

Ohio State - Cleveland Clinic Foundation – Case Western Reserve University

# Biostatistics Joint Symposium

## Thursday, May 17, 2012

At the MBI: 355 Jennings Hall, 1735 Neil Avenue, Columbus

### Schedule

Before 11:30 a.m.	Poster set up
11:30 – 12:00	Nathan Morris, Case Western Reserve University “The Infinitesimal Alpha Among Other Exotic Statistics Creatures”
12:15 – 1:30	Buffet Lunch 3 <sup>rd</sup> Floor Jennings Hall
1:30 – 2:00	Hong Zhu, The Ohio State University “Inference on Bivariate Survival Data with Interval Sampling through Kendall’s Tau: Testing and Association Measure”
2:15 – 2:45	Jesse Schold, Cleveland Clinic Foundation “Measuring Quality of Care of Healthcare Providers”
2:45 – 3:30	Break and poster session
3:30 – 4:30	Weng Kee Wong, UCLA “Nature-Inspired Meta-heuristic Algorithms for Generating Optimal Experimental Designs”



**Keynote Speaker: Weng Kee Wong,**  
Professor of Biostatistics  
Fielding School of Public Health, UCLA

### Abstract

Particle swarm optimization (PSO) is a relatively new, simple and powerful way to search for an optimal solution. It is widely used in many computer science, engineering and business. The

method works quite magically and frequently finds the optimal solution or a nearly optimal solution after a few iterations. There is virtually no assumption required for the method to perform well and the user only needs to input a few easy to work with tuning parameters.

After I present a brief review of the theory of optimal design of experiments and recent advances in the field, I use several nonlinear models in the biological sciences to demonstrate that PSO can find different kinds of optimal designs quickly, including mini-max types of optimal designs where effective algorithms to find such designs have remained elusive until now. Dose response studies will serve as illustrative applications.

*Graduate students, postdoctoral fellows, staff researchers, and faculty from the three participating institutions are invited to present posters on your work at the Symposium. Please contact Dennis Pearl ([Pearl.I@osu.edu](mailto:Pearl.I@osu.edu)) to reserve a spot in the poster session.*

# May 17, 2012 OSU-CCF-CWRU Biostatistics Joint Symposium

## Further Abstracts

### *The Infinitesimal Alpha Among Other Exotic Statistical Creatures*

Nathan Morris

Case Western Reserve University, Department of Epidemiology and Biostatistics

Driven by a set of increasingly high-throughput technologies, modern medical researchers are routinely performing high-dimensional scans. These include such applications as linkage scans, gene expression studies, genome wide association studies, methylation studies, exome sequencing studies and many others. In these studies, a large number of hypotheses must be tested, often on the order of  $10^5$  or  $10^6$ . In many cases, p-values are calculated for each hypothesis one at a time, and a stringent criteria such as a Bonferroni corrected alpha level is used to adjust for the large number of tests. Such corrections lead to extraordinarily small (i.e., “exotic”) alpha levels such as the alpha of  $5 \times 10^{-8}$  frequently used in genome wide association studies. Statisticians have typically gained much of their intuition about how test statistics behave by considering traditional alpha levels. In this presentation I will discuss the surprising behavior of hypothesis tests at low alpha levels both in terms of type I error and power.

---

### *Inference on Bivariate Survival Data with Interval Sampling through Kendall's Tau: Testing and Association Measure*

Hong Zhu

Ohio State University, College of Public Health

In many biomedical applications, interest focuses on the occurrence of two or more consecutive failure events and the association between event times. Bivariate survival data with interval sampling arise frequently when disease registry or surveillance systems commonly collect data with incidence of disease occurring within a calendar time interval. The initiating event is retrospectively confirmed and subsequent failure event is observed during follow-up. In cancer studies, the initiating and two consecutive failure events could correspond to birth, cancer onset and death. Such data represent a non-randomly screened subset of a population and the interval sampling bias needs to be properly adjusted for in analysis. Similar to truncated survival data, the analysis method for this type of data relies on the key assumption of independence, that is, the disease process does not depend on when the initiating event occurs. This paper proposes a nonparametric test of a relatively weaker but sufficient assumption of quasi-independence based on a coordinate-wise conditional Kendall's tau for bivariate survival data with interval sampling. Further, to quantify dependence between bivariate failure times given quasi-independence, a nonparametric estimator of Kendall's tau that uses inverse probability weights is developed, where the contribution of each comparable and orderable pair is weighted by the inverse of the associated probability. Simulation studies demonstrate that the test procedure and association estimator perform well with moderate sample sizes. The methods are applied to ovarian cancer registry data for illustration.

