

Education

PhD, Physics	Princeton University	2012 – 2018
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- *Research*: information-theoretic regularization in supervised, unsupervised, and reinforcement learning
- *Advisors*: David J Schwab, William Bialek

MPhil, Information Engineering	University of Cambridge	2011 – 2012
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- *Research*: neural network models for dendritic integration of synaptic inputs
- *Advisor*: Máté Lengyel

BA, Physics and BS, Math	University of Southern California	2006 – 2011
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- *Research*: quantum algorithms, quantum information theory, the role of dendritic computation in recognition memory
- *Advisors*: Bartlett Mel, Paolo Zanardi, Andrew Childs

Work Experience

Intern	Google DeepMind	June 2017 – October 2017
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- Worked with Matt Botvinick on the neuroscience team
- Used information theory and variational inference techniques to encourage deep RL agents in multi-task settings to develop hierarchical task representations that transfer well

Machine Learning Intern	Spotify	June 2016 – June 2017
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- Analyzed ad campaign AB tests using Bayesian hypothesis testing and presented results to key stakeholders
- Developed probabilistic models of musical taste with applications in recommendations, fraud detection, and ad targeting
- Worked on information-theoretic clustering models for user segmentation

Data Science Intern	Zynga	Summer 2015
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- Specialized in classification of imbalanced datasets
- Surveyed and tested a wide range of resampling and cost-sensitive methods on a variety of datasets

Awards and Recognition

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- Hertz Fellowship (2012-2018)
 - Churchill Scholarship (2011-2012)
 - Department of Energy Computational Sciences Graduate Fellowship (CSGF) (2012-2016)
 - USC Order of the Laurel and the Palm (2011)
 - USC Presidential Scholarship (2006-2011)

Publications¹

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- **DJ Strouse**, Max Kleiman-Weiner, Josh Tenenbaum, Matt Botvinick, & David Schwab. Learning to share and hide intentions using information regularization. *Neural Information Processing Systems (NIPS)*, 2018.
 - **DJ Strouse** & David Schwab. The information bottleneck and geometric clustering. *Neural Computation (NECO)*, 2018.
 - **DJ Strouse** & David Schwab. The deterministic information bottleneck. *Neural Computation (NECO)*, 2017.
 - **DJ Strouse** & David Schwab. The deterministic information bottleneck. *Uncertainty in Artificial Intelligence (UAI)*, 2016.
 - Andrew Childs & **DJ Strouse**. Levinson's theorem for graphs. *Journal of Mathematical Physics (JMP)*, 2011.

In review

- Xundong Wu, Gabriel C. Mel, **DJ Strouse**, & Bartlett W. Mel. How dendrites affect online recognition memory.

In preparation

- **DJ Strouse** & David Schwab. Deep variational deterministic information bottleneck.

¹See www.djstrouse.com for latest project and publication information.

Presentations

Talks

- An information theoretic approach to geometric clustering. *American Physical Society (APS)*. Mar 2017.
- The deterministic information bottleneck. *American Physical Society (APS)*. Mar 2016.
- The deterministic information bottleneck. *Physics-Informed Machine Learning (PIML)*. Jan 2016.
- The information bottleneck method. *Microsoft Research Cambridge (UK)*. Apr 2012.
- Open science is more than open publishing - meet CoLab. *Open Science Summit*. Jul 2010.
- A Levinson's theorem for scattering on graphs. *Institute for Quantum Computing (IQC)*. Jun 2010.

Posters

- **DJ Strouse** & David Schwab. The deterministic information bottleneck: optimizing memory for prediction. *Society for Neuroscience (SfN)*. Nov 2014.
- **DJ Strouse**, Balazs Ujfalussy, & Máté Lengyel. Dendritic subunits: the crucial role of input statistics and a lack of two-layer behavior. *Computational and Systems Neuroscience (Cosyne)*. Feb 2013.
- **DJ Strouse**, Jakob Macke, Roman Shusterman, Dima Rinberg, & Elad Schneidman. Behaviorally-locked structure in a sensory neural code. *Sensory Coding & Natural Environment (SCNE)*. Sept 2012.
- **DJ Strouse** & Máté Lengyel. Hierarchical generalized linear models of dendritic integration and somatic membrane potential. *Computational and Systems Neuroscience (Cosyne)*. Feb 2012.
- Xundong Wu, **DJ Strouse**, & Bartlett Mel. Optimizing online learning capacity in a biologically-inspired memory structure. *Computational and Systems Neuroscience (Cosyne)*. Feb 2012.
- Xundong Wu, **DJ Strouse**, & Bartlett Mel. Optimizing online learning capacity in a biologically-inspired neural network. *Society for Neuroscience (SfN)*. San Diego, CA. Jun 2011.

Skills and Languages

- *Programming languages*: Python, TensorFlow, R
- *Technical skills*: reinforcement learning, information theory, deep learning

Professional Service

- Co-Organizer, Hertz Foundation East Coast Fellows Retreat, Oct 2015 and Oct 2017
- Co-Organizer, Cosyne workshop on *Dendritic computation in neural circuits*, Mar 2013
- Co-Founder, CoLab - an online set of tools to enable open & massively collaborative science, Dec 2009 – Apr 2012

Other Education

- Computational and Cognitive Neuroscience Summer School (CCNSS). Beijing, China. Aug 2013.
- Advanced Course in Computational Neuroscience (ACCN). Bedlewo, Poland. Aug 2012.
- Methods in Computational Neuroscience (MCN). Woods Hole, MA. Aug 2011.