

EDUCATION

Harvard University

Ph.D. Candidate in Psychology (Cognition, Brain, and Behavior)

Advisors: Dr. Talia Konkle and Dr. George Alvarez

Cambridge, MA

September 2021 – present

Carnegie Mellon University

Research Associate, Psychology Department

Advisor: Dr. Michael Tarr

Pittsburgh, PA

September 2019 – August 2021

Yale University

B.S. in Cognitive Science

Advisor: Dr. Hal Blumenfeld

New Haven, CT

September 2014 – December 2018

SELECTED PUBLICATIONS

Google Scholar profile (up-to-date)

1. Papadimitriou, I., **Prince, JS.**, (2025). Vocabulary embeddings organize linguistic structure early in language model training. *arXiv*. <https://doi.org/10.48550/arXiv.2510.07613>.
2. Thobani, I., Sagastuy-Brena, J., Nayebi, A., **Prince, JS.**, Cao, R., Yamins, D., (2025). Model-brain comparison using inter-animal transforms. *arXiv*. <https://doi.org/10.48550/arXiv.2510.02523>.
3. Kay, KN., **Prince, JS.**, Gebhart, T., Tuckute, G., Zhou, J., Naselaris, T., Schutt, H. (2025). Disentangling signal and noise in neural responses through generative modeling. *PLoS Computational Biology*. <https://doi.org/10.1371/journal.pcbi.1012092>.
4. Yu, M., Nan, M., Adeli, H., **Prince, JS.**, Pyles, JA., Wehbe, L., Henderson, MM., Tarr, MJ., Luo, AF., (2025). Meta-Learning an In-Context Transformer Model of Human Higher Visual Cortex. *NeurIPS 2025*. <https://doi.org/10.48550/arXiv.2505.15813>.
5. Conwell, C., McMahon, E., Jagadeesh, A., Vinken, K., Sharma, S., **Prince, JS.**, Alvarez, GA., Konkle, T., Livingstone, M., Isik L., (2025). Monkey See, Model Knew: Large Language Models Accurately Predict Visual Brain Responses in Humans and Non-Human Primates. *bioRxiv*. <https://doi.org/10.1101/2025.03.05.641284>.
6. Fel, T., Lubana, ES., **Prince, JS.**, Kowal, M., Boutin, V., Papadimitriou, I., Wang, B., Wattenberg, M., Ba, D., Konkle, T., (2025). Archetypal SAE: Adaptive and stable dictionary learning for concept extraction in large vision models. *ICML 2025*. <https://doi.org/10.48550/arXiv.2502.12892>.
7. **Prince, JS.**, Alvarez, GA., Konkle, T. (2024). Contrastive learning explains the emergence and function of visual category-selective regions. *Science Advances*. <https://doi.org/10.1126/sciadv.adl1776>.
8. **Prince, JS.**, Fajardo, G., Alvarez, GA., Konkle, T. (2024). Manipulating dropout reveals an optimal balance of efficiency and robustness in biological and machine visual systems. *ICLR 2024*. <https://openreview.net/forum?id=ADDCErFzev>.
9. Conwell, C., **Prince, JS.**, Alvarez, GA., Konkle, T. (2024). A large-scale examination of inductive biases shaping high-level visual representation in brains and machines. *Nature Communications*. <https://doi.org/10.1038/s41467-024-53147-y>.
10. **Prince, JS.**, Alvarez, GA., Konkle, T. (2024). Representation with a capital R: measuring functional alignment with causal perturbation. *UniReps Workshop @ NeurIPS 2024 (Oral)*. <https://openreview.net/forum?id=pn7KvRSRm3¬eId=jK926fssbe>.
11. **Prince, JS.**, Conwell, C., Alvarez, GA., Konkle, T. (2024). A case for sparse positive alignment of neural systems. *Re-Align Workshop @ ICLR 2024*. <https://openreview.net/forum?id=8FnN1QmR84>.

