mail is posted on the project website.

(4) The 2019 meeting will be held at the University of Illinois with Alex Lipka as the local host. Tentative dates are June 20-21, 2019. Larry Madden will serve as program chair. The 2020 meeting is tentatively planned for Oklahoma State with Carla Goad as the local host. Colorado State was suggested as a tentative site for 2021.

(5) 2017-2018 is the second year of the current project that is scheduled to end in 2021. Progress toward those objectives as they relate to the expected outcomes and impacts, especially providing continuing

education and statistical support to the scientific community in the review and editorial process have become more important than ever.

(6) Several individuals who participate in the annual meetings are not official participants according to NIMSS. Several other individuals listed have not participated in annual meetings. The same state and institution can be represented by multiple people, only one of whom is designated as a voting member. Ed encouraged people to join only if they intend to participate.

The business meeting adjourned at approximately 5:15 p.m.

Accomplishments: Statisticians who consult and do research in an Agricultural Experiment Station environment enable land grant institutions to perform their agricultural research missions more effectively and efficiently than would otherwise be possible. However, most stations have at most one or two professional statisticians who are not, and cannot be expected to be, experts in every area of statistics. This multi-state committee brings together statisticians to work cooperatively to determine the best current approaches to common statistical problems and to help guide future directions of sound statistical practice. In addition to producing group outputs such as workshops, the committee serves as a resource for its members and a sounding board for new ideas in their applied statistical research. As a result, all members are able to provide more effective assistance to agricultural researchers addressing national research priorities than they would without NCCC-170.

Outputs:

Workshops:
Guilherme Rosa taught a short course on “Quantitative Genetics and Prediction of Complex Traits” (co-taught with Dr. Dan Gianola) at the China Agricultural University, Beijing, China. October 18-22, 2017.

Guilherme Rosa taught a short course on “Statistical Modeling in Animal Breeding and Genetics” at Sao Paulo State University (UNESP), Jaboticabal, Brazil. November 6-10, 2017.

Nora Bello taught a workshop on an “Introduction to structural equation modeling for production systems in animal agriculture” at the Department of Agronomy and Department of Economics and Statistics, National University of Cordoba, Argentina. December 22, 2017.

Rob Tempelman taught an “Introduction to SAS” workshop for the MSU Center for Statistical Training and Consulting. February 9, 2018.

Walt Stroup taught a three workshop on generalized linear mixed models at the Finnish Natural Resources Institute. March, 2018.

Alex Lipka taught a series of three workshops entitled “GWAS to identify targets for MAS”, “Implementing genomic selection”, and “Comparing GS to MAS” at the African Plant Breeding Academy, Class III, Session 3, World Agroforestry Centre, Nairobi, Kenya. May 17-19, 2018.

Guilherme Rosa taught a 1-day workshop on “Introduction to Graphical Modeling for Agricultural Data” at the 30th Conference on Applied Statistics in Agriculture, Kansas State University, Manhattan, KS. May 6, 2018.

Bruce Craig led a day-long workshop titled “An Overview of Linear Mixed Models” as part of the 9th International Purdue Symposium on Statistics. June 5, 2018.

Guilherme Rosa taught a short course on “Quantitative Genetics” (co-taught with Dr. Bruce Walsh) at the 23rd Summer Institute in Statistical Genetics, University of Washington, Seattle, WA. July 16-18, 2018.

Guilherme Rosa taught a short course on “Mixed Models in Quantitative Genetics” (co-taught with Dr. Bruce Walsh) at the 23rd Summer Institute in Statistical Genetics, University of Washington, Seattle, WA. July 18-20, 2018.

Kathy Yeater presented a training workshop entitled “Learning the Essential Steps to Non-Gaussian Data Analysis” to the USDA Biosciences Research Laboratory, Insect Genetics and Biochemistry Research Unit, Fargo, ND. July 16-17, 2018.

Nora Bello taught a workshop on “Application of general and generalized linear mixed models for experimental design and data analysis of research problems in animal health and production” at a Summer Workshop on Mixed Models, Kansas State University. Sponsored by Shell U.S. August 7-8, 2018.

