Members Present: Nora Bello (KS), Bruce Craig (IN, Admin.), Sara Duke (USDA-ARS), Susan Durham (UT), Ed Gbur (AR), Carla Goad (OK), Alex Lipka (IL), Larry Madden (OH), Bahram Momen (MD), Walt Stroup (NE), Mark West (USDA-ARS), Kathy Yeater (USDA-ARS)

Members Absent: John Aleong (VT), Jennifer Clarke (NE), Xin Dai (UT), Mark Hinds (Pioneer Hi-Bred), Ken Koehler (IA), Raul Macchiavelli (PR), Kevin McCarter (LA), David Meek (USDA retired), Margaret Nemeth (Monsanto retired), Guilherme Rosa (WI), Dan Schmoldt (USDA, NIFA rep.), Bahman Shafii (ID), Julia Sharp (SC), Subramania Sritharan (OH), Rob Tempelman (MI), Maria Villamil (IL), Linda Young (USDA), Jun Zhu (WI)

USSES Present: William Bridges (SC), Jerry Davis (GA), Lin Luo (GA), Bahram Momen (MD),

Others Present: William Bowerman (MD), Elizabeth Claassen (SAS), Nick Keuler (WI), Matt Kramer (USDA-ARS), Yu Mo (MD), Dan Nettleton (IA), Neil Paton (Cargill), Ellen Paparozzi (NE), Perla Reyes (KS), Bryan Vinyard (USDA-ARS)

2016 Officers: Ed Gbur, Chair; Susan Durham, Secretary; Kathy Yeater, Program Chair; Bahram Momen, Local Arrangements

NCCC-170 Website: http://www.uark.edu/misc/ncr170/

Minutes:
Technical program: The meeting began at 8:30 a.m. on Thursday, June 23, 2016 with opening remarks by Dr. William Bowerman, Chair of the Dept. of Environmental Science and Technology at the University of Maryland. Presentations ended at approximately 5:00 p.m. The technical program consisted of the following presentations:

Elizabeth Claassen  
JMP Analytical Development  
Predictive Modeling in an n < p World

Sara Duke  
USDA ARS  
Where is Research Going: Long Term Agro-Ecosystem Research Initiative

W. Bowerman, H. Pittman, L. Fuentes  
Univ. of Maryland, K. F. Leith, M. C. Wierda, Clemson Univ., F. Bourland Univ. of Arkansas, D. Jones Cotton Inc, W. Bridges Clemson Univ.  
Evaluating and Improving Eagle Monitoring and Cotton Variety Testing

Yu Mo, Bahram Momen, Michael S. Kearney  
Univ. of Maryland  
Quantify remote sensing phenology using a nonlinear mixed model

N. M. Bello, A. Jager, E. Cha, M. Sanderson, N. Cernicchiaro, D. Renter Kansas State Univ.  
Rethinking Causal Inference from Observational Data: a structural equation modeling approach
Business meeting: The business meeting began at about 9:00 a.m. on Friday, June 24, 2016. Ed Gbur presided. The following items were discussed:

1. The organizers were thanked for a productive and enjoyable meeting: Bahram Momen for local arrangements and Kathy Yeater for the technical program. Ed Gbur was thanked for his work as chair and webmaster of the committee.

2. Presenters who wish to post their talk on the project website should send a pdf of the talk to Ed Gbur (egbur@uark.edu).

3. The annual report and impact statement are due shortly after the annual meeting. 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, 2015 to September 30, 2016 (or since last year’s report) that are related to or inspired by their participation in NCCC-170 as soon as possible.

4. The current NCCC-170 project is scheduled to end on September 30, 2016. The project renewal has been approved for October 1, 2016 through September 30, 2021.

5. The 2017 meeting will be held in Elk River, Minnesota at the Cargill Experiment Station with Neil Paton as the local host. Tentative dates are June 22-23, 2017. Nora Bello will serve as program chair. The 2018 meeting is tentatively planned for Idaho and for Arkansas in 2019. Illinois will serve as a backup location if needed and otherwise as a tentative site for 2020.

6. The group reviewed progress toward objectives of the current project.

7. The group reviewed objectives of the new project. The new project retains four objectives from the current project and adds an objective identified during the 2015 meeting to provide continuing education and statistical support to the scientific community in the review and editorial process. The “Expected Outcomes and Impacts” section identifies “the sort of things we should be thinking about.”