12. Vinken, K., **Prince, JS.**, Konkle, T., Livingstone, M. (2023). The neural code for ‘face cells’ is not face specific. *Science Advances*. <https://doi.org/10.1126/sciadv.adg1736>.
13. Sarch, G., Tung, HYF., Wang, A., **Prince, JS.**, Tarr, MJ., (2025). 3D view prediction models of the dorsal visual stream. *arXiv*. <https://doi.org/10.48550/arXiv.2309.01782>.
14. **Prince, JS.**, Charest, I., Kurzawski, JW., Pyles, JA., Tarr, MJ., Kay, KN. (2022). Improving the accuracy of single-trial fMRI response estimates using GLMsingle. *eLife*. <https://doi.org/10.7554/eLife.77599>.
15. Jain, N., Wang, A., Henderson, MH., Lin, R., **Prince, JS.** ... Wehbe L. (2022). Selectivity for food in human ventral visual cortex. *Nature Communications Biology*. <https://doi.org/10.1038/s42003-023-04546-2>.
16. Allen, EJ., St-Yves, G., Wu, Y., Breedlove, JL., **Prince, JS.** ... Kay KN. (2022). A massive 7T fMRI dataset to bridge cognitive neuroscience and artificial intelligence. *Nature Neuroscience*. <https://doi.org/10.1038/s41593-021-00962-x>.
17. Kronemer, SI., Aksen, M., Ding, Z., Ryu, JH., Xin, Q., Ding, Z., **Prince, JS.**...Blumenfeld, H. (2022). Human visual consciousness involves large scale cortical and subcortical networks independent of task report and eye movement activity. *Nature Communications*. <https://doi.org/10.1038/s41467-022-35117-4>.

INVITED TALKS

- Western University, Ontario - Mur Lab Meeting (PI: Marieke Mur) Nov. 19, 2025
Modeling the emergence and function of high-level representations in visual cortex
- Freie Universität Berlin - Neural Dynamics of Visual Cognition Group Meeting (PI: Radoslaw Cichy) Nov. 13, 2025
Adaptive denoising for improved computational models of neural datasets
- University of Minnesota - Center for Neuroengineering Seminar Sept. 15, 2025
Adaptive denoising for improved computational models of neural datasets
- University of Minnesota - Naselaris Lab Meeting (PI: Thomas Naselaris) Sept. 12, 2025
Feature accentuation along the encoding axes of IT reveals hidden differences in model-brain alignment
- Harvard Medical School - Primate Vision Group Joint Meeting (PIs: Marge Livingstone, Carlos Ponce) May 1, 2025
Feature accentuation along the encoding axes of IT reveals hidden differences in model-brain alignment
- Brown University – AI, Neuro, CogSci Research (ANCOR) talk series (PIs: Thomas Serre, Ellie Pavlick) Apr. 28, 2025
Modeling the emergence and function of high-level visual representations
- Stanford University – Scaffolding of Cognition Team (PI: Cameron Ellis) Mar. 14, 2025
Contrastive learning explains the emergence and function of visual category-selective regions
- University of Minnesota – Computational Visual Neuroscience Laboratory (PI: Kendrick Kay) Oct. 24, 2024
Enhancing the reliability of neural data with signal-aware low-rank denoising.
- Bissell Grogan Symposium, The Brimmer and May School, Newton MA Jan. 16, 2024
The promise and pitfalls of AI for visual recognition.
- Visual Inference Lab, Columbia University (PI: Nikolaus Kriegeskorte) Jan. 5, 2024
A unifying contrastive coding framework for visual category representation in the human brain.
- Vision and Computational Cognition Group, Max Planck Institute (PI: Martin Hebart) Dec. 21, 2023
A unifying contrastive coding framework for visual category representation in the human brain.
- Brains Minds and Machines Summer Course, Marine Biological Laboratory, Woods Hole Aug. 23, 2023
Quantifying dataset diversity with brain-guided curriculum learning.
- University of Minnesota – Dept. of Psychology Perception Lunch Feb. 21, 2023
GLMsingle: A toolbox for accurate single-trial fMRI response estimates.
- MIT Brain and Cognitive Sciences – Computational Tutorial Series April 29, 2022
GLMsingle: a toolbox for improving single-trial fMRI response estimates.
Recording: <https://cbmm.mit.edu/video/glm-single-toolbox-improving-single-trial-fmri-response-estimates>.