Books:

Glaz, B. and K.M. Yeater (ed.) 2018. Applied Statistics in Agricultural, Biological, and Environmental Sciences. ASA, CSSA, and SSSA, Madison, WI. doi: 10.2134/appliedstatistics

Dixon, P.M., K.J. Moore, and E. van Santen. 2018. The Analysis of Combined Experiments. *In* Applied Statistics in Agricultural, Biological, and Environmental Sciences. Glaz and Yeater (ed.). pp 201-234. ASA, CSSA, and SSSA, Madison, WI. doi: 10.2134/appliedstatistics.2016.0004

Burgueno, J., J. Crossa, F. Rodriguez, and K.M. Yeater. 2018. Augmented Designs-Experimental Designs in which all Treatments are Not Replicated. *In* Applied Statistics in Agricultural, Biological, and Environmental Sciences. Glaz and Yeater (ed.) pp 345-370. ASA, CSSA, and SSSA, Madison, WI. doi: 10.2134/appliedstatistics.2016.0005

Yeater, K.M. and M.B. Villamil. 2018. Multivariate Methods for Agricultural Research. *In* Applied Statistics in Agricultural, Biological, and Environmental Sciences. Glaz and Yeater (ed.). pp 371-400. ASA, CSSA, and SSSA, Madison, WI. doi: 10.2134/appliedstatistics.2015.0083

Stroup, W.W. 2018. Analysis of Non-Gaussian Data. *In* Applied Statistics in Agricultural, Biological, and Environmental Sciences. Glaz and Yeater (ed.) pp 449-510. ASA, CSSA, and SSSA, Madison, WI. doi:10.2134/appliedstatistics.2015.0081

Presentations:

Bello, N.M. Searching for causal networks in experimental data: a swine application. Biometry Seminar, Dept. of Statistics, University of Wisconsin – Madison. April 27, 2018. (Invited)

Bello, N.M. Exploring biological relationships between reproductive outcomes in a swine production system. Department of Agronomy and Department of Economics and Statistics, National University of Cordoba, Argentina. December 22, 2017. (Invited)

Bello, N.M. Data architecture and related considerations for big data analytics. USDA National Animal Genome Research Program (NAGRP) Meeting on Livestock High-Throughput Phenotyping and Big Data Analytics, Beltsville, Maryland. November 13-14, 2017. (Invited)

Bello, N.M. Statistical principles for reproducible research in the Animal Sciences. Department Seminar Series, Department of Animal Sciences, University of Wisconsin – Madison. September 26th, 2017. (Invited)

Tempelman, R.J. Using genetic relationships to improve the design and analysis of animal science studies. Midwestern section of the American Society of Animal Science. March 13, 2018. (Invited)

Lipka A.E. Quantification of Non-Additive Genomic Contribution towards Food and Energy-related Crop Traits. 9th International Purdue Symposium on Statistics. June 7, 2018. (Invited)

Lipka A.E. Quantification of the Genomic Contribution towards Food and Energy-related Crop Traits. Bioinformatics Seminar, Department of Statistics, Purdue University. April 10, 2018. (Invited)

Lipka A.E. Quantification of the Genomic Contribution towards Food and Energy-related Crop Traits. Spring Seminar Series, Interdisciplinary Plant Group, University of Missouri. April 2, 2018. (Invited)

Lipka A.E. Quantification of the Genomic Contribution towards Food and Energy-related Crop Traits at the Data Driven Crop Design Technology workshop, Kyushu University, Japan. February 20, 2018. (Invited)

Shenstone, E. and Lipka A.E. Genome Wide Association Study for Binomially Distributed Traits: A Case Study for Stalk Lodging in Maize. Genomes to Fields G2F Collaborator's Meeting, Chicago. December 5, 2017. (Invited)

Rosa, G.J.M. Leveraging on High-Throughput Phenotyping Technologies to Optimize Livestock Genetic Improvement and Husbandry. 69th Annual Meeting of the European Federation of Animal Science (EAAP). Dubrovnik, Croacia, August 27-31, 2018. (Invited)

Rosa, G.J.M. Harnessing Operational Farm Data to Enhance Advancement of Agricultural Sciences. 63rd Annual Meeting of the Brazilian Region (RBRAS) of the International Biometric Society, Curitiba, Brazil, May 23-25, 2018. (Invited)

Rosa, G.J.M. Harnessing Operational Farm Data to Enhance Advancement of Agricultural Sciences. KSU Conference on Applied Statistics in Agriculture, Manhattan, KS. May 07-08, 2018. (Invited)

Rosa, G.J.M. Modeling Networks for Prediction and Causal Inference in Quantitative Genetics and Genomics. Symposium on Genomic Prediction. Beijing, China, October 17, 2017. (Invited)

Chitakasempornkul, K., A. Jager, N. M. Bello. Hierarchical Bayesian structural equation modeling of heterogeneous relationships between performance outcomes in animal production systems. International Biometrics Conference. Barcelona, Spain. July 8-13, 2018.

