

DAVID RIEGERT

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EDUCATION

- PhD in Statistics** expected completion: Summer 2020
Queen's University, Ontario
- MSc in Mathematics** Sep. 2012
Characterizing the Spectrum of Lake Michigan
Queen's University, Ontario
- BSc in Mathematics and Physics** June 2011
University of Alberta, Alberta

WORK AND RESEARCH EXPERIENCE

- Research Assistant** May 2011 - Present
Queens's University *Kingston, ON*
Extensive research using spectral analysis in areas such as hydrology, geomagnetism, and transfer function estimation under the supervision of Dr.'s David Thomson and Glen Takahara.
- 3-Pollutant Model Project** May 2016 - Apr. 2019
Health Canada
The goal of this project was to develop a measure of acute health risk by analyzing the combined effects from ozone, nitrogen dioxide, and fine particulate matter on mortality and morbidity in 23 Canadian cities. Using insights from the coherence between these quantities, linear and non-linear filters were estimated to predict mortality from the pollutant inputs. A metric of risk was then derived from these filters.
- Building Up a New Database of Projected Air Pollution Data** Jan. 2018 - Jun. 2018
Health Canada
Extracted and stored time-series model outputs in an SQL database. Validated these model outputs against observations.
- Preservation of Magnetogram Data by Digitization** Jan. 2016 - Mar. 2016
Natural Resources Canada
Methods and software were developed to digitize analogue magnetograms dating between the 1860's to the 1970's.
- Legacy, Leisure and the Work Hard - Play Hard Hypothesis** 2015 - 2016
Lonnie Aarssen
Statistical consulting and data analysis for Lonnie Aarssen at Queens University on clustering of patterns in social science data.
Published in The Open Psychology Journal 9(1):7-24, May 2016.
- Modeling High Impact Low Frequency Geomagnetic Disturbances** Oct. 2012 - Apr. 2015
Bonneville Power Administration
Data from solar-orbiting spacecraft were used to predict solar flare / coronal mass ejections and their local effects on geomagnetically induced currents in power systems.

Upgrading Ground-Level Ozone Data Based on Precursors and Climate Data 2014 - 2015
Health Canada

Wrote an R software package to manage and validate Canadian air pollution data.

Metrics of Neutral Zone Effectiveness in Ice Hockey 2014-2015 Season
Kingston Frontenacs (Ontario Hockey League)

Developed Java software to gather line, neutral zone turnover, and shot data. Stored in an SQL database.

RESEARCH GRANTS AND AWARDS

Natural Resources Canada Grant, \$24,200 Jan. 2016 - Mar. 2016
Preservation of Magnetogram Data by Digitization

Wrote the proposal for this grant with Aaron Springford and Dr. Thomson at Queen's University.

Bonneville Power Admin. Technology Innovation Grant, \$81,000 May 2014 - Apr. 2015
Modeling High Impact Low Frequency Geomagnetic Disturbances: Prediction of the Magnitude of Solar Flare / Coronal Mass Ejections and of Local Effects on Geomagnetically Induced Currents

Wrote the proposal for this grant with Aaron Springford and Dr. Thomson at Queen's University.

Bonneville Power Admin. Technology Innovation Grant, \$169,000 Oct. 2012 - Sep. 2013
Modeling High Impact Low Frequency Geomagnetic Disturbances Using Magnetic Field Data from Solar Orbiting Spacecraft

Wrote the proposal for this grant with Aaron Springford and Dr. Thomson at Queen's University.

PUBLICATIONS AND INDUSTRY REPORTS

Riegert D and Thomson DJ. *Non-Stationarity and Offset Coherence Information in Geomagnetic Applications*. 2018 June. 2018 IEEE Statistical Signal Processing Workshop (SSP) (pp. 179-182). IEEE.

Takahara G and Thomson DJ. *3-Pollutant Model Project: Year 2 Final Report*. 2018 April. Delivered to Hwashin Shin, Population Studies, Health Canada (**D Riegert was a subcontractor and co-author of this report**).

Riegert D. *Building up a New database of Projected Air Pollution Data: Final Report*. 2018 March. Delivered to Hwashin Shin, Population Studies, Health Canada.

Naydenov KD, Naydenov MK, Alexandrov A, Vasilevski K, Hinkov G, Matevski V, Nikolic B, Goudiaby V, **Riegert D**, Paitaridou D, Christou A. *Ancient genetic bottleneck and Plio-Pleistocene climatic changes imprinted the phylogeography of European Black Pine populations*, European Journal of Forest Research. 2017 December; 136 (5-6): 767-86.

