

## ACADEMIC INTERESTS

- Near Infrared Spectroscopy
- Climate change and weather agricultural impact analysis
- Remote sensing and sensor data interpretation and visualization.
- Statistical sensitivity analysis and model calibration

## EDUCATION

### **2016 – 2020 Ph.D. (Applied Statistics)**

*Statistical data mining algorithms for optimizing analysis of spectroscopic data from on-line NIR mill systems*

James Cook University, Townsville, QLD

### **2013 – 2015 M.Sc. (Mathematics)**

*Bayesian statistical calibration for variety specific trait parameters in a sugarcane crop model.*

James Cook University, Townsville, QLD

### **2006 – 2010 B.Sc. (Mathematics)**

James Cook University, Townsville, QLD

## EMPLOYMENT HISTORY

### **2020 – 2022 Post-Doctoral Research Fellow**

James Cook University, Townsville, QLD

- My responsibilities have included statistical analysis for a nitrogen fertilizer management project and help with coordinating a first and third year university subject.

### **2016 – 2020 Associate Lecturer**

James Cook University, Townsville, QLD

- My responsibilities have included statistical analysis for a nitrogen fertilizer management project and help with coordinating a first and third year university subject.

### **2014 – 2016 Research Officer**

James Cook University, Townsville, QLD

- My responsibilities included statistical analysis for sugarcane yield forecasting research projects, journal paper write-ups and presentation of findings at conferences.

### **2010 – 2013 Casual Research Assistant**

James Cook University, Townsville, QLD

- My responsibilities included tutoring a first year university science class, statistical analysis for climate based research projects and presentation of findings at conferences.

## **RESEARCH EXPERIENCE**

### **2019 – 2022 Climate Smart Sugarcane Irrigation Partnership**

- Develop single page front-end of web application using html5 and pure javascript. This included interactive maps using mapbox and interactive plots using plotly.js package.
- Redeveloped front-end of web application using react and redux.
- Developed web application back-end using Microsoft Azure and Amazon Web Services for storage of data displayed on the front-end
- Developed web-scrappers to automate the collection weather observations and forecasts using Azure function applications (javascript) and Amazon Web Services lambda functions (python 3.7)
- Developed software framework to collected recent weather data and forecasts and integrate with sugarcane crop model api's (irrigweb) including automated simulation runs for display in web-app

### **2015 – 2018 How much N will that crop need? Incorporating climate forecasting to improve nitrogen management in the wet tropic**

- Applied statistical clustering techniques to identify spatial clusters based on climate data in the Wet Tropics
- Applied statistical regression tree analysis to investigate relationships between optimum yield and optimum nitrogen application rates dependent on soil, climate and regional effects
- Responsible for write-up of research results for contribution to project milestone reports.

### **2013 – 2016 Developing remote sensing as an industry wide yield forecasting, nitrogen mapping and research aide**

- Statistical analysis of influential atmospheric parameters on annual sugarcane yields for three sugarcane growing regions
- Statistical analysis to identify significant year to year variability of GNDVI/Yield relationships in three sugarcane growing regions.

### **2013 – 2016 Developing targeted, seamless weather and climate forecasting systems for critical early season harvest periods**

- Reported synthesis of 3 operation climate forecast systems and their use in yield predictions for first milestone report
- Produced yield forecasts for NSW sugarcane industry based on historical climate records using crop simulator software APSIM.

## **2011 – 2013 How will climate change impact climate variability in sugarcane growing regions?**

- Produced statistical analysis on climate change impact for the Australian sugarcane industry.
- Presented findings at industry conferences

## **AWARDS AND ACHIEVEMENTS**

**2017** Mac Hogarth Award: Best student paper (Agronomy), 39<sup>th</sup> Conference of the Australian Society of Sugar Cane Technologists (2017)

**2016** Awarded 3-year scholarship from Sugar Research Australia (2014/19)

**2014** Citation for outstanding contributions to student learning, Office for Learning and Teaching (team award)

**2013** Awarded 2-year scholarship from Sugar Research Australia (STU072)

## **OTHER TRAINING**

### **2016 Introduction to Big Data Analytics**

University of California, San Diego, offered through Coursera, online.

### **2016 Hadoop Platform and Application Framework**

University of California, San Diego, offered through Coursera, online.

### **2016 Machine Learning With Big Data**

University of California, San Diego, offered through Coursera, online.