## *Measuring Quality of Care of Healthcare Providers*

Jesse Schold  
Cleveland Clinic Foundation

In the past decade there has been an astounding proliferation of metrics used to evaluate the quality of care of healthcare providers. This trend is based in part on an increasing availability of data and information technology to support development of performance metrics along with an emphasis from regulators on initiatives to improve quality of care in a cost-effective manner. There are numerous public and private agencies which now develop quality metrics and utilize them for purposes of contracting, reimbursement and credentialing hospitals and individual programs and providers. Despite the substantial momentum and ramifications of quality metrics, there are significant controversies regarding the appropriate use and development of these metrics and the potential unintended consequences associated with their implementation for quality oversight and reimbursement. These controversies include unintended effects on provider behavior and a potential deleterious impact on access to care, lack of effective dissemination of quality indicators to improve patient decision-making, inability to adequately adjust metrics for patient acuity and discordance of quality assessments based on the specific statistical methodology. In this talk, I will discuss these issues broadly and present empirical evidence of the impact and potential limitations of quality metrics which are utilized to evaluate the performance of organ transplant centers in the United States.

---

*The 2012 Biostatistics Joint symposium is funded by the Statistics Department, the College of Public Health, and the Biostatistics Center of The Ohio State University. Thanks also to the Mathematical Biosciences Institute for providing the facilities for the symposium.*

## OSU-CCF-CWRU Joint Biostatistics Symposium Speaker List History

The Joint Biostatistics Symposium alternates between Columbus in even-numbered years and Cleveland in odd-numbered years

<b>Date</b>	<b>Host institution</b>	<b>Keynote speaker</b>	<b>Case speaker</b>	<b>CCF speaker</b>	<b>OSU speaker</b>
04/18/1991	OSU	Gary Koch	NA	M. Schluchter	J. Klein
05/16/1995	CCF	Martin Tanner	NA	J.S. Rao	D. Pearl
05/17/1996	OSU	Bruce Weir	NA	N. Obuchowski	M. Irwin
05/2/1997	CCF	Nan Laird	J. Witte	T. Greene	J. Hsu
05/28/1998	OSU	Kathryn Roeder	R. Elston	J. Gassman	H. Doss
05/13/1999	CWRU	Bruce Lindsay	J. Sun A. Ivanova	N. Obuchowski	S. Lin
05/11/2000	OSU	Scott Zeger	J. Albert	H. Ishwaran	F. Wright
05/10/2001	CCF	Butch Tsiatis	N. Gordon	R. O'Brien	S. Lemeshow
05/9/2002	OSU	Steven Piantadosi	NA	Apperson-Hansen	L. Shen
05/2/2003	CWRU	Nancy Geller	M. Diaz-Insua	G. Beck	D. Burr
05/13/2004	OSU	Mike West	T. Radivoyevitch	X. Peng	S. Lin
05/13/2005	CCF	Donald Rubin	J. Albert	L. Li	Y. Lee
5/18/2006	OSU	C.R. Rao	R. Elston	M. Kattan	M. Lee
5/17/2007	CWRU	Cyrus Mehta	J. Sun	D. Babineau	B. Lu
5/15/2008	OSU	Frank Harrell	T. Radivoyevitch	P. Imrey	H. Nagaraja
5/14/2009	CCF	Colin Begg	P. Fu	X. Wang	M. Pennell
5/13/2010	OSU	Betz Halloran	R. O'Brien	Y. Xu	L. Kubatko
5/5/2011	CWRU	Rafael Irizarry	A. Sattar	B. Hu	A. Shoben
5/17/2012	OSU	Weng Kee Wong	N. Morris	J. Schold	H. Zhu