

Lyndon Duong

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SUMMARY

I am a computational neuroscience researcher studying statistical adaptation and continual learning in neural networks. Through understanding how neural populations rapidly adapt to dynamically varying inputs, I seek to develop unsupervised online learning algorithms to enable more generalizable and data-efficient machine learning models. My work involves close collaboration with experimental physiologists on projects involving statistical modeling of high-dimensional neural datasets.

Technical skills: Python (PyTorch, NumPy, matplotlib); MATLAB; LaTeX; numerical linear algebra; Bayesian statistics; signal processing; machine learning.

EDUCATION **Doctor of Philosophy**, Neural Science Present

New York University, New York, NY, USA

Thesis: Statistical adaptation and gain control in recurrent neural circuits

Advisors: Eero Simoncelli, David Heeger

Master of Science, Physiology and Pharmacology Jun 2018

Western University, London, ON, Canada

Thesis: A normalization circuit of attention in primate lateral prefrontal cortex

Advisor: Julio Martinez-Trujillo

Bachelor of Science, Joint Major in Physiology and Physics May 2014

McGill University, Montreal, QC, Canada

Dean's Multidisciplinary Undergraduate Research List

Thesis (Physiology): Spike count correlations among neuron types in prefrontal cortex

Advisor: Julio Martinez-Trujillo

Thesis (Physics): Effects of ionic buffer strength on polymer confinement in nanocavities

Advisor: Walter Reisner

WORK **Manager, Projects and Operations** Sep 2016 – Jun 2018

EXPERIENCE Ben Graham Centre for Value Investing, Ivey Business School, Western University

- Performed equity valuations and wrote quarterly reports for endowed investment fund
- Analyzed large retail banking datasets for academic study in behavioural finance

TEACHING **Graduate Teaching Assistant** Sep 2019 – Dec 2019

EXPERIENCE Mathematical Tools for Neural and Cognitive Science (NEURL-GA.2201)

Center for Neural Science, New York University

Graduate Teaching Assistant Sep 2015 – Apr 2016

Physiology Laboratory (Physiology 3130z)

Department of Physiology and Pharmacology, Western University

- Nominated for Graduate Student Teaching Award

SELECTED **plenoptic.py** May 2019 – Present

OPEN-SOURCE github.com/LabForComputationalVision/plenoptic

- PROJECTS
- Machine learning PyTorch library for analyzing model internal representations
 - Developed code to assess a model's input sensitivity using randomized eigenvalue algorithms

Analyzing neural time series data Sep 2015 – Present

github.com/lyndond/Analyzing_Neural_Time_Series

- Signal processing tools implemented in Python popular among neuroscience researchers

Lyndon Duong — Publications and Presentations

REFEREED JOURNAL PUBLICATIONS

1. Roussy, M., Luna, R., **Duong, L.** et al. “Ketamine disrupts naturalistic coding of working memory in primate lateral prefrontal cortex networks.” *Molecular Psychiatry*, 2021.
2. Gulli, R.A., **Duong, L.**, Corrigan, B.W., et al. “Flexible coding of memory and space in the primate hippocampus during virtual navigation”, *Nature Neuroscience*; 23: 103–112, 2020.
3. Doucet, G., Corrigan, B.W., Gulli, R.A., **Duong, L.**, Martinez-Trujillo, J.C. “Modulation of local field potentials and neuronal activity in primate hippocampus during saccades.” *Hippocampus*; 30: 192– 209, 2020.
4. **Duong, L.**, Leavitt, M.L., Pieper, F., Sachs, A., Martinez-Trujillo, J.C. “A normalization circuit in the lateral prefrontal cortex facilitates competitive interactions between neurons during the allocation of attention.” *eNeuro*; 6 (2), 2019.
5. Klotz, A.R., **Duong, L.**, Mamaev, M., de Haan, H., Chen, J., Reisner, W. “Measuring the confinement free energy and effective width of single polymer chains via single molecule tetris.” *Macromolecules*; 48 (13), 4742-4747, 2015.
6. Klotz, A.R., Mamaev, M., **Duong, L.**, de Haan, H., Reisner, W. “Correlated Fluctuations of DNA Between Nanofluidic Entropic Traps.” *Macromolecules*, 48 (14), 5028-5033, 2015.

SELECTED CONFERENCE PRESENTATIONS

Oral

1. **Duong, L.**, Leavitt, M.L., Pieper, F., Sachs, A., Martinez-Trujillo, J.C., “Ensemble coding of spatial working memory and attention in primate lateral prefrontal cortex.” Society for Neuroscience. San Diego, CA, USA. November 2018.
2. Martinez-Trujillo, J.C., **Duong, L.**, Abbass, M., Pieper, F., Sachs, A., “Temporal ensemble code of visuospatial attention in primate lateral prefrontal cortex.” Society for Neuroscience. Washington D.C., USA. November 2017.

Posters

1. **Duong, L.**, Gulli, R.A., Corrigan, B.W., Leavitt, M.L., Doucet G., Sachs, A., Martinez-Trujillo, J.C. “Lateral prefrontal cortex single neuron and ensemble activity during associative learning in virtually navigating primates.” Society for Neuroscience. Washington D.C., USA. November 2017.
2. **Duong, L.**, Abbass, M., Pieper, F., Sachs, A., Martinez-Trujillo, J.C. “Neural network properties are dynamically modulated by attention in primate lateral prefrontal cortex.” Society for Neuroscience. San Diego, CA, USA. November 2016.
3. **Duong, L.**, Leavitt, M.L., Pieper, F., Sachs, A., Martinez-Trujillo, J.C. “Construction of neural ensembles for optimal decoding of attention in primate prefrontal cortex.” Center for Visual Science Symposium: The Future of Attention. Rochester, NY, USA. May 2016.
4. **Duong, L.**, Pieper, F., Sachs, A., Martinez-Trujillo, J.C. “Effects of neural ensemble size and composition on the decoding of attention in primate lateral prefrontal cortex.” Vision Sciences Society. St. Pete Beach, FL, USA. May 2016.
5. **Duong, L.**, Abbass, M., Pieper, F., Sachs, A., Martinez-Trujillo, J.C. “Attention and normalization in area 8a of the primate dorsolateral prefrontal cortex are cell type dependent.” Society for Neuroscience. Chicago, IL, USA. October 2015.
6. **Duong, L.**, Tremblay, S., Pieper, F., Martinez-Trujillo, J.C. “Correlation between the effects of attention and response normalization in prefrontal area 8A neurons shows cell type dependence.” Vision Sciences Society. St. Pete Beach, FL, USA. May 2015.