Francisco J. Luongo

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Education

University of California, San Francisco, San Francisco, CA

Ph.D., Neuroscience, December 2015

- Thesis Topic: *Information processing and computation in prefrontal microcircuits*
- Thesis Advisor: Vikaas S. Sohal, M.D., Ph.D

Stanford University, Palo Alto, CA

B.S., Biology, May 2008

Current Position

Research Scientist — Septembet 2020 to present
Facebook Reality Labs

Research Interests

neural computation, sensory encoding/decoding models, machine learning, neural networks, cortical microcircuits, network analysis, calcium imaging, ECoG time-series analysis, scientific computing

Past Research Experience

Postdoctoral Fellow — January 2016 to August 2020
California Institute of Technology
Supervisor: Doris Y. Tsao, Ph.D

Doctoral Student — June 2011 to December 2015
University of California San Francisco
Supervisor: Vikaas S. Sohal, M.D., Ph.D

Research Assistant — July 2008 to Aug 2010
Stanford University
Supervisor: Thomas Clandinin, Ph.D

Undergraduate Researcher — Dec 2006 to June 2008
Stanford University
Supervisor: Liqun Luo, Ph.D

Publications

1. Lee AT, Cunniff MM, See JZ, Wilke SA, **Luongo, FJ**, Ellwood IT, Ponnavolu S, and Sohal VS (2019) "VIP interneurons contribute to avoidance behavior by regulating information flow across hippocampal-prefrontal networks." 2019 *Neuron* *link*

2. Kirkby L., **Luongo, F.**, Rao, V., Dawes, H., Chang, E., and Sohal, V.S. "An amygdala-hippocampus subnetwork that encodes variation in human mood." November 2018 *Cell* *link*

3. Marton, T., Seifikar, H., **Luongo, F.**, and Sohal, V.S. "Roles of prefrontal cortex and mediodorsal thalamus in task engagement and behavioral flexibility." *Journal of Neuroscience*, February 2018 *link*

4. **Luongo, F.**, Zimmerman, C., Horn, M., and Sohal, V.S. "Correlations between prefrontal neurons form a small world network that optimizes the generation of multineuron sequences of activity." *Journal of Neurophysiology*, May 2016 *link*

5. **Luongo, F.**, Horn, M., and Sohal, V.S. "Putative microcircuit-level substrates for attention are disrupted in mouse models of autism." *Biological Psychiatry*, Apr 2016 *link*

6. Gee, S., Ellwood, I., Patel, T., **Luongo, F.**, Deisseroth, K., and Sohal, V.S. "Synaptic activity unmasks dopamine D2 receptor modulation of a specific class of layer V pyramidal neurons in prefrontal cortex." *Journal of Neuroscience*, February 2012. *link*

7. Gohl D.M., Silies M.A., Gao X.J., Bhalerao S., **Luongo F.J.**, Potter C.J., and Clandinin T.R. "A versatile in--vivo system for directed genetic dissection of gene expression patterns." *Nature Methods*, March 2011. *link*

Papers in Preparation

1. **Luongo F.**, Liu, L., Tsao, D. "A visual shortcut to figure ground perception in a low-acuity animal."

2. **Luongo, F.**, Kirkby, L., Lee, M., Dawes, H., Chang, E.C., Sohal, V.S. "Key interactions efficiently summarize distributed network activity within chronic, large-scale recordings in the human brain."

Relevant Talks

1. **Luongo F.**, 'Identifying Object Representations in the Rodent Visual System.'
   Chen Institute Workshop on Computational Approaches to Neuroscience, [Pasadena, CA], 2017. *link*

Conference Abstracts

1. Lanfranchi, F., Wekselblatt J., **Luongo, F.**, and Tsao, D. "Behavioral tools for studying object vision in the Northern Tree Shrew" *Society for Neuroscience (SFN)*, [Chicago, USA], 2019

2. **Luongo, F.**, Liu, L., and Tsao, D. "A fundamental difference between rodent and primate object vision" *COSYNE*, [Lisbon, Portugal], 2019 *link*

3. **Luongo, F.**, Liu, L., and Tsao, D. "Scene segmentation in the mouse" *Society for Neuroscience (SFN)*, [Washington D.C., USA], 2018 *link*

4. **Luongo, F.**, Liu, L., and Tsao, D. "Figure ground modulation in the mouse visual system" *Society for Neuroscience (SFN)*, [Washington D.C., USA], 2017 *link*

5. **Luongo, F.**, Liu, L., and Tsao, D. "Extra-classical receptive field effects on visual processing in the awake rodent" *Society for Neuroscience (SFN)*, [San Diego, USA], 2016 *link*

6. Kirkby, L., **Luongo, F.**, Nahum, M., Van Vleet, T., Lee, M., Dawes, H., Chang, E., and Sohal, V. "Intrinsic network for mood in the human " *Society for Neuroscience (SFN)*, [San Diego, USA], 2016 *link*

7. Kirkby, L., **Luongo, F.**, Nahum, M., Van Vleet, T., Lee, M., Dawes, H., Chang, E., and Sohal, V. "Neural biomarkers of mood in the human mesolimbic network" *Society for Neuroscience (SFN)*, [Chicago, USA], 2015 *link*

8. **Luongo, F.**, Horn, M., and Sohal, V.S. "Changes in prefrontal microcircuit organization increase repetitive network activity in two mouse models of autism" *AREADNE: Research in encoding and decoding of neural ensembles*, [Santorini, Greece], 2014. *link*

9. **Luongo, F.**, Horn, M., and Sohal, V.S. "Changes in prefrontal microcircuit organization increase repetitive network activity in two mouse models of autism" *COSYNE*, [Salt Lake City, Utah], 2014. *link*

Funding

Burroughs Wellcome Fund PDEP award	2018-2021
Arnold O. Beckman Postdoctoral Fellowship (Accepted)	2017-2019
Della Martin Postdoctoral Fellowship (Awarded)	2017
National Institute of General Medicine IMSD predoctoral fellow	2010-2013

Relevant coursework

Methods in computational neuroscience, Bayesian inference, Machine Learning Summer School (MLSS), Linear algebra, Multi-variable calculus, Statistics

Techniques and Software Skills

Techniques:

2-photon calcium imaging, electrophysiology, Optogenetics, calcium imaging, micro-endoscope imaging, histology, cloning, drosophila genetics

Programming languages

python, Matlab, unix, git, bash

References

Doris Y. Tsao
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