Iain Carmichael

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Work

NSF Mathematical Sciences Postdoctoral Research Fellowship, Seattle, WA — June 2019-present
Department of Statistics, University of Washington
Advisor: Daniela Witten

Education

The University of North Carolina at Chapel Hill, Chapel Hill, NC — May 2019
Ph.D. Statistics
Department of Statistics and Operations Research
Thesis: *Probabilistic and geometric approaches to the analysis of non-standard data*
Advisors: Shankar Bhamidi, J.S. Marron

Cornell University, Ithaca, NY — May 2014
B.A. Mathematics, Physics

Budapest Semesters in Mathematics, Budapest, Hungary — Spring 2013
Semester abroad

Publications

In preparation

1. **Carmichael, I.**, Witten, D. (2020). Cluster structure estimation for multi-view mixture models.
2. **Carmichael, I.** (2020). Subspace geometry of multi-view algorithms.
3. **Carmichael, I.**, Jung, M., Marron, J.S. (2020). Python, R and Matlab packages for angle-based joint and individual variation explained.

Under Review

4. **Carmichael, I.**, Calhoun, B.C., Hoadley, K.A., Troester, M.A., Geradts, J., Couture, H.D., Olsson, L,. Perou, C.M., Niethammer, M., Hannig, J., Marron, J.S. (2019). Joint and individual analysis of breast cancer histologic images and genomic covariates. *(Under review)*
5. Banerjee, S., Bhamidi, S., **Carmichael, I.** (2018). Fluctuation bounds for continuous time branching processes and nonparametric change point detection in growing networks. *(Under review)*
6. **Carmichael, I.**, Marron, J.S. (2017). Geometric insights into support vector machine behavior using the KKT conditions. *(Under review)*

Published

7. **Carmichael, I.**, Williams, JP. (2018). An exposition of the false confidence theorem. *Stat, 7(1), e201.*

8. **Carmichael, I.**, Marron J.S. (2018). Data science vs. statistics: two cultures?. *Japanese Journal of Statistics and Data Science, 1(1), 117-138.*

9. **Carmichael, I.**, Wudel, J., Kim, M., Jushchuk, J. (2017). Examining the evolution of legal precedent through citation network analysis. *NCL Rev. 96 (2017): 227.*

Talks and posters

"Joint and individual analysis of breast cancer histologic images and genomic covariates," *Harvard Medical School*, Boston, MA, December, 2019.

"Joint and individual analysis of histopathology images and genetic covariates," *Computational Medicine group*, Chapel Hill, NC, May, 2019.

"Fusion of image and genetic data with convolutional neural networks and AJIVE," *Bayesian, Fiducial, and Frequentist (BFF) Conference*, Durham, NC, April, 2019. (*poster*) https://idc9.github.io/assets/carmichael_bff_2019_compressed.pdf

"Angle-based Joint and Individual Variation Explained with Applications to Image and Genetic Data," *University of Illinois Urbana–Champaign, Department of Statistics*, Urbana, IL, February, 2019.

"Angle-based Joint and Individual Variation Explained with Applications to Image and Genetic Data," *University of Wisconsin–Madison, Department of Statistics*, Madison, WI, January, 2019.

"Angle-based Joint and Individual Variation Explained with Applications to Image and Genetic Data," *Harvard University, Department of Biostatistics*, Boston, MA, January, 2019.

"Angle-based Joint and Individual Variation Explained with Applications to Image and Genetic Data," *FocuStat Combo Kitchen*, Oslo, Norway, November, 2018.

"Angle-based joint and individual variation explained," *Joint PI Meeting: NSF BIGDATA and Big Data Hubs & Spokes*, Alexandria, VA, June, 2018. (*poster*) https://idc9.github.io/assets/ajive_carmichael_nsf_bigdata2018_poster.pdf

"Joint analysis of H&E stained images and genetic covariates using deep learning and AJIVE," *GenStat group*, Chapel Hill, NC, September, 2018.

"Word embeddings for computational humanities," *UNC Digital Innovation Lab*, Chapel Hill, NC, October 2017. https://github.com/idc9/word_embed_tutorial

"Data science and the undergraduate curriculum," *UNC STOR Department Colloquium*, Chapel Hill, NC, September 2017. https://idc9.github.io/assets/data_science_stor_colloquium.pdf

"Open data, networks and the law," *PyData Carolinas*, Raleigh, NC, October, 2016.

Professional Experience

Consultant, Reese News Lab, *Chapel Hill, NC* — Spring - Fall 2017

Research Scientist, Gamalon Machine Intelligence, *Cambridge, MA* — May - August 2016

Teaching

Instructor, STOR-BIOS Linear Algebra Summer Boot Camp, *UNC, Chapel Hill, NC* — Summer 2017

Instructor, STOR 390: Introduction to Data Science, *UNC, Chapel Hill, NC* — Spring 2017

- Created and taught the first data science course for UNC's undergraduate statistics major. https://idc9.github.io/stor390/

Graduate Research Consultant, JOMC 390: Data Driven Journalism, *UNC, Chapel Hill, NC* Spring 2016

Teaching Assistant, *UNC, Chapel Hill, NC*

- STOR 634: Measure Theory Fall 2015
- STOR 113: Decision Models for Business and Economics Fall 2014 - Spring 2015

Undergraduate student mentorship, *UNC, Chapel Hill, NC*

- Kate Cho (statistics) Spring 2016
- Michael Kim (statistics) Spring 2016 - Spring 2017
- James Jushchuk (computer science) Spring 2016 - Spring 2018
- Scott Garcia (statistics) Fall 2016
- Ethan Koch (statistics) Spring 2017 - Spring 2018
- Charles Tang (computer Science) Spring 2019

Awards

The Walter Deemer Excellence in Teaching Award, *UNC, Chapel Hill*, NC December 2018

Dean's Graduate Fellow in the College of Arts and Sciences, *UNC, Chapel Hill*, NC 2018-2019

Grant from Data@Carolina (with Shankar Bhamidi), *UNC, Chapel Hill*, NC Fall 2016

Regional Datathon winner (team of 4 winning $20,000 data science competition sponsored by Citadel), *Duke University, Durham, NC* April 2017

5th place in international Data Open Championship sponsored by Citadel, *Manhattan, NY* November 2017

Professional Service

Referee for: Journal of Machine Learning Research, IEEE Transactions on Neural Networks and Learning Systems, Journal of Applied Probability

UNC middle/high school science exposition, *UNC, Chapel Hill, NC* Spring 2018
https://github.com/idc9/UNC_science_expo_2018

Tutorials on R, Python, data science, optimization and natural language processing can be found on my github page (github.com/idc9) 2015 - present

Member of Evidence, Analysis, Interpretation, and Critique task force for UNC's Curriculum Development Committee, *UNC, Chapel Hill, NC* Spring 2017

Coach of UNC's undergraduate team competing in DataFest, *Duke University, Durham, NC* 2016 - 2017