Takahara G and Thomson DJ. *3-Pollutant Model Project: Year 1 Final Report*. 2017 March. Delivered to Hwashin Shin, Population Studies, Health Canada (**D Riegert was a subcontractor and co-author of this report**).

Springford A and **Riegert D**. *Preservation of Magnetogram Data by Digitization: Development of Software Tools for Digitization and Storage*. 2016 December. Report delivered to Lorne McKee, Natural Resources Canada.

Boles U, Enriquez A, **Riegert D**, Ghassemian A, Abdollah H, Simpson S, Baanchuk A, Michael K, Glover B, Redfearn D. *Dynamic Ranges of Contact Force During Radiofrequency Ablation*. Innovation in CRMJ. 2016 July. DOI: 10.19102/icrm.2016.070801

Thomson DJ, **Riegert D**, and Springford A. *Final Report BPA TIP-290: Modeling high impact low frequency geomagnetic disturbances: Prediction of the magnitude of solar flare / coronal mass ejections and of local effects on geomagnetically induced currents*. 2015. Delivered to Bonneville Power Administration.

Thomson DJ, **Riegert D**, and Springford A. *Upgrading Ground-Level Ozone Data Based on Precursors and Climate Data*. 2015 May. Delivered to Hwashin Shin, Population Studies, Health Canada and Claire Austin, Environment Canada.

Boles U, Enriquez A, Lee H, **Riegert D**, Baranchuk A, Redfearn D, Simpson C, Abdoullah H, Michael K. *Voltage Guided Identification of Critical Pulmonary Vein Connections Improves Outcomes After Pulmonary Vein Isolation*. Canadian Journal of Cardiology. 2015 Oct 31;31(10):S235. DOI: 10.1016/j.cjca.2015.07.496

Springford A, **Riegert D**, and Thomson DJ. *Forecasting Solar Flare Activity Using an Inferred Solar Stress Index*. 2014. JSM Proceedings, Section on Physical and Engineering Sciences. Alexandria, VA: American Statistical Association. pp. 3823-3834.

Thomson DJ, **Riegert D**, and Springford A. *Final Report, BPA TIP-290: Detection of Solar G-Modes in Flare Data*. 2013. Delivered to Bonneville Power Administration.

PRESENTATIONS

Riegert D, Springford A, and Thomson DJ. *Identification and Interpolation of Problematic Data Sections*. 2018 Aug. 27. Invited Oral Presentation: The Joint Annual Meeting of the International Society of Exposure Science and the International Society for Environmental Epidemiology, Ottawa, Ontario, Canada.

Riegert D and Thomson DJ. *Multi-Frequency Transfer Functions - A (Somewhat) Naive First Approach*. 2018 Aug. 25. Oral Presentation: CANSSI Project Closing Workshop: Modern Spectral Methods in Time Series Analysis: Applications in Physical Science, Environmental Science, and Computer Modeling, Kingston, Ontario, Canada.

Riegert D and Thomson DJ. *Non-stationary and Offset Coherence Information in Geomagnetic Applications*. 2018 Jun. 11. Poster Presentation: IEEE Statistical Signal Processing Workshop, Freiburg, Germany.

Riegert D and Thomson DJ. *Getting the Most Out of Non-Stationarity in Time Series Modelling*. 2018 Jun. 5. Oral Presentation: Annual Meeting of the Statistical Society of Canada, Montreal, Quebec, Canada.

Riegert D and Thomson DJ. *All We Need is Loève: Transfer Function Estimation Between Non-Stationary Processes*. 2018 May 23. Poster Presentation: Triennial Earth-Sun Summit Meeting, Leesburg, VA, USA.

Riegert D and Thomson DJ. *Accounting for the Effect of Earth's Rotation in Magnetotelluric Inference*. 2017 Dec. 13. Oral Presentation: Fall Meeting of the American Geophysical Union, New Orleans, Louisiana, USA.

Riegert D and Thomson DJ. *Tipping the Scale in our Favour: Estimating Magnetotelluric Transfer Functions*. 2016 Oct. 30. Oral Presentation: Thirteenth Canadian Solar Workshop, La Petite-Rouge, Quebec, Canada.

Riegert D and Thomson DJ. *Incorporating Correlation Structures into Transfer Function Estimation*. 2016 Aug. 3. Oral Presentation: Joint Statistical Meetings, Chicago, Illinois, USA.

Riegert D, Thomson DJ, and Springford A. *Statistical Estimation of Transfer Functions to Examine the Relationship Between Geomagnetism and Power Systems*. 2016 May 30. Oral Presentation: Annual Meeting of the Statistical Society of Canada, St. Catharines, Ontario, Canada.

