SUMMER INSTITUTE 2016

Workshops In Quantitative Research Methodology

Department of Public Health Sciences
Medical University of South Carolina
Charleston, South Carolina
May 2-10, 2016
August 18-19, 2016
The 2016 Summer Institute in the Department of Public Health Sciences in the College of Medicine at the Medical University of South Carolina (MUSC) offers several workshops that introduce current quantitative methods used in key areas of public health, population health, and biomedical and clinical research, and offer hands on experience with implementing these methods. The targeted audience includes public health professionals, biostatisticians, epidemiologists, biomedical and clinical researchers as well as residents, post docs, fellows and graduate students.

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Developing Your Clinical Trial Toolbox (May 2-3)

This workshop provides two sessions per day (8-noon and 1-5 each day) on aspects of clinical trial development and implementation for randomized clinical trials, and hands-on experience with the latest developments. Attendees have the opportunity to bring their specific trial questions to the course for discussion and feedback.

Day 1 Session I: Study Designs (aligning designs with objectives)
Day 1 Session II: Sample Size Estimation and Randomization Plans
Day 2 Session I: Interim Analysis and Data and Safety Monitoring
Day 2 Session II: Practical Issues in Study Planning (budgets, form development, dissemination)

Who Should Attend:
Clinical researchers, biostatisticians and students having an interest in clinical trial design and methodology.

Short Bios:
Valerie Durkalski is Professor of Biostatistics and Director of The Data Coordination Unit (DCU), a statistical and data management center housed in the Department. The DCU specializes in the design of clinical trials and analysis of their data and in establishing, implementing and maintaining data and project management systems for multicenter clinical trials. Dr. Durkalski collaborates on several large multicenter clinical trials in various therapeutic areas, serves on several Data and Safety Monitoring Boards (DSMBs) and NIH peer-review panels. She publishes and presents on various topics related to the design and conduct of clinical trials and teaches ‘Design & Conduct of Clinical Trials’ to graduate students and healthcare professionals.

Caitlyn Ellerbe is an Assistant Professor of Biostatistics and Senior Biostatistician with The Data Coordination Unit (DCU), a statistical and data management center housed in the Department of Public Health Sciences. The DCU specializes in the design of clinical trials and analysis of their data and in establishing, implementing and maintaining data and project management systems for multicenter clinical trials. Dr. Ellerbe collaborates on the design and implementation of several large multicenter clinical trials with a focus on rare diseases, stroke, and other neurological emergencies. She publishes and presents on various topics related to the design and conduct of clinical trials, with a special emphasis on the design and conduct of adaptive clinical trials.
# Workshop Information

## Bayesian Biostatistics (Intro May 2-3; Advanced May 5-6)

A course sequence of 2 workshops will be presented. The sequence will consist of an Introductory Bayesian Biostatistics course (IBB), and an Advanced Bayesian Biostatistics course (ABB). The IBB course is designed to provide a basic grounding in Bayesian modeling methods and hands-on experience with WinBUGS and demonstration of SAS capabilities. The ABB course covers specific application areas in more depth and is designed to be a continuation of the IBB course. The IBB course fee includes the text, Lesaffre and Lawson (2012) *Bayesian Biostatistics*, Wiley, NY.

### IBB Topics:
- Bayesian Basics
- Hierarchical models; DAGs; MCMC
- Comparison with conventional analysis
- Random effect models: LMM and GLMM,
- Other software: R2WinBUGS, OpenBUGS, BRUGS, JAGS, INLA

### ABB Topics:
- Parametric survival modeling
- Longitudinal modeling
- Measurement error
- Handling Missing data
- Special Topics:
  - Imaging/disease mapping
  - Variable selection
  - INLA examples

### Who Should Attend:
Those interested in extending their knowledge of statistics and modeling into hierarchical multi-level modeling using powerful Bayesian methodology.

**Andrew B. Lawson** is Professor of Biostatistics and has a wide experience of the development and application of Bayesian methods in Biostatistical problems. He has published a number of papers and books focused on Bayesian applications, in particular in spatial Biostatistics.

