DANIEL (DJ) STROUSE
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Born: Nov 24, 1987
in Elgin, IL
Citizenship: USA
Hometown: Newark, DE
Last updated: Jan 14, 2014

Education

9/2017 PhD in Physics
Princeton University, Princeton, NJ
Advisor: William Bialek

9/2012 Master's of Philosophy (MPhil) in Engineering
University of Cambridge, Cambridge, UK
Advisor: Máté Lengyel

5/2011 B.A. Physics (*magna cum laude*), B.S. Mathematics (*magna cum laude*)
University of Southern California (USC), Los Angeles, CA

Research Interests

- Design principles of biological systems
- Inference and prediction in biological systems
- Quantitative approaches to cultural phenomena

Grants, Honors, & Awards

2013-2017 Hertz Foundation Fellowship

2012-2016 DoE Computational Sciences Graduate Fellowship (*awarded in 2011)*

2011-2012 Churchill Scholarship

2011 Hertz Foundation Fellowship Finalist

2011 NSF Graduate Research Fellowship *(declined for DoE CSGF)*

2011 USC Order of the Laurel and the Palm *(highest honor bestowed upon graduating seniors)*

2011 Rose Hills Undergraduate Summer Research Fellowship

2011 USC Provost Undergraduate Spring Research Fellowship

2010 Stanford Amgen Scholar *(summer research fellowship)*

2009 USC Provost Undergraduate Summer Research Fellowship

2008 USC Global Fellow *(consulting internship in Shanghai, China)*

2008 USC Stevens Global Impact Fellow *(social entrepreneurship program in Karnataka, India)*

2006-2010 USC Presidential Scholarship *(half-tuition scholarship)*

2006 Eagle Scout

Journal Publications

X. Wu, **DJ Strouse**, & B. Mel. *Optimizing online learning capacity in a biologically-inspired neural network.* (in preparation)

AM Childs & **DJ Strouse**. *Levinson's theorem for graphs.* Journal of Mathematical Physics. Aug 2011. [arxiv] [journal]

Posters

DJ Strouse, Balazs Ujfalussy, & Mate Lengyel. *Dendritic subunits: the crucial role of input statistics and a lack of two-layer behavior.* Computational and Systems Neuroscience (Cosyne). Salt Lake City, UT. February 2013.

DJ Strouse, Jakob Macke, Roman Shusterman, Dima Rinberg, & Elad Schneidman. *Behaviorally-locked structure in a sensory neural code.* Sensory Coding & Natural Environment (SCNE). Vienna, Austria. September 2012.

DJ Strouse & Mate Lengyel. *Hierarchical generalized linear models of dendritic integration and somatic membrane potential.* Computational and Systems Neuroscience (Cosyne). Salt Lake City, UT. February 2012.

Bartlett Mel, Xundong Wu, & **DJ Strouse**. *Optimizing online learning capacity in a biologically-inspired memory structure.* Computational and Systems Neuroscience (Cosyne). Salt Lake City, UT. February 2012.

Xundong Wu, **DJ Strouse**, & Bartlett Mel. *Optimizing online learning capacity in a biologically-inspired neural network.* Society for Neuroscience (SfN). Washington, DC. November 2011. [link]

Xundong Wu, **DJ Strouse**, & Bartlett Mel. *Optimizing online learning capacity in a biologically-inspired neural network.* Annual Joint Symposium On Neural Computation. San Diego, CA. June 2011.

DJ Strouse. *Reliable brains from unreliable neurons – the search for synfire chains in the brain.* Stanford Amgen Scholars Symposium. Palo Alto, CA. August 2010.

Talks

8/2012 Advanced Course in Computational Neuroscience Symposium (Będlewo, Poland)
Title: Optimal dynamics for fast network responses

4/2012 Microsoft Research Cambridge, Machine Learning Group (Cambridge, UK)
Title: The Information Bottleneck Method

8/2011 Methods in Computational Neuroscience Symposium (MBL, Woods Hole, MA)
Title: Sniff-modulations of the olfactory bulb vocabulary

8/2010 Stanford Amgen Scholars Symposium (Palo Alto, CA) [link]
Title: Reliable brains from unreliable neurons – the search for synfire chains in the brain

7/2010 Open Science Summit (University of California, Berkeley, CA) [link]
Title: Open science is more than open publishing – meet CoLab

