



# Statistics Workshop at CSA/CSSS 2010 Saskatoon



A Statistics Workshop during the CSA/CSSA 2010 Conference Saskatoon will be held between **4:00 and 7:30 PM on June 21, 2010** (with a 20-minute pizza break during the 3-hour session). This workshop will provide an excellent opportunity for the participants to update or refresh their statistical knowledge and skills with the analysis of agricultural research experiments. The emphasis will be on subjects including multivariate statistics, analysis of multi-environment trials, and analysis of covariance. Approaches of handling complex of interactions among variables across multiple site-years will also be discussed. Some of the statistical examples in the field of soil science, agronomy, and genetics and breeding will be discussed. Some of the SAS MIXED model codes will be provided to participants as templates for the future references. Following three Powerpoint presentations, the Expert Panel (below) will be discussing and answering questions from the audients.

## Topics:

Multivariate analysis, structural equation modeling (including path analysis); some of the examples in soil science will be used ----- Dr. Eric Lamb

Analysis of covariance (linear, quadratic, site index as covariables); some examples in the agronomic studies will be discussed ----- Dr. Rong-Cai Yang

Using Proc Mixed models in handling complex of interactions across multiple site-years; some examples in genetics and breeding will be discussed ----- Dr. Gary Crow

## The Expert Panel



**Dr. Rong-Cai Yang**, Research Scientist, Alberta Agriculture and Rural Development (ARD) & ARD Professor, University of Alberta, Edmonton.

Analysis of covariance (ANCOVA) is a statistical technique that combines analysis of variance with regression analysis. It is often used for the analysis of agricultural research experiments when one or more continuous variable (the covariates) are measured. However, different uses of ANCOVA and their

interpretations are not always known or appreciated. Dr. Yang will discuss the use of SAS PROC MIXED for ANCOVA and its applications to the analysis of agricultural experiments. The analysis and discussion will center on the common uses of ANCOVA including statistical control of errors, testing for homogeneity of slopes for different treatment groups, linear and quadratic responses to quantitative treatments, and stability analysis of treatments over multiple environments. SAS code will be given to serve as templates for similar analyses or to be modified to accommodate for different analyses.

Dr. Rong-Cai Yang obtained his PhD degree in quantitative genetics/plant breeding from the University of Saskatchewan. He has provided high-level advice and mentorship to ARD scientists and their partners in statistical design and analysis of research experiments. Dr. Yang has maintained a very active research program in statistical genomics related to crop and animal improvement. His current research interests and activities include: (i) the development of mixed-model methodology for studying genotype-environment interactions and evaluation of long-term crop variety trials in western Canada; (ii) breeding theory and methodology for self-pollinated crops; and (iii) statistical and genetic analyses of large-scale genomic data (particularly those from Alberta Bovine Genomics Program).



**Dr. Eric Lamb**, a plant ecologist and statistician in the Department of Plant Sciences at the University of Saskatchewan. His research program in plant ecology is focused on disentangling the complex networks of ecological mechanisms that structure plant and soil biodiversity. Dr. Lamb has training and research expertise in experimental and field survey design, univariate and multivariate statistical methods, and specialized techniques including Structural Equation Modeling. He teaches a practically-oriented graduate course in biostatistics and experimental design based on the R statistical platform.

**Dr. Gary Crow**, Dr. Gary Crow is an Associate Professor in the Department of Animal Science at the University of Manitoba, with research interests in Animal Genetics and Animal Production Systems. For over 20 years he has taught a graduate course in Research Methodology first to Animal Science students, then to a broader audience of Agriculture and



Food Science students, as well as to students from the Faculty of Science. This has included providing advice to students on their particular problems in the area of design and analysis, primarily using SAS software. Dr. Crow also teaches undergraduate and graduate courses in genetics as it is applied to farm animals. His current research activities include study of genetic conservation in cattle, systems modeling of beef cattle production systems, study of cattle use of riparian zones and collaborative study with University of Manitoba plant geneticists on application of mixed models to variety trial data collected over many years and sites. Dr. Crow recently completed ten years as Associate Head of the Department of Animal Science and has been involved in a number of administrative activities over that time including university Animal Care committees. Dr. Crow received his B.Sc.(Agr.) and M.Sc. from the University of Guelph, and his Ph.D. from the University of Saskatchewan.

Should you have a question, concern, or suggestion about the workshop, please contact Dr. Yantai Gan at Email: [yan.gan@agr.gc.ca](mailto:yan.gan@agr.gc.ca)