**Mulugeta Gebregziabher** is Associate Professor of Biostatistics. He collaborates with clinicians/health services researchers in several topics and has published collaborative and methodological work that involves longitudinal and missing data. He has extensive experience and teaches advanced regression methods for graduate students.
Machine Learning (May 5-6)

Machine learning is growing in popularity among biomedical investigators due to the pressing need to systematize and extract the knowledge from multivariate datasets encountered in research application. This course will introduce key concepts in machine learning, descriptive unsupervised analysis, and supervised learning. Several popular machine learning frameworks, such as Support Vector Machines (SVMs), Random Forests, Neural Networks will be presented. Weka and RWeka will be introduced and applied to reanalysis of several biomedical datasets. Basic knowledge of R is a highly encouraged prerequisite.

Who Should Attend:
Biomedical investigators interested in applying machine learning to their research.

Alexander V. Alekseyenko is Associate Professor of Biomedical Informatics and the Founding Director for Program for Human Microbiome Research. He develops machine learning methods for personalize medicine applications in the human microbiome domain.

Lewis Frey, PhD develops novel algorithms and information systems for the purpose of discovery and data integration applicable to precision medicine. He applies novel machine learning approaches deployed through virtual machines in hospital networks and in big data technology within the Veterans Affairs for analysis over 20 million patients.
Geographic Information Systems (GIS) for Public Health (May 9-10)

Geographic information systems (GIS) are becoming increasingly popular in all areas of public health. The focus of this course is to teach practical GIS skills that can be applied in any public health setting. There are two goals for this course: 1) for students to develop a GIS toolkit by learning the most frequently used GIS skills (Day 1); and 2) for students to learn how to apply GIS in public health setting through the exploration of applicability of GIS to public health data (Day 2). The general teaching philosophy for the course is that hands-on training in GIS is the most effective approach for you to acquire this new skill. However, short lectures and selected readings will be used to reinforce critical concepts. Attendees should plan on bringing their laptops.

Who Should Attend: Clinical researchers, biostatisticians and students having an interest in GIS.

John Pearce is an Assistant Professor of Environmental Health in the Department of Public Health Sciences. Dr. Pearce’s research seeks to investigate the nature of environmental risk factors and their impacts on human health. He has extensive experience in geographic information science for public health and has several ongoing studies that apply relevant methods. He currently teaches environmental health at MUSC and has taught courses on geographic information systems for public health.
Applied Logistic Regression (May 9-10)

The aim of this course is to provide theoretical and practical training for biostatisticians and professionals of related disciplines in statistical modeling using logistic regression. The increasingly popular logistic regression model has become the standard method for regression analysis of binary data in the health sciences. (Text: Applied Logistic Regression 3rd Ed, Hosmer, Lemeshow, Sturdivant 2013)

Day 1
A. Introduction
B. Fitting the Logistic Regression Model (HL&S Ch 1)
C. The Multiple Logistic Regression Model (HL&S Ch 2)
D. Interpretation of coefficients (HL&S Ch 3)
E. The Multivariate Case: Statistical Adjustment (HL&S Ch 3)

Day 2
F. Interaction and Confounding (HL&S Ch 3)
G. Stratified Analysis via Logistic Regression (HL&S Ch 3)
H. Numerical Problems (HL&S Ch 4)
I. Summary Measures of Goodness-of-Fit (HL&S Ch 5)
J. Area Under the ROC Curve (HL&S Ch 5)
K. ICU Example

Who Should Attend:
Clinical researchers, biostatisticians, epidemiologists and graduate students in the health sciences.