Riegert D. *Characterizing the Spectrum of Lake Michigan*. 2014 Aug. 3. Oral Presentation: Joint Statistical Meetings, Boston, Massachusetts, USA.

Riegert D. *An Overview of Spectral Estimation*. 2013 Oct. 19. Oral Presentation: Tenth Canadian Solar Workshop, La Petite-Rouge, Quebec, Canada.

Haley C, Lansimaki E, Pohlkamp-Hartt J, **Riegert D**, and Springford A. *Exploring Spatial and Temporal Heterogeneity of Environmental Noise in Toronto*. 2013 May 27. Case Study Poster Competition: Annual Meeting of the Statistical Society of Canada, Edmonton, Alberta, Canada.

Riegert D, Springford A, and Thomson DJ. *Modeling High Impact Low Frequency Geomagnetic Disturbances Using Magnetic Field Data from Solar-Orbiting Spacecraft*. 2013 Feb. 18. Oral Presentation: Division of Atmospheric and Space Physics Meeting, Kingston, Ontario, Canada.

Springford A, **Riegert D**, and Thomson DJ. *Modelling High Impact Low Frequency Geomagnetic Disturbances Using Magnetic Field Data from Solar-Orbiting Spacecraft*. 2012 Oct. 13. Oral Presentation: Ninth Canadian Solar Workshop, La Petite-Rouge, Quebec, Canada.

Riegert D. *Is There Structure in High-Frequency Variation of Great Lakes Water Levels?*. 2012 Jun. 6. Oral Presentation: Annual Meeting of the Statistical Society of Canada, Guelph, Ontario, Canada.

TEACHING EXPERIENCE

Calculus I Sep. 2018 - Dec. 2018
APSC 171 – Instructor Queen's University, Ontario

Calculus II Jan. 2017 - Apr. 2017
APSC 172 – Instructor Queen's University, Ontario

Calculus I Sep. 2016 - Dec. 2016
APSC 171 – Instructor Queen's University, Ontario

Instructed classes of 250 to 300 first year engineering students. Worked as a part of a teaching team to ensure consistent delivery of material across multiple sections.

Time Series Analysis and Spectral Estimation Jan. 2016 - Apr. 2016
STAT 464 / 864 – Instructor Queen's University, Ontario

Curriculum development and instruction to a class of 43 undergraduate and graduate students.

OTHER TEACHING EXPERIENCE

Differential and Integral Calculus Sep. 2013 - Apr. 2014
MATH 121 – Course Coordinator Queen's University, Ontario

Responded to and addressed student questions through online forums and e-mail and authored mid-term tests.

Applications of Numerical Methods Jan. 2014 - Apr. 2014
MATH 272 – Lab Instructor Queen's University, Ontario

Taught concise MATLAB lessons at the beginning of the lab and then provided one-on-one assistance.

Applied Mathematics for Civil Engineers Fall Semester of 2011-2015
MTHE 224 – Lab Instructor Queen's University, Ontario

Lab curriculum development including lessons at the beginning of lab, assignments, and lab exam. Presented lesson and then provided one-on-one assistance.

Assorted Courses 2011 - 2015
Guest Lecturer Queen's University, Ontario

Calculus I for Engineers, Fall 2015 (Queen's University)

Differential Equations, Winter 2015 (Queen's University)

Time Series and Spectrum Estimation, Winter 2013 (Queen's University)

AWARDS

Engineering and Applied Science First Year Instructor Teaching Award 2016 & 2018
APSC 171 *Queen's University, Ontario*

“The award is given each year to the instructors of first year Engineering and Applied Science courses who, in the opinion of the students, contributed most to creating a good teaching and learning environment in the classroom.”

TECHNICAL SKILLS

Computing and Quantitative Skills

- Proficient in R, L^AT_EX, SQL, Fortran, and MATLAB.
- Experience in Python, C/C++, SQL, parallelization and high performance computing.
- Data analysis and graphics.
- Statistical modelling and programming.

Courses Completed

- Spectrum Estimation
- Time Series Analysis
- Experimental Design
- Computational Data Analysis
- Generalized Linear Models
- Design of Digital Filters
- SSC (2016) Business and Industrial Statistics Workshop: Uncertainty Quantification and Optimization for Complex Models with Gaussian Processes
- Fields Institute (2019): Bootcamp on Machine Learning for Finance

VOLUNTARY POSITIONS HELD

Graduate Math Society 2013 - 2015
Treasurer *Queen's University, Kingston*

Managed finances of the GMS: records and payments for expenditures.

Society of Graduate and Professional Students 2014-2015
Council Member *Queen's University, Kingston*

Represented the Department of Mathematics and Statistics graduate students on the SGPS Student Council.