

CENTER FOR STATISTICAL TRAINING & CONSULTING

The Center for Statistical Training and Consulting is a professional service and research unit at MSU. Our aim is to support research and provide training, grant development, and consulting in statistics for faculty, staff and grad students.

SUMMER 2015 WORKSHOPS

All Summer workshops are Full-Day Workshops from 9 am-4 pm in 106 Farrall Hall. For more complete abstracts or to register visit www.cstat.msu.edu. Registration Now Open!

INTRODUCTORY AND INTERMEDIATE STRUCTURAL EQUATION MODELING (SEM)

**Presented by Dr. Tenko Raykov,
Measurement and Quantitative Methods**

Monday, June 15th, from 9am-4pm

This full day workshop deals with introductory and intermediate aspects of the increasingly popular methodology of Structural Equation Modeling (SEM) in the behavioral, educational, social, business, marketing, and biomedical disciplines. The workshop begins with a coherent introduction to the basics of methodology including model identification issues, implied covariance and mean structure, parameter estimation, (robust) maximum likelihood estimation and (asymptotically) distribution-free estimation, as well as model fit evaluation. Longitudinal data analysis is subsequently focused on. A discussion of analysis of data from nationally representative studies using complex designs follows then. Throughout the workshop, multiple uses of numerical data and examples are made and Mplus is employed. This workshop is geared toward graduate students and faculty from the social, behavioral, biomedical and business disciplines.

WHAT WOULD IT TAKE TO CHANGE YOUR INFERENCE? QUANTIFYING THE DISCOURSE ABOUT CAUSAL INFERENCES IN THE SOCIAL SCIENCES

**Presented by Dr. Kenneth Frank,
Measurement and Quantitative Methods**

Tuesday, June 16th, from 9am-4pm

This full day workshop will answer the question about what it would take to change an inference by formalizing the sources of bias and quantifying the discourse about causal inferences in terms of those sources. In Part I, we will use Rubin's causal model to interpret how much bias there must be to invalidate an inference in terms of replacing observed cases with counterfactual cases or case form an unsampled population. In Part II, we will quantify the robustness of causal inferences in terms of correlations associated with unobserved variable or unsampled populations. This will be a mixture of presentation, individual exploration, and group work. Participants may include graduate students and professors, although all must be comfortable with basic regression and multiple regression.

SAMPLE SIZE ANALYSIS FOR PREPARATION OF GRANT APPLICATIONS

**Presented by Dr. Alla Sikorskii,
Department of Statistics and Probability**

Wednesday, June 17th, from 9am-4pm

In this full day workshop we will consider sample size issues in the preparation of grant applications for exploratory developmental research projects (NIH R21 mechanism) and larger projects (NIH R01 mechanism). The implementation of sample size calculations in GPower and SAS software will be illustrated.

Topics:

- Hierarchy of evidence in clinical research
- Distributional and anchor-based measures of treatment effect
- Effect size
- Clinical and statistical significance
- Sample size determination for superiority clinical trials
- Sample size determination for superiority trials with repeated measures
- Sample size determination for equivalence and non-inferiority clinical trials

INTERMEDIATE R: FUNCTIONS AND PROGRAMMING

**Presented by Dr. Vincent Melfi,
Department of Statistics and Probability**

Thursday, June 18th, from 9am-4pm

In this full day workshop we will consider how functions in R allow users to automate commonly used procedures and to implement new methods. Even for those who rarely need this functionality, understanding R functions and programming is quite useful, since R is built around functions.

This workshop will begin with an overview of R's data types and subsetting methods. Some simple built-in functions will be investigated to gain insight into the structure of R functions. Participants will then learn how to write original R functions and to use the core R programming language including loops and conditional expressions to make functions more powerful and general.

Methods to create efficient code such as vectorization, avoiding loops when possible, and understanding how R represents numbers and characters will be covered.

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