JINGYANG ZHOU

Center for Computational Neuroscience, Flatiron Institute
160 5th Avenue, NY 10010, USA
jyzhou@flatironinstitute.org
(917) 340-6720

ACADEMIC POSITIONS

Postdoctoral researcher **11/2019 - present**

Center for Computational Neuroscience, Flatiron Institute / Center for Neural Science, NYU/ Howard Hughs Medical Institute.

Supervisor: Eero Simoncelli
Research: human/machine perception, computational neuroscience, machine learning.

EDUCATION

Psychology department at New York University **09/2013 - 09/2019**

Ph.D in Psychology (Cognition and Perception).

Advisor: Jonathan Winawer.

Research*:* Neuroimaging, computational models of perceptual and cognitive processing, and object recognition.

Experience: I analyzed data from single-neuron spiking activities, local field potential (LFP), multi-unit activities (MUA), voltage sensitive dye (VSD), genetically-encoded Calcium imaging (GCaMP), fMRI, human Electrocorticography (ECoG), psychophysics and cognitive behavioral experiments. I collected fMRI data.

Coursework: Math tools for computational neuroscience, Signal processing (NYU engineering), image processing, advanced statistics, neuro-imaging methods, and psychophysics.

Mathematics and Economics department at New York University **09/2007 - 01/2012**

B.A. in Mathematics and Economics (theory, 2007–2012), *Magna cum laude*.

Research: Topology, theoretical economics and behavioral experiments.

Methods: Building axiomatic models, and design behavioral experiments.

Coursework: Real analysis (undergraduate and Phd-level), topology (undergraduate and Phd-level), abstract algebra (undergraduate), numerical methods (graduate), probability (graduate), linear algebra (graduate), microeconomics theory (graduate).

GRANTS, FELLOWSHIPS, AND AWARDS

Ted Coons Graduate Student Travel Award ($1000) **2018-2019**

NYU Dean's Dissertation Fellowship ($27526) **2018-2019**

Vision Science Society (VSS) Student Travel Award ($500) **2018**

NYU center of imaging token grant ($5000) **2017**

for "*Conservation of crowding distance in human hV4.*" (Co-PIs: Jonathan Winawer and Dennis Pelli.)

Ted Coons Graduate Student Travel Award ($1000) **2016-2017**

ACNN (Advanced computational neuroscience network) workshop scholarship **2016**

NYU GSAS Dean's student travel grant ($500) **2016**

Henry M. MacCracken scholarship for doctoral study **2013-2018**

NYU Dean's Honors List **2007-2011**

NYU Dean's undergraduate research fund (DURF) ($900) **2011**

for "*a modeling and experimental study of working memory.*" (Advisor: Andrew Caplin)

NYU freshmen and sophomore training grant (FAST) ($1000) **2008**

for "*Modeling and simulating addictive behavior.*" (Advisor: Ennio Stacchetti)

Funding/awards to supervised student:

Silvia Choi, Hillary Ann Citrin Award for best Undergraduate Thesis. **2016**

for "*Temporal Integration and visual object recognition*." Mentored with Jonathan Winawer.

Silvia Choi, Dean's undergraduate research fund (DURF) ($1000) **2015**

for "*Temporal Integration and visual object recognition*." Mentored with Jonathan Winawer.

SCIENTIFIC PUBLICATIONS

- **Zhou, J**., Duong, L.R., and Simoncelli, E.P. A unified framework for perceived magnitude and discriminability of sensory stimuli. *Proceedings of the National Academy of Sciences* 121 (25), e2312293121, 2024. https://www.pnas.org/doi/epdf/10.1073/pnas.2312293121. Interview with Simons Foundation: Two Neuroscience laws governing how we sense the world finally united after 67 years.

- **Zhou, J.**, Whitmire, M., Chen, Y., and Siedemann, E. Disparate nonlinear neural dynamics measured with different techniques in macaque and human V1. *Scientific Reports, 14(1), 13193, 2024*. https://www.nature.com/articles/s41598-024-63685-6.