Johnson, L.C., M. Galliart, N. M. Bello, J. Polland, P. St Amand, M. Knapp, B. Maricle, S. Baer. Experimental natural selection of big bluestem grass ecotypes across the Great Plains' climate gradient. Population, Evolutionary and Quantitative Genetics Conference PEQG18. Madison, WI. May 13-17. 2018.

Chitakasempornkul, K., M. B. Menegat, M. A. D. Goncalves, S. S. Dritz, A. Jager, M. D. Tokach, R. D. Goodband, N. M. Bello. Exploring causal biological relationships between reproductive traits in high-performing gilts and sows. Midwest Meetings of the American Society of Animal Sciences. Omaha, NE. March 12-14, 2018.

Shawk, D. J., K. N. Nemechek, R. D. Goodband, J. C. Woodworth, M. D. Tokach, S. S. Dritz, Chitakasempornkulgs, N. M. Bello and J. M. DeRouchey. Effect of increasing chloride concentration on 7

to 12 kg nursery pig growth performance. Midwest Meetings of the American Society of Animal Sciences. Omaha, NE. March 12-14, 2018.

Wu, F., M. D. Tokach, J. M. DeRouchey, S. S. Dritz, J. C. Woodworth, R. D. Goodband, K. Capp, S. Remfry, K. Chitakasempornkul, N. M. Bello, T. G. Nagaraja, R. G. Amachawadi. Effects of tylosin administration route on the development of antimicrobial resistance in fecal enterococci of finishing swine. Midwest Meetings of the American Society of Animal Sciences. Omaha, NE. March 12-14, 2018.

Sharpe, S., L. Johnson, N. M. Bello, O. Parrish and M. Galliart. Rapid evolution in a contaminated environment: evolutionary response of native grass Andropogon virginicus to heavy metals in an abandoned mine site. Annual Conference of the oSTEM professional society (Out in Science, Technology, Engineering and Mathematics). Chicago, IL. November 16-18, 2017.

Rankin, A. J., T. O. Schermerhorn, K. S. KuKanich, N. M. Bello, J. A. S. Huey, K. A. Fentiman and J. A. Meekins. The effects of ophthalmic prednisolone and diclofenac on diabetes mellitus regulation in dogs. American College of Veterinary Ophthalmologists Conference. Baltimore, MD. October 11-14, 2017.

Murphy, M., D. Hodgson, N. M. Bello. On accuracy and precision of oxygen flow meters. International Veterinary Emergency and Critical Care Symposium. September 13-17, 2017. Nashville, TN.
Macchiavelli, R. Oportunidades de Investigación en Biometría. VI Reunión Iberoamericana de Biometría. Quito, Ecuador, November 15-17, 2017.

Madden, L. V. Is disease intensity a good surrogate for yield loss or toxin contamination? A case study with Fusarium head blight of wheat using surrogacy models. The 12th International Epidemiology Workshop. Lillehammer, Norway. June 10-14, 2018.

Yeater, K.M. What is a GLMM? And, how do I analyze it? USDA Northern Crop Science Laboratory, Fargo, ND. March 28, 2018.

Yeater, K.M. Best Practices for Data Spreadsheet Organization. USDA Biosciences Research Laboratory, Insect Genetics and Biochemistry Research Unit, Fargo, ND. July 16, 2018.

Yeater, K.M. Introduction to JMP. USDA Biosciences Research Laboratory, Insect Genetics and Biochemistry Research Unit, Fargo, ND. July 18, 2018.

Torres, P.; Macchiavelli, R.; Teran, L, Chavarria Carvajal, J. Semi-parametric mixed beta regression model for disease severity in plants. XXIX International Biometric Conference, Barcelona, Spain, July 9-13, 2018.

Alhojaily, S., Stott, R., Rutigliano, H., Stevens, J.R., and Isom, S.C. Effects of lactation and negative energy balance on endometrial expression of selected transcripts of Holstein dairy cows at day 7 post-ovulation. Annual meeting of the American Society of Animal Science, Vancouver, Canada, July 2018.

Publications:

Leone, C. M., Dharmasena, M., Tang, C., DiCaprio, E., Ma, Y., Araud, E., Bolinger, H., Rupprom, K., Yeargin, T., Li, J., Schaffner, D., Jiang, X. Sharp, J. L., Vinje, J., and Fraser, A. 2018. Prevalence of human noroviruses in commercial food establishment bathrooms. Journal of Food Protection, 81(5): 719-728.

