

**DANIEL (DJ) STROUSE**  
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Born: Nov 24, 1987  
 in Elgin, IL  
 Citizenship: USA  
 Hometown: Newark, DE  
 Last updated: Jan 21, 2012

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## Education

- 8/2012      Master's of Philosophy (MPhil) in Engineering  
 University of Cambridge  
*Advisor: Máté Lengyel*
- 8/2011      Methods in Computation Neuroscience summer course  
 Marine Biological Laboratory (MBL)
- 5/2011      B.A. Physics (*magna cum laude*), B.S. Mathematics (*magna cum laude*)  
 University of Southern California (USC)

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## Research Interests

- Information processing in physical and biological systems
- Normative theories in biology
- Theoretical neuroscience

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## Grants, Honors, & Awards

- 2012-2015    DoE Computational Sciences Graduate Fellowship (*awarded in 2011*)
- 2011-2012    Churchill Scholarship
- 2011          NSF Graduate Research Fellowship (*declined for DoE CSGF*)
- 2011          Hertz Foundation Fellowship Finalist
- 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          National Merit Scholar
- 2006          Eagle Scout

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## Journal Publications

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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]

## Conference Proceedings

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**DJ Strouse** & Mate Lengyel. *Hierarchical generalized linear models of dendritic integration and somatic membrane potential*. Cosyne, February 2012.

Bartlett Mel, Xundong Wu, & **DJ Strouse**. *Optimizing online learning capacity in a biologically-inspired memory structure*. Cosyne, February 2012.

Xundong Wu, **DJ Strouse**, & Bartlett Mel. *Optimizing online learning capacity in a biologically-inspired neural network*. Program No. 869.12. 2011 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2011. Online. [link]

## Presentations

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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 Alta, 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<sup>1</sup>

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9/2011-8/2012      Churchill Scholar (University of Cambridge, Cambridge, UK)  
*Advisor: Máté Lengyel*  
*Project: Hierarchical generalized linear models for dendritic integration and somatic membrane potential*  
*Summary: Developing a model of dendritic integration and somatic membrane potential based on hierarchies of generalized linear models and applying the model to experimental data (from the labs of Michael Häusser, Judit Makara, and Szabolcs Káli) in order to infer the functional architecture of a neuron*

8/2011      Methods in Computational Neuroscience Student (MBL, Woods Hole, MA)  
*Advisors: Elad Schneidman, Jakob Macke*  
*Project: Sniff-modulations of the olfactory bulb vocabulary*  
*Summary: Studied how sniffing modulates the typical patterns of neural activity in the mouse olfactory bulb (using data from the lab of Dima Rinberg) in order to better understand 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*

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<sup>1</sup>Additional information available at [www.djstrouse.com](http://www.djstrouse.com).

- 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

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### **Other Skills & Information**

COMP. LANGUAGES    C++, Python, Matlab, Mathematica

HUMAN LANGUAGES   English (fluent), Mandarin (conversational), Spanish (conversational)

HOBBIES             hiking, running, using the web to improve how science is done and shared