- **Zhou, J.**, Benson, N.C., Kay, K.N. and Winawer, J. Predicting neuronal dynamics with a delayed gain control model. *PLOS computational biology*. November 20th 2019. https://doi.org/10.1371/journal.pcbi.1007484.

- **Zhou, J.,** Benson, N.C., Kay, K.N. and Winawer. J. Systematic changes in temporal summation across human visual cortex. *Journal of Neuroscience,* 30 November 2017, 1724-17; https://doi.org/10.1523/JNEUROSCI.1724-17.2017.

- **Zhou, J.**, and Chun, C.W. *How does perceptual discriminability relate to neuronal receptive fields?* Under review, 2022. Under review at *Journal of Vision*. https://www.biorxiv.org/content/biorxiv/early/2022/12/22/2022.12.21.521510.full.pdf.

- **Zhou, J.** *Quantifying and predicting chromatic threshold.* Under review at *Journal of Vision*, 2023. https://www.biorxiv.org/content/10.1101/2023.06.06.543898v1.full.

- K. Kay, J.S. Prince, Gebhart, T., Tuckute, G., **Zhou, J.**, Naselaris, T., and Schutt H. Disentangling signal and noise in neural responses through generative modeling. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC11071385/.

The following are peer-reviewed articles published in conference proceedings. The review process, while less thorough than that for a journal article (in particular, a decision is made after one round of review), is still substantial. Acceptance rates are commonly the rate of 20 - 40%. The published articles are generally available online, and although they are not usually listed in ISI indices, they are widely read and cited in mathematical, engineering and machine learning community.)

- Duong, L.R.*, **Zhou, J.***, Nassar, J., Berman, J., Olieslagers, J., and Williams, A.H. Representational dissimilarity metric spaces for stochastic neural networks. *The International Conference on Learning Representations (ICLR)*, 2023. https://arxiv.org/pdf/2211.11665.pdf. (* indicates co-first authorship.)

- **Zhou, J.**, Chun, C.W., Subramanian, A., and Simoncelli, E. P. Comparing models of neural representation based on their metric tensors. *Neurips* 2023 *Unireps* (Unifying Representations in Neural Models) workshop. https://www.biorxiv.org/content/10.1101/2023.11.17.567604v1.full.pdf.

CONFERENCE/WORKSHOP PRESENTATIONS

Talks:

- **Zhou, J.** *Perceptual discriminability and metric properties of representational geometry***.** Manhattan representational geometry workshop, January 2023.

- **Zhou, J.**, Whitmire M., Chen, Y. and Siedemann, E. *Near-additive temporal dynamics of sub-threshold population responses in macaque V1*. Vision Science Society Meeting (VSS), May 2022.

- **Zhou, J.**, Duong, L.R., and Simoncelli, E.P. *Metric properties of representation geometries. Stanford Vision Brunch*, January 2022.

- **Zhou, J.**, Duong, L.R., and Simoncelli, E.P. *Fechner and Stevens can co-exist under Fisher's roof*. VSS, 2021.

- Burchell, A., Benson, N.C., **Zhou, J**., Winawer J., and Pelli D.G. *Using fMRI to link crowding to hV4.* Talk at VSS, May 2019.

- **Zhou, J.**, Benson, N.C., Kay, K.N., and Winawer, J. *Dynamics of temporal summation in human visual cortex*. Talk at VSS symposium "Advances in temporal models of human visual cortex," May 2018.

- **Zhou, J.,** Benson, N.C.**,** Pelli, D., and Winawer, J. *Conservation of crowding distance in human hV4*. Talk presented at Optical Society of America Fall Vision Meeting, October 2017, Washington, DC.

Posters:

- **Zhou, J.***,* and Chan, C. W.. *How does perceptual discrimination relate to neuronal receptive fields?* Vision Science Society Annual Meeting, May 2023.

- Duong, L. R., **Zhou, J.**, *Nassae, J., Berman, J., Olieslagers, J., and Williams, A. Representational dissimilarity metric spaces for stochastic neural networks.* The International Conference on Learning Representations (ICLR). May 2023, Rwanda.