### **2016 Programming for Everybody (Getting Started with Python)**

University of Michigan, offered through Coursera, online.

### **2016 Python Data Structures**

University of Michigan, offered through Coursera, online.

### **2016 Using Databases with Python**

University of Michigan, offered through Coursera, online.

### **2016 Using Python to Access Web Data**

University of Michigan, offered through Coursera, online.

## **REFEREES**

A/Prof. Yvette Everingham  
Professor,  
James Cook University  
[yvette.everingham@jcu.edu.au](mailto:yvette.everingham@jcu.edu.au)

Dr. Stephen Staunton  
Adjunct Research Fellow,  
Sugar Research Australia  
[geoff.inmanbamber@gmail.com](mailto:geoff.inmanbamber@gmail.com)

## **PUBLICATIONS**

### **Thesis**

**Sexton, J.** (2020). *Statistical data mining algorithms for optimising analysis of spectroscopic data from on-line NIR mill systems*. College of Science, Technology and Engineering. Townsville, Australia, James Cook University. **Doctor of Philosophy:** 171.

**Sexton, J.** (2015). *Bayesian statistical calibration for variety specific trait parameters in a sugarcane crop model*. College of Science, Technology and Engineering. Townsville, Australia, James Cook University. **Master's:** 111.

### **Published scientific journal articles**

Biggs J, Everingham Y, Skocaj D, Schroeder B, **Sexton J** and Thorburn P (2021) The potential for refining nitrogen fertiliser management through accounting for climate impacts: an exploratory study for the Tully region. *Marine Pollution Bulletin*, 170, <https://doi.org/10.1016/j.marpolbul.2021.112664>.

**Sexton, J.**, Everingham, Y., Donald, D., Staunton, S., White, R. 2020. *Investigating the identification of atypical sugarcane using NIR analysis of online mill data*. *Computers and Electronics in Agriculture*, 168. 105-111, <https://doi.org/10.1016/j.compag.2019.105111>.

**Sexton, J.**, Everingham, Y., Donald, D., Staunton, S., White, R. 2018. *A comparison of non-linear regression methods for improved on-line near infrared spectroscopic analysis of a sugarcane quality measure*. *Journal of Near Infrared Spectroscopy*, 26(5). 297-310, <https://doi.org/10.1177/0967033518802448>.

**Sexton, J.**, Everingham, Y., Inman-Bamber, G., 2017. *A global sensitivity analysis of cultivar trait parameters in a sugarcane growth model for contrasting production environments in Queensland, Australia*. *European Journal of Agronomy*, 88. pp. 96-105, <http://dx.doi.org/10.1016/j.eja.2015.11.009>

**Sexton, J.**, Everingham, Y., Inman-Bamber, G., 2016. *A theoretical and real world evaluation of two Bayesian techniques for the calibration of variety parameters in a sugarcane crop model*. *Environmental Modelling & Software*, 83, 126-142, <http://dx.doi.org/10.1016/j.envsoft.2016.05.014>.

Everingham, Y., **Sexton, J.**, Skocaj, D., Inman-Bamber, G., 2016. *Accurate prediction of sugarcane yield using a random forest algorithm*. *Agronomy for Sustainable Development*. **36**(27) <https://doi.org/10.1007/s13593-016-0364-z>.

Stokes, C., Inman-Bamber, G., Everingham, Y., **Sexton, J.**, 2016. *Measuring and modelling CO2 effects on sugarcane*. *Environmental Modelling and Software*. **78**, 68-78. <https://doi.org/10.1016/j.envsoft.2015.11.022>.

**Sexton, J.**, Everingham, Y., Timbal, B., 2015. *Harvest disruption projections for the Australian sugar industry*. *International Journal of Climate Change Strategies and Management* 7(2), <http://dx.doi.org/10.1108/IJCCSM-03-2013-0018>.

Everingham, Y., Inman-Bamber, G., **Sexton, J.**, Stokes, C., 2015. *A dual ensemble agroclimate modelling procedure to assess climate change impacts on sugarcane production in Australia*. *Agricultural Sciences*, 6, 870-888. <http://dx.doi.org/10.4236/as.2015.68084>.

Gyuris, E., Everingham, Y., **Sexton, J.**, 2012. *Maths anxiety in a first year introductory quantitative skills subject at a regional Australian university – establishing a baseline.* International Journal of Innovation in Science and Mathematics Education, 20(2). pp. 42-54. <https://researchonline.jcu.edu.au/24807/>.