Vernon, K.L., Cloy, S., Boone, L.H., Coverdale, J.A., Jenkins, T. C., and Sharp, J. L. 2017. Dietary supplementation of conjugated linoleic acid in horses: establishment of baseline values on bone turnover, synovial prostaglandin E2, and gait kinematics. Comparative Exercise Physiology, 13 (2): 71-78.

Mikhailova, E., Hagan, D., Sharp, J. L., Ritter, B., Stiglitz, R., Mealing, V., Allerton, T., Burdette, K., and Solomons, A. 2017. Landscape, soil and plant analysis of Japanese stiltgrass (Microstegium vimineum) invasion in Piedmont region, SC. Communications in Soil Science and Plant Analysis, 48 (9): 1068-1077. 0.1080/00103624.2017.1323099

Bello, N. M., V. C. Ferreira, D. Gianola and G. J. M. Rosa. 2018. Invited review: Conceptual framework for investigating causal effects from observational data in livestock. Journal of Animal Science. In press.

Bello, N. M. and D. Renter. 2018. Invited review: Reproducible research from noisy data: revisiting key statistical principles for the animal sciences Journal of Dairy Science 101 (7):1-23.

Lamsal, A., S. Welch, J. White, K. Thorp and N. M. Bello. 2018. Estimating Parametric Phenotypes that Determine Anthesis Date in Zea mays: Challenges in Combining Ecophysiological Models with Genetics. PLoS One 13(4): e0195841.

Murphy, M.L., D. S. Hodgson and N. M. Bello. 2018. On accuracy and precision of oxygen therapy flowmeters in a veterinary teaching hospital. Veterinary Anaesthesia and Analgesia 45(1): 41-47.

Goncalves, M. A. D., M. D. Tokach, S. S. Dritz, N. M. Bello, K. J. Touchette, R. D. Goodband, J. M. DeRouchey and J. C. Woodworth. 2018. Standardized ileal digestible valine:lysine dose-response effects in 25- to 45- kg pigs under commercial conditions. Journal of Animal Science 96(2): 591-599.

Cha, E., M. Sanderson, D. Renter, N. Cernicchiaro, A. Jager and N. M. Bello. 2017. Implementing structural equation models to observational data from feedlot production systems. Preventive Veterinary Medicine 147: 163-171.

Ekong, P.S., N. M. Bello, L. W. Noll, N. Cernicchiaro, D. G. Renter, J. Bai, T. G. Nagaraja and M. W. Sanderson. 2017. Bayesian estimation of true prevalence, sensitivity and specificity of three diagnostic tests for detection of Escherichia coli O157 in cattle feces. Preventive Veterinary Medicine 148: 21-27.

Goncalves, M. A. D., M. D. Tokach, N. M. Bello, K. J. Touchette, R. D. Goodband, J. M. DeRouchey, J. C. Woodworth and S. S. Dritz. 2017. Dose-response evaluation of the standardized ileal digestible tryptophan:lysine ratio to maximize growth performance of growing-finishing gilts under commercial conditions. Animal. doi:10.1017/S1751731117002968.

Clark, A. B., M. D. Tokach, J. M. DeRouchey, S. S. Dritz, R. D. Goodband, J. C. Woodworth, K. J. Touchette and N. M. Bello. 2017. Modeling the effects of standardized ileal digestible isoleucine to lysine ratio on growth performance of nursery pigs. Translational Animal Science doi:10.2527/tas2017.0048.

Clark, A. B., M. D. Tokach, J. M. DeRouchey, S. S. Dritz, R. D. Goodband, J. C. Woodworth, K. J. Touchette and N. M. Bello. 2017. Modeling the effects of standardized ileal digestible valine to lysine ratio on growth performance of nursery pigs. Translational Animal Science. doi:10.2527/tas2017.0049

Fissekis, S., D. S. Hodgson and N. M. Bello. 2017. Effect of cleaning on accuracy and precision of oxygen flow meters on anesthetic machines of various ages. Veterinary Anaesthesia and Analgesia. http://dx.doi.org/10.1016/j.vaa.2016.10.002.