- University of Minnesota – Computational Visual Neuroscience Laboratory (PI: Kendrick Kay) Sept. 25, 2020
Data-driven fMRI denoising enhances cross-dataset representational stability and boosts image decodability.
- Natural Scenes Dataset Conference 2020 (online) Aug. 12, 2020
GLMSingle: a turnkey solution for accurate single-trial fMRI estimates.
- University of California, Irvine – Visual Perception and Neuroimaging Lab (PI: Emily Grossman) Mar. 18, 2020
The effect of fMRI design and preprocessing paradigms on SNR and temporal autocorrelation.
- Carnegie Mellon University - VisCog Group (PIs: M.Behrmann, D.Plaut, M.Tarr, B.Noizari, B.Mahon) Feb. 3, 2020
An overview of large-scale neuroimaging datasets and implications for the study of high level vision.

CONFERENCE TALKS

1. Prince, JS., Alvarez, GA., Konkle, T. (2024). Representation with a capital R: measuring functional alignment with causal perturbation. Presented at the UniReps Workshop, NeurIPS 2024, Dec 14, Vancouver, Canada.
2. Prince, JS., Conwell, C., Konkle, T. (2024). Large datasets: a Swiss Army knife for diverse research aims in NeuroAI. Presented at “Large-scale visual neural datasets: where do we go from here?” symposium; Vision Sciences Society, May 17-24, St. Pete Beach, FL.
3. Prince, JS., Fajardo, G., Alvarez, GA., Konkle, T. (2023). Manipulating category selectivity and information distribution in visual recognition systems using dropout. Presented at the Conference on Cognitive Computational Neuroscience, Aug 24-27, Oxford, UK.
4. Prince, JS., Konkle, T. (2022). Neural and computational evidence that category-selective visual regions are facets of a unified object space. Presented at the Vision Sciences Society, May 13-18, St. Pete Beach, FL.
5. Prince, JS., Konkle, T. (2020). Computational evidence for integrated rather than specialized feature tuning in category-selective regions. Presented at the Virtual Vision Sciences Society, June 19-24. Video: www.tinyurl.com/jp-vss2020.

SELECTED CONFERENCE POSTERS

1. Lahner, B.*, Luo, AF.*, Prince, JS.*, Deb, M., Henderson, MM., Pyles, JA., Wehbe, L., Oliva, A., Murty, AR., Tarr, MJ. (2025). CONFORM: A Project to Create Crowd-Sourced Open Neuroscience fMRI Foundation Models. Data on the Brain & Mind Workshop @ NeurIPS 2025, Dec 7, San Diego, California.
2. Prince, JS., Wang, B., Jagadeesh, AV., Fel, T., Lo, E., Alvarez, GA., Livingstone, MS., Konkle, T. (2025). Parametric control along the encoding axes of IT neurons uncovers hidden differences in model-brain alignment. Conference on Cognitive Computational Neuroscience, Aug 12-15, Amsterdam, Netherlands.
3. Prince, JS., Wang, B., Jagadeesh, AV., Fel, T., Lo, E., Alvarez, GA., Livingstone, MS., Konkle, T. (2025). Feature accentuation along the encoding axes of IT neurons uncovers hidden differences in model-brain alignment. Vision Sciences Society, May 16-20, St. Pete Beach, FL.
4. Prince, JS., Hamblin, C., Alvarez, GA., Konkle, T. (2024). Dissecting visual population codes with brain-guided feature accentuation. Presented at the Conference on Cognitive Computational Neuroscience, Aug 6-9, Boston, MA.
5. Prince, JS., Hamblin, C., Alvarez, GA., Konkle, T. (2024). Interpreting distributed population codes with feature-accentuated visual encoding models. Presented at Vision Sciences Society, May 17-24, St. Pete Beach, FL.
6. Conwell, C., Prince, JS., Alvarez, GA., Konkle, T. (2023). The Unreasonable Effectiveness of Word Models in Predicting High-Level Visual Cortex Responses to Natural Images. Presented at the Conference on Cognitive Computational Neuroscience, Aug 24-27, Oxford, UK.
7. Conwell, C., Prince, JS., Hamblin, C., Alvarez, GA. (2023). Controlled assessment of CLIP-style language-aligned vision models in prediction of brain & behavioral data. Presented at the Workshop on Understanding Foundation Models, ICLR 2023, May 1-5, Kigali, Rwanda.