6/2010 Institute for Quantum Computing Colloquium (Waterloo, Ontario, Canada) [link]
Title: A Levinson's theorem for scattering on graphs

Research Experience (*project/publication still in progress)[1]

9/2011-8/2012* Churchill Scholar (University of Cambridge, Cambridge, UK)
Advisor: Máté Lengyel
Project: Hierarchical linear-nonlinear cascade models of dendritic integration
Summary: Developing a model of dendritic integration in single neurons based on hierarchical linear-nonlinear cascade models and applying the model to experimental data (from Tiago Branco, Michael Häusser, and Judit Makara) and compartmental model simulations (from Balázs Ujfalussy) in order to infer the presence/absence and extent of local nonlinear computational abilities in dendrites

8/2011* Methods in Computational Neuroscience Student (MBL, Woods Hole, MA)
Advisors: Elad Schneidman, Jakob Macke
Project: Behaviorally-locked structure in a sensory neural code
Summary: Studying how sniffing modulates the typical patterns of neural activity in the

[1] Additional information available at www.djstrouse.com.

mouse olfactory bulb (using data from the lab of Dima Rinberg) in order to better understand olfactory neural coding, the significance of diverse sniffing behaviors, and to determine whether it is possible to infer features of the sniff from local neural activity (i.e. without an efference copy of the motor command)

8/2010-7/2011* USC Provost Research Fellow (USC, Los Angeles, CA)
Advisor: Bartlett Mel
Project: Optimizing online learning capacity in a biologically-inspired neural network
Summary: Investigated the optimal dendrite morphology for memory capacity of a network and how that optimal morphology varies with input density, correlations, and noise

7/2010-8/2010 Stanford Amgen Scholar (Stanford University, Palo Alto, CA)
Advisor: Kwabena Boahen
Project: Reliable brains from unreliable neurons – the search for synfire chains in the brain
Summary: Developed mathematical models to study the development of "synfire chains" (network structures that increase the reliability of spatially and temporally patterned responses) in biologically plausible neural networks

6/2010-7/2010 Visiting Scholar (Institute for Quantum Computing, Waterloo, Ontario, Canada)
Advisor: Andrew Childs
Project: A Levinson's theorem for scattering on graphs
Summary: Proved a theorem on the relationship between the bound and scattering eigenstates for quantum scattering on graphs, which may aid the design of new algorithms for quantum computers

8/2009-5/2010 Undergraduate Researcher (USC, Los Angeles, CA)
Advisor: Ted Berger
Project: Towards real-time simulations of neural synapses
Summary: Investigated undesirable oscillations in the variable time step for the numerical integration method used in a neural synaptic modeling program developed by the Berger group and proposed and helped to implement an adaptive algorithm to speed up simulations

5/2009-7/2009 USC Provost Research Fellow (Institute for Scientific Interchange, Torino, Italy)
Advisor: Paolo Zanardi
Project: Statistical equilibration in the quantum world
Summary: Investigated the nature of statistical equilibrium in quantum mechanics through quantum spin models

12/2008-5/2009 Undergraduate Researcher (USC, Los Angeles, CA)
Advisor: Michael Arbib
Project: SemRep – a model for relating attention and sentence formation
Summary: Helped develop a cognitive model relating visual attention and sentence formation and conducted experiments on the relationship between eye movements and verbal scene descriptions to probe the model

Professional

3/2013 Organizer, Computational and Systems Neuroscience (Cosyne) workshop on *Dendritic computation in neural circuits*

12/2009-4/2012 Co-Founder, *CoLab*, an online set of tools designed to promote open and massively collaborative science

Summer Schools

8/2013 Computational and Cognitive Neuroscience Summer School (CCNSS)
Cold Spring Harbor Asia, Beijing, China

8/2012 Advanced Course in Computational Neuroscience (ACCN)
FENS-IBRO European Neuroscience School Programme, Będlewo, Poland

8/2011 Methods in Computational Neuroscience (MCN) summer course
Marine Biological Laboratory (MBL), Woods Hole, MA

Other Skills & Information

COMP. LANGUAGES	Python, Matlab, Mathematica
HUMAN LANGUAGES	English (fluent), Mandarin (conversational), Spanish (conversational)
HOBBIES	hiking, running, traveling, using the web to improve how science is done and shared