

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

Cornell Alumni Admissions Ambassador , <i>Chapel Hill, NC</i>	2018 - Present
Consultant , Reese News Lab, <i>Chapel Hill, NC</i>	Spring - Fall 2017
Research Scientist , Gamalon Machine Intelligence, <i>Cambridge, MA</i>	May - August 2016

TEACHING

Instructor , STOR-BIOS Linear Algebra Summer Boot Camp, <i>UNC, Chapel Hill, NC</i>	Summer 2017
Instructor , STOR 390: Introduction to Data Science, <i>UNC, Chapel Hill, NC</i>	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