

# Iain Carmichael

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## EDUCATION

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**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

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### 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

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“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](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](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](https://idc9.github.io/assets/data_science_stor_colloquium.pdf)

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

## PROFESSIONAL EXPERIENCE

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**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

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**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

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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

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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](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](https://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

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### 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/](https://github.com/idc9/r_jive/)

**Skills:** R, Python, Matlab  $\text{\LaTeX}$ , Bash, Github