



McGill

Department of  
Epidemiology, Biostatistics  
and Occupational Health

## Biostatistics Seminars

Fall 2020



### **Raquel Prado, PhD**

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## Recent Model-Based Approaches for Analysis of Neuroimaging Data

Wednesday, November 4, 2020  
3:30 pm – 4:30 pm – [Zoom Link](#)

**Abstract:** We present some recent models and related computational and inferential methods for analyzing different types of neuroimaging data. We begin discussing approaches for detecting activation and co-activation from complex-valued fMRI data. We show how these approaches lead to more accurate detection of brain activation when compared to alternative methods based on magnitude-only data. We illustrate our results in simulation studies and in human studies. We then present an approach for magnitude-only data that makes use of Bayesian tensor regression models for joint estimation of activation and connectivity. This approach combines low-rank tensor decompositions and multiway stick breaking priors for inferring activation at the voxel level. Connectivity is modeled at the region of interest level using a Gaussian graphical prior structure. These models are illustrated in the context of analyzing multi-subject fMRI data from the balloon-analog risk-taking experiment. Finally, we present new spectral, time, and time-frequency domain approaches for analyzing multi-channel electroencephalogram data.

**Bio:** **Raquel Prado** is Professor in the [Department of Statistics](#) at the [Baskin School of Engineering, UCSC](#), where she has been on the faculty since 2001. In 1998 she graduated with a PhD in [Statistics and Decision Sciences](#) from [Duke University](#). From 1998 until 2001 she was an Assistant Professor in Statistics at [Universidad Simon Bolivar](#) in Venezuela. She was a co-recipient of the Outstanding Statistical Application Award of the American Statistical Association in 1999. She is a Fellow of the [American Statistical Association](#). She served as Program Chair of the [International Society for Bayesian Analysis](#) in 2013 and is currently Past-President of ISBA. Please visit: <https://raquel.soe.ucsc.edu>

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