8. Prince, JS., Alvarez, GA., Konkle, T. (2023). Lesioning category-selective units *in silico* yields functionally specialized deficits. Presented at the Vision Sciences Society, May 19-24, St. Pete Beach, FL.
9. Conwell, C., Prince, JS., Alvarez, GA., Konkle, T. (2023). Language Models of Visual Cortex: Where do they work? And why do they work so well where they do? Presented at the Vision Sciences Society, May 19-24, St. Pete Beach, FL.
10. Conwell, C., Prince, JS., Alvarez, G., Konkle, T. (2022). What can 5.17 billion regression fits tell us about artificial models and the human visual system? Presented at the Vision Sciences Society, May 13-18, St. Pete Beach, FL.
11. Conwell, C., Prince, JS., Kay, K., Alvarez, GA., Konkle, T. (2022). Opportunistic experiments on a large-scale survey of diverse artificial vision models in prediction of 7T human fMRI data. Presented at the Conference on Cognitive Computational Neuroscience, August 25-28, San Francisco, CA.
12. Vinken, K., Prince, JS., Konkle, T., Livingstone, M. (2022). Common encoding axes for face-selectivity and non-face objects in macaque face cells. Presented at the Conference on Cognitive Computational Neuroscience, August 25-28, San Francisco, CA.
13. Prince, JS., Charest, I., Kurzwaski, JW., Pyles, JA., Tarr, MJ., Kay, KN. (2021). GLMsingle: a turnkey solution for accurate single-trial fMRI response estimates. Presented at the Virtual Vision Sciences Society, May 21-26. Video: www.tinyurl.com/jp-vss2021.
14. Kallmayer, A., Prince, JS., Konkle, T. (2020). Comparing representations that support object, scene, and face recognition using deepnet trajectory analysis. Presented at the Virtual Vision Sciences Society, June 19-24.
15. Prince, JS., Konkle, T. (2019). Relating category-selective regions in biological and artificial neural networks. Presented at the Vision Sciences Society, May 17-22, St. Pete Beach, FL.
16. Prince, JS., Blumenfeld, H. (2017). Machine learning to predict conscious visual perception using pupillary dynamics. Presented at the Society for Neuroscience, November 11-15, Washington, D.C.

GRANTS AND AWARDS

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| <ul style="list-style-type: none"> • National Defense Science and Engineering Graduate (NDSEG) Fellowship • Elsevier/Vision Research Travel Award • Rising Stars Travel Grant: Shared Visual Representations in Humans and Machines Workshop | <p>Award Term: 2022-2024</p> <p>Vision Sciences Society 2020</p> <p>NeurIPS 2019</p> |
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ACTIVITIES AND SERVICE

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| <ul style="list-style-type: none"> • Co-chair, Trainee Organizing Committee, Cognitive Computational Neuroscience conference
<i>Extensive involvement in planning logistics for the conference; organizing 650-person social event.</i> • Brains, Minds, and Machines Summer Course, Marine Biological Laboratory, Woods Hole
<i>Attended intensive month-long summer school, completed project assessing whether human visual representational dimensions can guide the selection of useful training samples for object recognition ANNs.</i> • Mentor, Harvard Prospective Ph.D. & RA Event in Psychology (PPREP)
<i>Provide career guidance and CV/essay feedback to 3 students (per year) from historically minoritized groups in STEM who are applying to graduate school, lab manager, and/or research assistant positions.</i> • TA, Computational Methods in Human Neuroscience (NSCI 258, Prof. Nick Turk-Browne, Yale)
<i>Assisted with creation and debugging of Python workbooks with focus on ML-driven computational fMRI analyses. Mentored students and reinforced key concepts from lecture during weekly office hours.</i> • Journal and conference reviewing: Nature Neuroscience; ICLR; Imaging Neuroscience; Cognitive Computational Neuroscience; SVHRM Workshop @ NeurIPS; Re-Align Workshop @ NeurIPS; UniReps Workshop @ NeurIPS | <p>August 2024</p> <p>August 2023</p> <p>Sept. 2021 - present</p> <p>Spring 2019</p> |
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