



Department of Epidemiology, Biostatistics & Occupational Health
Biostatistics Seminars
Summer 2009

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The Scripps Translational Science Institute - The Scripps Research Institute*

***Accommodating Linkage Disequilibrium in Genetic Association
Analyses via Ridge Regression.***

Tuesday, 16 June, 2009
4:00 pm - 5:00 pm
Purvis Hall, 1020 Pine Ave. West, Room 24

ALL ARE WELCOME



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Abstract:

The use of genome-wide association studies (GWAS) for the identification of genes and genetic variations that influence common, complex diseases such as hypertension, cancer, and depression will continue to grow as cost-effective high-throughput genotyping technologies are developed. As a result, appropriately flexible yet robust data analysis strategies for analyzing GWAS data will be essential. We emphasize the need to accommodate phenomena such as linkage disequilibrium via simple extensions of traditional regression models. We describe the use of regression analysis models for GWAS that are very intuitive and flexible. We propose the use of ridge regression to account for correlation. We showcase the method using simulated data. Our results suggest that ridge regression and related techniques have the potential to distinguish causative from non-causative variations in association studies. We showcase the utility of the logistic ridge regression method on previously published GWAS data. We also consider limitations of the proposed approach as well as areas for further research.

Bio:

Nathalie Malo's research interests are the derivation, testing, and implementation of novel genetic/genomic data analysis tools designed to facilitate the identification of genes contributing to general disease susceptibility, progression, and treatment response. Her post-doctoral research focused on statistical methods for genome-wide association studies and has been published in the *American Journal of Human Genetics* (Malo, Libiger, and Schork (2008). '[Accommodating linkage disequilibrium in genetic-association analyses via ridge regression](#)', *AJHG*, 82(2):375-85). In her post-doctoral research she worked with Dr. Nicholas J. Schork at the University of California, San Diego, Moore's Cancer Center, and at The Scripps Research Institute, Scripps Genomic Medicine, La Jolla, California. She obtained her Ph.D. in Epidemiology and Biostatistics from McGill University, which resulted in the publication of her first scientific article (Malo *et al.* (2006). 'Statistical Practice in High-Throughput Screening Data Analysis', *Nature Biotechnology*, 24, 167-175). Prior to her doctoral studies, she worked for three years in the Genetics Department of Genizon BioSciences Inc., a biotechnology company specializing in the mapping and positional cloning of genes associated with complex genetic diseases. She also holds a Master's degree in Statistics and a bachelor's degree in Mathematics from the University of Montreal.