Daniel J. Saunders

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BINDS Lab
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Education

M.Sc. Computer Science, University of Massachusetts, Amherst — 2017–2018
Concentration: machine learning, computational neuroscience
GPA: 3.7

B.S. Computer Science, University of Massachusetts, Amherst — 2012–2016
Concentration: theoretical computer science, artificial intelligence
GPA: 3.5

B.S. Mathematics, University of Massachusetts, Amherst — 2012–2016
Concentration: mathematical computing
GPA: 3.5

Employment

Graduate Research Assistant — Spring 2017–
Biologically Inspired Neural and Dynamical Systems Lab
Supervisor(s): Professors Robert Kozma and Hava Siegelmann

Data Science Intern — Summer 2018
HealthcareSource
Supervisor(s): Patrick McDonough

Programmer — Fall 2016–
Department of Resource Economics, University of Massachusetts, Amherst
Supervisor(s): Professors Christian Rojas and Debi Mohapatra

Research Intern — Summer 2017
Air Force Research Lab Automatic Target Recognition Center
Supervisor(s): Dr. Roman Ilin and Professor Robert Kozma

Programmer — Summer 2016
Biologically Inspired Neural and Dynamical Systems Lab
Supervisor(s): Dr. Hava Siegelmann

Programmer — Summer 2015–Winter 2017
Cognition and Action Lab, University of Massachusetts, Amherst
Supervisor(s): Professor Rebecca Spencer

Software Development Intern — Summer 2015
Epsilon
Supervisor(s): Patrick McDonough

Awards

Bay State Master's Program (50% of tuition & fees) — Spring 2017- Fall 2018

Graduate Research Fellowship — Spring 2017–Fall 2018

IJCNN 2018 - Nomination for Best Paper Award — Spring 2018
Unsupervised Learning with Self-Organizing Spiking Neural Networks

Publications

PREPRINTS

1. H. Hazan, D. J. Saunders, H. Khan, D. T. Sanghavi, H. T. Siegelmann, and R. Kozma. BindsNET: A machine learning-oriented spiking neural networks library in Python. *ArXiv e-prints*, June 2018. Submitted to *Frontiers in Neuroinformatics*.

CONFERENCE ARTICLES

2. H. Hazan, D. J. Saunders, D. T. Sanghavi, H. T. Siegelmann, and R. Kozma. Unsupervised learning with self-organizing spiking neural networks. In *International Joint Conference on Neural Networks*, 2018.
3. D. J. Saunders, H. T. Siegelmann, R. Kozma, and M. Ruszinkó. Unsupervised learning with self-organizing spiking neural networks. In *International Joint Conference on Neural Networks*, 2018.

WORKING PAPERS (WORKING TITLES)

4. H. Hazan, D. J. Saunders, H. T. Siegelmann, and R. Kozma. Biologically plausible unsupervised learning rules & architectures for spiking neural networks.
5. D. J. Saunders, C. Rojas, and D. Mohapatra. Using NYC taxicab trip records to improve prediction of hotel occupancy.
6. H. Hazan, D. Patel, D. J. Saunders, H. T. Siegelmann, and R. Kozma. Transferring reinforcement learning policies to spiking neural networks for Atari game-playing.

Talks & Presentations

POSTER PRESENTATIONS

1. D. J. Saunders, H. Hazan, H. Khan, H. T. Siegelmann, R. Kozma. BindsNET: An ML-oriented spiking networks library built with PyTorch. PyTorch Developers Conference 2018.

Software

1. BindsNET: A spiking neural networks simulation library built with PyTorch.
   GitHub repo: https://github.com/Hananel-Hazan/bindsnet
   Authors: **D. J. Saunders**, H. Hazan, and H. Khan.
2. NYC-TLC: A Python package for the downloading and manipulation of NYC taxi trip records using the Dask distributed computation library.
   GitHub repo: https://github.com/djsaunde/nyctlc
   Authors: **D. J. Saunders**

Technical Skills, etc.

- Programming languages (ordered by decreasing proficiency): Python, R, Java, C/C++, MATLAB, SQL, JavaScript, Haskell
- Machine learning frameworks (ordered by decreasing proficiency): PyTorch, Scikit-Learn, Keras, Tensorflow, Theano, MatConvNet
- Reading list: https://djsaunde.github.io/read/read.pdf
- Notes on lab work, books, and papers: https://djsaunde.github.io/notes

Relevant coursework

- Machine learning (undergraduate & graduate)
- Artificial intelligence (undergraduate & graduate)
- Deep neural networks
- Statistics I & II (undergraduate)
- Mathematical statistics I & II (graduate)
- Distributed & operating systems
- Causal inference
- Algorithms for data science
- Applied information theory
- Dynamical systems
- Computational complexity