Everingham, Y., Gyuris, E., **Sexton, J.**, 2013. *Using student feedback to improve student attitudes and mathematical confidence in a first year interdisciplinary quantitative course: from the ashes of disaster!* International Journal of Mathematical Education in Science and Technology, 44(6). 877-892. <http://dx.doi.org/10.1080/0020739X.2013.810786>.

### **Published peer-reviewed conference papers**

Stringer, J.K., Skocaj, D.M., Rigby, A., Olayemi, M., Everingham, Y.L., **Sexton, J.** (2019) *Productivity performance of climatological sub-regions within the Tully mill area.* In: Proceedings of the 41st Annual Conference of the Australian Society of Sugar Cane Technologists. pp. 156-163 In: ASSCT 2019: 41st Annual Conference of the Australian Society of Sugar Cane Technologists, 30 April - 3 May 2019, Toowoomba, QLD, Australia.

Thorburn, P.J., Biggs, J.S., Skocaj, D., Schroeder, B.L., **Sexton, J.**, and Everingham, Y. (2018) *Crop size and sugarcane nitrogen fertiliser requirements: Is there a link?* In: Proceedings of the 40th Annual Conference of the Australian Society of Sugar Cane Technologists (40) pp. 210-218 In: ASSCT 2018: 40th Annual Conference of the Australian Society of Sugar Cane Technologists, 17-20 April 2018, Mackay, QLD, Australia

**Sexton, J.**, Everingham, Y., Donald, D., Staunton, S., White, R. 2018. *A feasibility test for detection of atypical cane samples using near infrared spectroscopy.* Proceedings of the 40th Annual Conference of the Australian Society of Sugar Cane Technologists. In: ASSCT 2018: 40th Annual Conference of the Australian Society of Sugar Cane Technologists, 18-20 April 2018, Mackay, QLD, Australia

**Sexton, J.**, Everingham, Y., Skocaj, D., Biggs, J., Thorburn, P., Schroeder, B. 2017 *Identification of climatological sub-regions within the Tully mill area.* Proceedings of the 39th Annual Conference of the Australian Society of Sugar Cane Technologists. In: ASSCT 2017: 39th Annual Conference of the Australian Society of Sugar Cane Technologists, 3-5 May 2017, Cairns, QLD, Australia

**Sexton, J.**, Everingham, Y., Donald, D. 2017. *A comparison of data mining algorithms for improving NIR models of cane quality measures.* Proceedings of the 39th Annual Conference of the Australian Society of Sugar Cane Technologists. In: ASSCT 2017: 39th Annual Conference of the Australian Society of Sugar Cane Technologists, 3-5 May 2017, Cairns, QLD, Australia

**Sexton, J.**, Everingham, Y. 2015. *Better understanding trait parameters to improve simulations of cultivar yield differences.* Proceedings of the 39th Annual Conference of the Australian Society of Sugar Cane Technologists. In: ASSCT 2015: 37th Annual Conference of the Australian Society of Sugar Cane Technologists, 28-30 April 2015, Cairns, QLD, Australia.

Everingham, Y., **Sexton, J.**, and Robson, A. 2015 *A statistical approach for identifying important climatic influences on sugarcane yields.* In: Proceedings of the 37th Annual Conference of the Australian Society of Sugar Cane Technologists (37) pp. 8-15. From:

ASSCT 2015: 37th Annual Conference of the Australian Society of Sugar Cane Technologists, 28-30 April 2015, Bundaberg, QLD, Australia.

Everingham, Y., **Sexton, J.**, Timbal, B. 2013 *Downscaled rainfall projections for the Burdekin, Mackay and NSW*. In: Proceedings of the 35th Conference of the Australian Society of Sugar Cane Technologists. pp. 1-10. From: 35th Conference of the Australian Society of Sugar Cane Technologists, 16-18 April 2013, Townsville, QLD, Australia.

Everingham, Y.L., **Sexton, J.**, White, J., 2011. *An introduction to multivariate adaptive regression splines for the cane industry*. In: Proceedings of the 2011 Conference of the Australian Society of Sugar Cane Technologists. pp. 1-22. From: 2011 Conference of the Australian Society of Sugar Cane Technologists, 4-6 May 2011, Mackay, QLD, Australia.