Lyndon Duong

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SUMMARY

> I am a computational neuroscience researcher studying statistical adaptation in biological neural networks. Through understanding how neural populations rapidly adapt to dynamically varying inputs, I seek to develop unsupervised online learning algorithms, enabling more robust and data-efficient models with wide applicability.
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> **Technical expertise**: Python (PyTorch, NumPy, matplotlib); MATLAB; Git; 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 EXPERIENCE

Manager, Projects and Operations   Sep 2016 – Jun 2018
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 EXPERIENCE

Graduate Teaching Assistant   Sep 2019 – Dec 2019
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 OPEN-SOURCE PROJECTS

plenoptic.py   May 2019 – Present
github.com/LabForComputationalVision/plenoptic
- A PyTorch library for analyzing and understanding learned 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
- Python implementations of data analysis and signal processing techniques from textbook 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.