8. With a new project comes a new participant list. Several persons who participate in the annual meetings are not official participants in the project, and not everyone from the current project is listed as a participant in the new project. 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 if they intend to participate.

9. Elizabeth Claassen announced the JMP Discovery Summit, to be held at SAS headquarters in Cary, NC on September 19-23, 2016.

The business meeting adjourned at approximately 9:40 a.m. After break, the group reconvened for a discussion on how to train and advance applied statisticians in professional and academic settings. We forgot to take the annual group photograph for the project web site.

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:**
George Milliken taught a short course entitled “Experimental Design and Analysis of Mixed Models” at the FDA Center for Veterinary Medicine in Washington D.C., September 30-October 1, 2015.

Julia Sharp presented a webinar module entitled “Introductory Statistics” to the American Dairy Science Association’s Fatty Acid Form in November 2016. She and Billy Bridges presented a webinar module entitled “What is Meta-analysis” to the same group in April 2016.

Larry Madden presented a one day workshop entitled “Meta-analysis for evidence based agriculture” at the ASA-CSSA-SSSA International Meetings in Minneapolis, MN. November 2015.

Kathy Yeater presented a workshop entitled “So you want to do a: RNAseq experiment, Differential Gene Expression Analysis” at the USDA Meat Animal Research Center, Clay Center, NE. August 16, 2016.

Larry Madden presented a one day workshop entitled “Generalized linear mixed models for data analysis in plant pathology” at the Annual Meeting of the American Phytopathological Society. July 2016.

Walt Stroup presented the American Statistical Association (ASA) Traveling Course entitled “Introduction to Generalized Linear Mixed Models using SAS” twice in October, 2015, one in Dallas, TX and one in San Antonio, TX; two courses in November 2015, one in Indianapolis, IN, one in Cincinnati, OH. Each was to local ASA Chapter

**Presentations:**
Lipka, A.E. Exploration, embellishment, and implementation of statistical approaches for genome-wide association studies and genomic selection. Corn Breeding Research Meeting, Jacksonville, FL March 17, 2016. *(Invited)*


Chen, C., J.P. Steibel, and R.J. Tempelman. 2016. Exploring sparsities of genome wide association analyses based on different sparsities of prior specifications. 5th International Conference on Quantitative Genetics, Madison, WI, USA, June 12-17, 2016 (Poster).


Craig, B.A. Disk Diffusion Breakpoint Determination Using an Errors-in-Variables Model Approach, University of Texas Medical Branch at Galveston, April 2016.


Other project related activities:

Kathy Yeater is co-editing a book for ACSESS (ASA-CSSA-SSSA Publications) currently titled Applied statistics in agricultural, biological, and environmental sciences. All chapters are submitted and under final review. It is anticipated that final editing will commence near the end of FY16 and full publication will occur in early FY17. Current members and/or recent attendees of NCCC-170 that are chapter authors include: Philip Dixon, Kevin McCarter, Walt Stroup, Maria Villamil, and Kathy Yeater.

Dan Nettleton and Rob Tempelman were guest editors of a special issue on “Statistical Genomics and Transcriptomics in Agriculture” for the December, 2015 issue of Journal of Agricultural, Biological, and Environmental Statistics (http://link.springer.com/journal/13253/20/4/page/1).

Nora Bello is a co-PI on a USDA AFRI grant in the Foundational Program A1221 entitled Risk Management Strategies to Reduce the Impacts of Bovine Respiratory Disease Complex in Commercial Feeder Cattle". PI is David Renter, College of Veterinary Medicine, Kansas State University. The grant award was $489,466 for 2015-2019. The grant was ranked the number 1 proposal by its review panel.

Walt Stroup participated in a Roundtable Luncheon entitled On P-values at the 2015 Joint Statistics Meetings (JSM) to consider an American Statistical Association (ASA) policy of use of P-values in research publications. He was also an invited participant on a panel discussion entitled With Great Power Comes Great Responsibility: Harnessing the Extraordinary Power of Statistics on this topic at JSM 2016. ASA has since published a policy statement on the topic.

Larry Madden maintains a website (http://www.oardc.ohio-state.edu/aps-statsworkshop/default.htm) with statistical software code (SAS) and PowerPoint presentations on a range of data-analytic subjects. The material is based heavily on previously presented workshops.
Bruce Craig directed an Undergraduate Research Experience (URE) Purdue-Columbia during the Summer and Fall 2015 for Yinneth Lorena Leon Velasco on the topic of Applications of linear and nonlinear mixed models: a) Semantic Richness and Word Learning in Children with Autism Spectrum Disorder, and b) Feed Intakes of Sows Lactation. He also directed a URE during the Fall 2015 and Spring 2016 for Patrick Gallagher on the topic of Mixed model analysis of paired competition studies (entomology).