- **Zhou, J.**, Duong, L.R., Nassae, J., Berman, J., Olieslagers, J., and Williams, A. *Representational dissimilarity metric spaces for stochastic neural networks*. Computational and Systems Neuroscience (COSYNE) 2023, Montreal and Mont Tremblant, Quebec, Canada. March 2023.

- **Zhou, J.,** Duong, L.R., and Simoncelli, E.P. *Relating percept to perceptual sensitivity using Fisher information.* Poster presented at Society for Neuroscience meeting, November 2021.

- Groen IIA, **Zhou J.**, Piantoni G., Hermes D., Flinker A., Devinsky O., Doyle W., Ramsey N., Petridou N., Winawer J. *The temporal dynamics of neuronal responses in human visual cortex*. OHBM (Organization for Human Brain Mapping) 2019.

- Groen IIA, **Zhou J**., Hermes D, Kay KN, and Winawer J. *Simulation and recovery of broadband field potentials.* SFN 2018.

- **Zhou, J.,** Benson, N.C.**,** Pelli, D., and Winawer, J. *Conservation of crowding distance in human hV4*. Poster presented at Vision Science Society Annual Meeting, May 2018.

- Schellekens, W., **Zhou, J.,** Siero, J., Benson, N., Groen, I., Piantoni, G., Devinsky, O., Petridou, N., Ramsey. NF, Winawer, J. *Extending Population Receptive fields to new domains.* April 2018. The 4th Annual BRAIN Initiative Investigators Meeting, NIH.

- Kay, K.N., Winawer, J., **Zhou, J.**, Sertel, M., Yoshor, D. and Beauchamp, M. *The dynamics of top-down modulation in human visual cortex*. Society for Neuroscience meeting, 2017, Washington DC.

- **Zhou, J.,** Choi, S., and Winawer, J. *Temporal windows in psychophysical discrimination and in neural responses in human visual cortex.* Poster presented at Vision Science Society Annual Meeting, May 2017.

- Choi, S., **Zhou, J.**, and Winawer, J. *Temporal integration and visual object recognition*. Undergraduate research conference at NYU, May 2016.

- **Zhou, J.,** Benson, N.C., Kay, K.N., and Winawer, J. *Temporal summation and Adaptation in Human Visual Cortex.* Poster presented at Vision Science Society Annual Meeting, May 2016.

GENERAL PUBLICATIONS

Zhou, J. *Geometry and How We See the World — a book review on Amir Alexander's "Proof! How the World Became Geometrical."* The Cooper Square Review, April 2020. http://coopersquarereview.org/review/geometry-and-how-we-see-the-world/**.**

TEACHING EXPERIENCE

Teaching assistant, undergraduate *Perception* at NYU — Fall 2016

Instructor, undergraduate *Perception* at NYU — Summer 2017

Grader, undergraduate *Calculus I— III* and *linear algebra* at NYU — 2008 - 2011

Organizer, Manhattan Representational Geometry workshop January 2023

TRAINING

Cold Spring Harbor Computational Neuroscience: Vision Summer 2018
Science Communication Workshop (hosted by Stephen Hall), NYU Spring 2016

PROFESSIONAL ACTIVITIES

- Organizing **Vision Journal Club** at NYU
  - — with Hormet Yiltiz 2016 - 2017
  - — by myself 2017 - 2019
  - — with Kathryn Bonnen 2019 - 2021
  - — With Robert Woodry 2021- present
- Organizing **Manhattan Representational Geometry workshop** with Niko Kriegeskorte, Xuexin Wei and Heiko Schutt (January, 2023).
- Interview for the **Flatiron Scientist Spotlight Series.** A New Era of Perception Research**.** January, 2023.
- Interview with the Simons Foundation: Two Neuroscience Laws Governing How We Sense the World Finally United After 67 years. June 2024.

PROFESSIONAL ORGANIZATIONS

Vision Science Society
Society for Neuroscience