

BIOGRAPHY

Ph.D. Candidate

Tiago Ribeiro Pellegrini

Graduate Academic Unit

Mathematics & Statistics

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**June 24, 2020**

**1:00 p.m. (Atlantic)**

**Virtual Defence**

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Examining Board:

Dr. Guohua Yan (Math & Stats)

Dr. Barry Monson (Math & Stats)

Dr. Fan-Rui Meng (Forestry & Env. Mgt.)

Dr. Jeffrey Picka (Math & Stats) Supervisor

External Examiner: Dr. Cindy Xin Feng

School of Public Health

University of Saskatchewan

The Oral Examination will be chaired by:

Dr. Kevin Englehart, Associate Dean of Graduate Studies

Universities attended (with dates & degrees obtained):

Jan. 2013 – present Ph.D. candidate in Statistics, University of New Brunswick

Jan. 2011 – Dec. 2012 M.S., Statistics, Federal University of Sao Carlos, Brazil

Jan. 2007 – Dec. 2010 B.S., Federal University of Sao Carlos, Brazil

Publications:

Pellegrini, T., Hasan, M., and Ma, R. (2017). Modeling of paired zero-inflated continuous data without breaking down paired designs. *Journal of Applied Statistics*, 44(13):2427-2443.

Fiorucci, J.A.; Pellegrini, T.; Louzada, F.; Petropoulos, F.; Koehler, A. B. (2016). Models for optimizing the theta method and their relationship to state space models. *International Journal of Forecasting*. 32(4):1151-1161.

Conference Presentations:

Tweedie Mixed Models for Spatial Areal Data

43rd Annual Meeting of the Statistical Society of Canada

Dalhousie University, Halifax, NS, June 2015.

Wildfire analysis through spatial areal Tweedie mixed models,

The Third Workshop on Statistical Modelling of Complexly Correlated Data with Applications

University of Prince Edward Island, Charlottetown, PEI, June 2015

Modelling relative efficiency between paired fish catch by weight

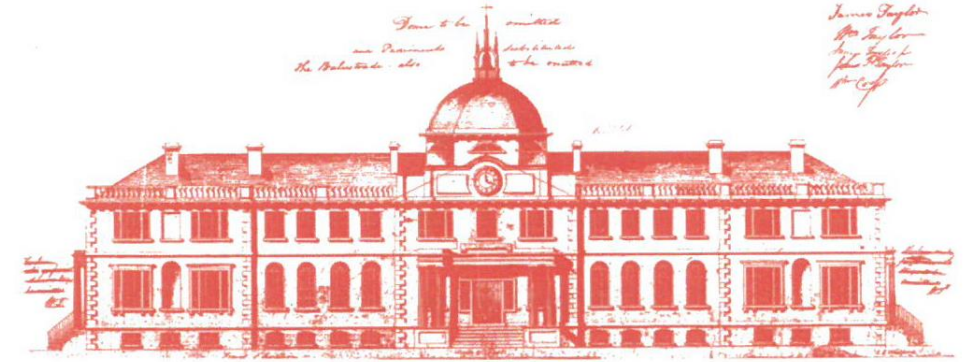
The 2nd Workshop on Statistical Modelling of Complexly Correlated Data with Applications

Mount Saint Vincent University, Halifax, NS, June 2014

SPATIAL TWEEDIE MIXED MODELS

Abstract

We propose a new class of Tweedie mixed models applied to hierarchical spatial data that can model discrete, continuous and semicontinuous data. The presented approach is extended to model two or more responses observed on the same spatial domain connected by shared random effects. The modeling framework is built upon unbiased estimating equations in conjunction with the orthodox BLUP approach and adjusted Pearson estimators. Our model assumptions are robust to random effects distributions and based only on the first and second moments of the random effects. We illustrate the usefulness of our approach through four motivating examples applied to health and environmental studies. A simulation study is conducted to assess the properties of our models. Backed up by the data analyses and simulation results presented in this work spatial Tweedie mixed models offer an appealing model framework to hierarchical spatial data that is robust to random effects distributions and is computationally efficient.



Home of the School of Graduate Studies, Sir Howard Douglas Hall was designed by J.E. Woolford in 1825 and is the oldest university building in Canada still in use.

The University of New Brunswick recognizes that the university sits on traditional Wolastoqey territory. The river that runs right by our university – the St. John River – is also known as Wolastoq, along which live the Wolastoqiyik -- the people of the beautiful and bountiful river.

UNIVERSITY OF NEW BRUNSWICK SCHOOL OF GRADUATE STUDIES

ORAL EXAMINATION

Tiago Ribeiro Pellegrini

**IN PARTIAL FULFILMENT
OF THE REQUIREMENTS FOR THE DEGREE OF**

DOCTOR OF PHILOSOPHY