Bruce Craig hosted Olusanya Olubusoye, LISA 20/20 Fellow, from the University of Ibadan, Nigeria, in March 2016 during his visit to the Purdue Statistics Department’s consulting service.

Bruce Craig participated in a panel discussion entitled The Non-Technical Skills Needed to Be an Effective Statistical Consultant at the 2015 Joint Statistical Meetings in Seattle, WA. Other panelists were C. Holloman, M. Clayton and M. Wiest.

Bruce Craig participated in a panel discussion entitled Teaching a Statistical Consulting Course at the 2016 Joint Statistical Meetings in Chicago. Other panelists were S. Hurwitz, P.D. Sampson, H.S. Smith, and M. Wiest.

Bahram Momen reported that NCCC-170 activities have helped him in his consulting and mentoring of many graduate students and faculty members in designing their research and analyzing the data.

Sara Duke is a co-PI on a USDA-NIFA grant with the University of the Incarnate Word in San Antonio, TX entitled Strengthening the Agricultural Statistics Pipeline at Hispanic-Serving Institutions. The grant was funded for September 2015 to August 2019.

Current specific goals retained for the 2016-2021 project:
(1) Educate project members in statistical issues and methodology related to statistical problems related to new complex data types collected on relatively few experimental units. Application areas include agricultural analytics, informatics, -omics, and -metrics.

(2) Continue to offer updated and expanded mixed model and generalized linear mixed model workshops upon request from subject matter groups.

(3) Develop web-based educational materials and workshops for agricultural scientists including statistical assistance in the review and editorial process of agricultural publications.

Impacts:
(1) NCCC-170 fosters research to identify and develop statistical methodology applicable to agricultural research and provides a forum for sharing and educating both statisticians and subject-matter scientists in the agricultural, environmental and natural sciences. As a result, all members are able to provide more effective assistance to agricultural researchers addressing national research priorities than they would be without NCCC-170.

(2) Project members provide continuing education for scientists in agriculturally related disciplines in modern statistical analyses of designed experiments in general and specifically in the areas of generalized linear mixed models, statistical techniques in genomics applications, and meta-analysis. Examples of such activities and their immediate impacts for the current reporting period are listed in the Accomplishments section of this report.
(3) Project members collaborate in research projects with scientists in agricultural related disciplines to develop and use proper statistical design and analysis methodology well beyond standard textbook applications. These efforts often result in competitive grant participation and refereed publications. Each of these impacts is listed in the Accomplishments and Publications sections of this report.

**Publications:**


DePalma, G., Turnidge, J, and Craig BA (2016). Determination of disk diffusion susceptibility testing interpretive criteria using model-based analysis: development and implementation. *Diagnostic Microbiology and Infectious Disease.* In press


Research to advance the chemical sciences undergoes rigorous peer review for a trusted, society-run journal. Led by active researchers, we publish quality work from scientists at every career stage, and from all countries. RSC Advances in numbers. An impact factor above 3. Submissions from 100+ countries in 2020. All submissions to RSC Advances are handled by our team of associate editors, who are established scientists actively working in research. All articles published in the journal have been through the full peer review process. The general process for handling manuscripts is as follows DOI 10.22406/aabs. The Advances in agricultural and biological sciences (AABS) is a bimonthly international journal published by Science and Beyond Publishing UK Limited. AABS focuses on all aspects of agricultural and biological research. It publishes original research, applied, and educational articles in all areas of agricultural and biological sciences. Local level cancer statistics; search profiles by area, constituency or health board in the UK. Go to local cancer statistics. Interested in an overview for Wales, Scotland or Northern Ireland? When Cancer Research UK material is used for commercial reasons, we encourage a donation to our life-saving research. Send a cheque payable to Cancer Research UK to: Cancer Research UK, 2 Redman Place, London, E20 1JQ or. It aims to meet the needs of farmers and ranchers, promotes agricultural trade and production, works to assure food safety, protects natural resources, fosters rural communities and works to end hunger in the United States and internationally. Approximately 80% of the USDA's $141 billion budget goes to the Food and Nutrition Service (FNS) program.