Stanley Lemeshow is internationally known for his expertise in biostatistics and epidemiology. He has published extensively in the applied and methodological literature and has co-authored three textbooks in the John Wiley & Sons Wiley statistics series: Applied Logistic Regression (the single most cited book on statistics and epidemiology methods), Applied Survival Analysis and Sampling of Populations; Methods and Applications. Dr. Lemeshow has taught more than 100 short courses on biostatistical methods in the USA and abroad.
Frequently in medical research, data are collected longitudinally and/or in clusters. This workshop will focus on familiarizing the participants with the appropriate analyses for such data. Linear Mixed Models ANOVA (including random effects, fixed effects, nesting, repeated measures, missing data), Generalized Linear Mixed Models for analyzing categorical data and introduction to growth models will be presented. The workshop will be divided into three modules. Module I - multilevel data, Module II - longitudinal data, Module III—SAS software and hands-on experience in using SAS for topics covered in Modules I&II. Module II requires participants to have SAS installed on their laptops. The Modules I and II will be presented on Day 1 and the Module III will be presented on Day 2.

Who Should Attend:
Clinical researchers, biostatisticians and students who have not been exposed to these topics.

Short Bios:

**Sharon Yeatts** is an Associate Professor of Biostatistics in the Department. She collaborates with clinicians at MUSC and around the country in several health related topics, with a focus on neurological trials. She oversees design and biostatistical analyses of several multicenter longitudinal studies. She teaches regression and factorial analyses in the graduate program.

**V. Ramakrishnan (Ramesh)** is a Professor of Biostatistics in the Department. He has extensive experience in Multilevel and Longitudinal data methods. He has authored or coauthored methodological articles in several areas of biostatistics, including missing data, genetic epidemiology, longitudinal growth models, mixture normal models. He has developed and taught graduate courses on several topics including a course in longitudinal and multilevel data analyses.
VENUE
The courses will take place on the campus of the Medical University of South Carolina,
Department of Public Health Sciences, Room 301 and 305V, 135 Cannon Street, Charleston, South Carolina.

Recommended Area Accommodations:

Charleston Marriott Hotel  
170 Lockwood Boulevard  
Charleston, SC 29403  
(843)723-3000/(800)968-3569  
www.marriott.com/chsmc

Springhill Suites/Charleston Riverview  
90 Ripley Point Drive  
Charleston, SC 29407  
(843) 266-8081  
www.marriot.com/chssh

Comfort Inn  
144 Bee Street  
Charleston, SC 29401  
(843)577-2224

The Courtyard by Marriott  
35 Lockwood Drive  
Charleston, SC 29401  
(843) 722-7229  
www.marriott.com/chscy

Inquire about an MUSC discount when making reservations.  
Additional information on Charleston and area hotel accommodations may be found at  

Daily Schedule:

8:00 - 8:30am  Coffee/Registration
8:30 - 10:00 am  Workshop Session
10:00 - 10:30 am  Break
10:30 - 12:00 pm  Workshop Session (End of Day 2 for the 1 1/2day workshops)
12:00 - 1:00 pm  Lunch (provided)
1:00 - 3:00 pm  Workshop Session
3:00 - 3:30 pm  Break
3:30 - 5:00 pm  Workshop Session (End of Day 2 will be at 4pm)
Registration Form:

Last Name: ________________  First Name: ____________________

Institution: _______________________________________________

Mailing Address: _____________________________________

City: ____________________  State:____ Zip: __________

Phone: _______________ E-mail: __________________

○ Student  ○ Professional

Registration Fee:  Bayesian Workshop—$600 each ($1000 for both)

Clinical Trials Workshop—$150 per session ($500 for all 4)

$500 All other workshops

○ Clinical Trials (May 2-3)
○ Machine Learning (May 5-6)
○ Intro Bayesian Biostatistics (May 2-3)
○ Advanced Bayesian Biostatistics (May 5-6)
○ Applied Logistic Regression (May 9-10)
○ GIS (May 9-10)
○ Longitudinal Analysis (Aug 18-19)

Total Amount: $_________

Payment can be made by phone or mail. Contact information is on the top left corner of this page. Registration fees are payable in U.S. dollars only. Personal checks are acceptable if payable through a U.S. bank.

Payment Method:
○ IIT (MUSC internal registrations only)
○ Check (make payable to MUSC, DPHS)
○ Visa  ○ Mastercard ○ American Express

Card #: ________________________  Exp Date: _________

Name on Card: ________________________________

Authorized Signature: _____________________________

Cardholder address: _____________________________________