www.djstrouse.com

DJ Strouse

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Education

PhD, Physics — **Princeton University** — **2012 – 2018**

- *Research*: information-theoretic regularization for reinforcement learning and supervised learning
- *Advisor*s: William Bialek, David J Schwab

MPhil, Information Engineering — **University of Cambridge** — **2011 – 2012**

- *Research*: neural network models for dendritic integration of synaptic inputs
- *Advisor*: Máté Lengyel

BA, Physics and BS, Math — **University of Southern California** — **2006 – 2011**

- *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**

- 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**

- 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**

- 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

- Hertz Fellowship (2012-present)
- 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)

Skills and Languages

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

Publications

- **DJ Strouse**, Max Kleiman-Weiner, David Schwab, Josh Tenenbaum, & Matt Botvinick. *Sharing and hiding information to cooperate and compete using information regularization*. 2018. (in preparation)
- **DJ Strouse** & David Schwab. *The information bottleneck and geometric clustering*. 2017. (submitted)
- **DJ Strouse** & David Schwab. *The deterministic information bottleneck*. Neural Computation, 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, 2011.

Presentations

Talks

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

Posters

- **DJ Strouse** & David Schwab. *The deterministic information bottleneck*. Uncertainty in Artificial Intelligence (UAI). Jersey City, NY. Jun 2016.
- **DJ Strouse** & David Schwab. *The deterministic information bottleneck: optimizing memory for prediction*. Society for Neuroscience (SfN). Washington, DC. 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). Salt Lake City, UT. 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). Vienna, Austria. Sept 2012.
- **DJ Strouse** & Máté Lengyel. *Hierarchical generalized linear models of dendritic integration and somatic membrane potential*. Computational and Systems Neuroscience (Cosyne). Salt Lake City, UT. Feb 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. 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.

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.