Iain Carmichael

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github.com/idc9
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Education

The University of North Carolina at Chapel Hill, Chapel Hill, NC — (expected) May 2019
Ph.D. Statistics
Department of Statistics and Operations Research
Thesis: *Topics in the analysis of non-standard data including networks, text and images*
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.**, Couture, H., Niethammer M., Perou C., Marron J.S. (2018). Joint analysis of H&E stained images and genetic covariates using deep learning and JIVE.
2. **Carmichael, I.**, Jung, M., Marron, J.S. (2018). Python, R and Matlab packages for angle-based joint and individual variation explained.

Under Review

3. Banerjee, S., Bhamidi, S., **Carmichael, I.** (2018). Fluctuation bounds for continuous time branching processes and nonparametric change point detection in growing networks. *(Under review)*
4. **Carmichael, I.**, Marron, J.S. (2017). Geometric insights into support vector machine behavior using the KKT conditions. *(Under review)*

Published

5. **Carmichael, I.**, Williams, JP. (2018). An exposition of the false confidence theorem. *Stat, 7(1), e201.*
6. **Carmichael, I.**, Marron J.S. (2018). Data science vs. statistics: two cultures?. *Japanese Journal of Statistics and Data Science, 1(1), 117-138.*
7. **Carmichael, I.**, Wudel, J., Kim, M., Jushchuk, J. (2017). Examining the evolution of legal precedent through citation network analysis. *NCL Rev. 96 (2017): 227.*

Presentations

"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

"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

Research Internship, RIPS program at IPAM in collaboration with the Aerospace Corporation, *UCLA, Los Angeles, CA* — June - August 2012

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

- Developed 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

Awards

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 IEEE Transactions on Neural Networks and Learning Systems

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

Supervised undergraduate theses/independent research along with Shankar Bhamidi (Ethan Koch, James Jushchuk, Kate Cho, Scott Garcia, and Michael Kim), *UNC, Chapel Hill, NC* 2015 - 2018

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

Software

Packages

PYJIVE: A python package implementing Angle-based Joint and Individual Variation Explained (AJIVE) for feature extraction with multiple data sets. https://github.com/idc9/pyjive/

RJIVE: An R package implementing AJIVE. https://github.com/idc9/r_jive/

JACKSTRAW: A python package implementing Jackstraw for inference on linear dimensionality reduction algorithms. https://github.com/idc9/jackstraw/

DIPROPERM: A python package implementing DiProPerm for high dimensional hypothesis testing with linear classifiers. https://github.com/idc9/diproperm/

Skills: R, Python, Matlab LaTeX, Bash, Github