Brendan Chambers

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EDUCATION

PhD University of Chicago, Committee on Computational Neuroscience 2016
- Topic: Motif analysis and temporal patterns in a neural communication network

BA Oberlin College, Department of Computer Science 2011
– Davenport Central High School
2007

RESEARCH EXPERIENCE

University of Chicago Postdoctoral Fellow 2017
- Transferred machine learning strategies to develop better causal inference tools
- Supervised & mentored two undergraduates, now placed into research jobs

University of Chicago PhD Candidate 2011-2016
- Compared network topologies and developed statistical nulls to control for sparseness
- Developed statistical methods to map network communication traffic and infer causal links
- Designed and implemented state-of-the-art spiking network simulations

Oberlin College Honors Scholar 2010
- Developed attention-steered deep auto-encoder for recognizing distorted text

Rockwell Collins Engineering Summer intern 2010
- Supported virtual sensing project & documented C++ code

Oberlin College Independent study 2010
Implemented Hopfield auto-encoder model for input completion

Oberlin College Undergraduate Research Assistant 2008-2009
- Preprocessed radio astronomy data and performed spectral analysis

INDEPENDENT PROJECTS

Mapped the full corpus of a popular computational biology journal using natural language processing 2018
- Developed custom web-scraper to harvest the complete history of PLoS Computational Biology
- Built a database of pre-processed text for analysis in multiple formats: SQLite, JSON, and Pandas
- Computed word-embedding encodings and quantified text similarity between all article pairs

Reported racial inequity in a statewide alleged gang-member database 2018
- Black residents of Illinois were overrepresented four-fold on the list compared to census data
- New entries to the database were even more skewed towards racial inequity

Identified voting blocs in legislative bodies (Chicago City Council, State Legislature of Iowa) 2018
- Developed custom web-scrapers to obtain voting data
- Analyzed rubber-stamp structure in voting records

Investigated racialized sentiment in Twitter statuses 2017
- Built databases of tweets using multiple methods: Streaming API, REST API, web-scraping
- Identified linguistic communities within tweets about Congressman John Lewis

DATA SKILLS

Programming Languages (years)
- Python (4) JavaScript/ES6 (1) Scheme (1) Java (4) Matlab (6)

Data Analysis
- Motif counting, community detection, designing statistical nulls, clustering, natural language processing

Machine Learning
- Deep autoencoders, recurrent neural networks, stochastic optimization

ARTICLES

Ensemble stacking mitigates biases in inference of synaptic connectivity 2017
Chambers B, Levy M, Dechery J, MacLean JN *Network Neuroscience*

Higher-order synaptic interactions coordinate dynamics in recurrent networks 2016
Chambers B, MacLean JN *PLoS Computational Biology*

Multineuronal activity patterns identify selective synaptic connections under realistic experimental… 2017
Chambers B, MacLean JN *Journal of Neurophysiology*

ABSTRACTS

Higher-order synaptic interactions shape neocortical activity beyond pairwise structure 2017
Chambers B, MacLean JN *NetSci Abstracts*

A small world of synaptic integration 2015
Chambers B, MacLean JN *Society for Neuroscience Abstracts*

Microcircuit activity is patterned topologically and reveals features of underlying connectivity 2014
Chambers B, Sadovsky AJ, MacLean JN *COSYNE Abstracts*

Detecting causal connectivity from spiking correlations 2014
Chambers B, Dechery J, MacLean JN *Society for Neuroscience Abstracts*

2007-2011

TEACHING EXPERIENCE

University of Chicago Breakout group leader, Brains! Workshop 2015

Chicago Public Schools Breakout group leader, Bret Harte Elementary 2015

University of Chicago Teaching Assistant, Department of Neuroscience 2012-2013

Oberlin College Teaching Assistant, Department of Physics & Department of Computer Science 2009-2011

Oberlin College Group Lab Tutor, Department of Computer Science 2010-2011

Oberlin Public Schools Math Tutor 2009-2011

Achieve Tutoring Match Tutor, Chevy Chase Community Center, Washington DC 2008

Davenport Public Schools Junior Summer Teacher, Day School Program for Literacy and Arts 2007

AWARDS

Symposium speaker at NetSci, interdisciplinary conference for network science 2017

50 Most-Downloaded Articles of the year list, PLOS Computational Biology 2017

University of Chicago Laura Thorne Donnelley Fellow 2017

Hot Topics Nominee, Society for Neuroscience 2016

NSF IGERT Fellow for Integrative Training in Neural Control of Movement 2012-2015

NSF S-STEM Scholar for Computation and Modeling 2009-2011

National Merit Scholar 2007-2009

John Fredrick Oberlin Scholar