Delph, K., E. G. Davis, N. M. Bello, K. Hankins, M. J. Wilkerson, C. Ewen. 2017. Comparison of immunologic responses following intranasal and oral administration of a USDA-approved, live-attenuated Streptococcus equi vaccine. Journal of Equine Veterinary Science. doi: 10.1016/j.jevs.2016.08.015

Hardie, L.C., M. J. Vandehaar, R.J. Tempelman, K.A. Weigel, L.E. Armentano, G. Wiggans, R.F. Veerkamp, Y. deHaas, M. Coffey, E.E. Connor, M.D. Hanigan, C.R. Staples, Z. Wang, J.C.M Dekkers, and D.M. Spurlock. 2017. The genetic and biological basis of feed efficiency in mid-lactation Holstein dairy cows. Journal of Dairy Science 100:9061-9075.

de Souza, R.A, R.J. Tempelman, M.S. Allen, W.P. Weiss, J.K. Bernard, and M.J. Vandehaar. 2018. Predicting nutrient digestibility in high producing lactating dairy cows. Journal of Dairy Science 101: 1123-1135.

Toledo-Alvarado, H., A.I. Vazquez, G. de los Campos, R.J. Tempelman, G. Bittante, and A. Cecchinato. 2018. Diagnosing pregnancy status using infrared spectra and milk composition in dairy cows. Journal of Dairy Science 101:2496-2505.

Lu, Y., M.J. Vandehaar, D.M. Spurlock, K.A. Weigel, L.E. Armentano, E.E. Connor, M. Coffey,R.F. Veerkamp, Y. de Haas, C.R. Staples, Z. Wang, M.D. Hanigan, and R.J. Tempelman. 2018. Genome wide association analyses based on a multiple trait approach for modeling feed efficiency. Journal of Dairy Science 101:3140-3154.

Zhou, Y., E.E. Connor, G.R. Wiggans, Y. Lu, R.J. Tempelman, S.G. Schroeder, H. Chen, and G.F. Liu. 2018. Genome-wide copy number variant analysis reveals variants associated with 10 diverse production traits in Holstein cattle. BMC Genomics 19:314.

Regmi, P., C.I. Robison, D.R. Jones, R.K. Gast, R.J. Tempelman, and D.M. Karcher. 2018. Effects of different litter substrates and induced molt on production performance and welfare quality parameters of white Leghorn hens housed in multi-tiered aviary system. Poultry Science. doi.org/10.3382/ps/pey211.

Vanous A, Gardner C, Blanco M, Martin-Schwarze A, Lipka AE, Flint-Garcia S, Bohn M, Edwards J, and Lübberstedt T. 2018. Association Mapping of Flowering and Height Traits in Germplasm Enhancement of Maize Doubled Haploid (GEM-DH) Lines. The Plant Genome.

Fenton ME, Owens BF, Lipka AE, Ortiz D, Tiede T, Mateos-Hernandez M, Ferruzzi MG, and Rocheford T. 2018. High-density linkage mapping of vitamin E content in maize grain. Molecular Breeding 38(3):31.

Diepenbrock CH, Kandianis CB, Lipka AE, Magallanes-Lundback M, Vaillancourt B, Góngora-Castillo E, Wallace JG, Cepela J, Mesberg A, Bradbury P, Ilut DC, Mateos-Hernandez M, Hamilton J, Owens BF, Tiede T, Buckler ES, Rocheford T, Buell CR, Gore MA, and DellaPenna D. 2017. Novel Loci Underlie Natural Variation in Vitamin E Levels in Maize Grain. The Plant Cell Online: tpc-00475.

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Dong H, Liu S, Clark LV, Sharma S, Gifford JM, Juvik JA, Lipka AE, and Sacks EJ. 2017. Genetic mapping of biomass yield in three interconnected Miscanthus populations. GCB Bioenergy.

Hu S, Sanchez DL, Wang C, Lipka AE, Yin Y, Gardner CA and Lübberstedt T. 2017. Brassinosteroid and Gibberellin control of seedling traits in maize (Zea mays L.). Plant Science.

Feldman MJ, Paul RE, Banan D, Barrett JF, Sebastian J, Yee MC, Jiang H, Lipka AE, Brutnell TP, Dinneny JR, Leakey AD. 2017. Time dependent genetic analysis links field and controlled environment phenotypes in the model C4 grass Setaria. PLoS Genetics 13(6):e1006841.

Hu S, Wang C, Sanchez DL, Lipka AE, Liu P, Yin Y, M Blanco, and Lübberstedt T. 2017. Gibberellins promote brassinosteroids action and both increase heterosis for plant height in maize (Zea mays L.). Frontiers in Plant Science 8:1039.

Dórea, J. R. R., Rosa, G. J. M., Weld, K. A. and Armentano, L. E. 2018. Mining data from milk infrared spectroscopy to improve feed intake predictions in lactating dairy cows. Journal of Dairy Science 101(7): 5878-5889.

Wang, Y., Mi, X., Rosa, G. J. M., Chen, Z., Lin, P., Wang, S. and Bao, Z. 2018. Technical note: an R package for fitting sparse neural networks with application in animal breeding. Journal of Animal Science 96: 2016-2026.

Lopes, F. B., Wu, X.-L., Li, H., Xu, J., Perkins, T., Genho, J., Ferretti, R., Tait Jr. R. G., Bauck, S. and Rosa, G. J. M. 2018. Improving accuracy of genomic prediction in Brangus cattle by adding animals with imputed low-density SNP genotypes. Journal of Animal Breeding and Genetics 135:14-27.

Ramos, S. B., Caetano, S. L., Rosa, G. J. M., Savegnago, R. P., Kern, E. L., Bernardes, P. A., Lôbo, R. B. and Munari, D. P. 2018. Estimation of genetic parameters for cow age at last calving under different censorship criteria. Livestock Science 208: 40-43.

Amiri Roudbar, M., Abdollahi-Arpanahi, R., Ayatollahi Mehrgardi, A., Mohammadabadi, M., Taheri Yeganeh, A. and Rosa, G. J. M. 2018. Estimation of the variance due to parent-of-origin effects for productive and reproductive traits in Lori-Bakhtiari sheep. Small Ruminant Research 160: 95-102.

Huang, X., Elston, R. C., Rosa, G. J. M., Mayer, J., Ye, Z., Kitchner, T., Brilliant, M. H., Page, D. and Hebbring, S. J. 2018. Applying family analyses to electronic health records to facilitate genetic research. Bioinformatics 34(4): 635-642.

Dadousis, C., Pegolo, S., Rosa, G. J. M., Bittante, G., Cecchinato, A. 2017. Genome-wide association and pathway-based analysis using latent variables related to milk protein composition and cheesemaking traits in dairy cattle. Journal of Dairy Science 100: 9085-9102.

Ferreira, V. C., Thomas, D. L., Valente, B. D. and Rosa, G. J. M. 2017. Causal effect of prolificacy on milk yield in dairy sheep using propensity score. Journal of Dairy Science 100: 8443–8450.

Töpner, K., Rosa, G. J. M., Gianola, D. and Schön, C.-C. 2017. Bayesian networks illustrate genomic and residual trait connections in maize (Zea mays L.). G3-Genes Genomes Genetics 7:2779-2789.

Caetano, S. L., Rosa, G. J. M., Savegnago, R. P., Ramos, S. B., Bernardes, P. A., Bezerra, L. A. F., Lôbo, R. B., Paz, C. C. P. and Munari, D. P. 2017. Estimation of genetic parameters for longevity considering the cow's age at last calving. Journal of Genetics 58:103-109.

Cieniewicz, E. J., Pethybridge, S. J., Gorny, A., Madden, L. V., McLane H., Perry, K. L., and Fuchs, M. 2017. Spatiotemporal spread of grapevine red blotch-associated virus in a California vineyard. Virus Research 241: 156-162.

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Other project related activities:
Larry Madden maintains a website with statistical software code (SAS) and PowerPoint presentations on a range of data-analytic subjects. The material is based heavily on previously presented workshops. The address is https://u.osu.edu/agstatworkshops/

Current specific goals for the 2016-2021 project:
(1) To identify, foster and coordinate cooperative research efforts in statistics among statisticians serving food and agriculture research programs.

(2) To provide continuing education and statistical support to the scientific community in the review and editorial process.

(3) To address the statistical design and analysis issues associated with studies involving technologies that typically produce a large number of spatially and/or temporally correlated variables per observations but small sample sizes (e.g.,-omics, informatics, and -metrics).

(4) To address concerns associated with the development and implementation of generalized linear mixed model techniques and software used by statisticians and researchers.

(5) To address meta-analysis issues associated with multi-location, multi-investigator projects including those in which study treatments and/or designs may differ by location.

Impacts:
(1) Education of members leading to cooperative research efforts and improved consulting and teaching by individual members.

(2) Cooperative research efforts among some members and information exchange on new developments among all members in the areas of generalized linear mixed models and the analysis of high dimensional, large volume data (i.e., Big Data).

(3) Members continuing to offer workshops and, where appropriate, alternative means of continuing education and support for subject matter scientists, reviewers, and technical editors on valid design and statistical analysis of studies.