

THOMAS ALEXANDRE LANGLOIS, PhD

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PROFESSIONAL EXPERIENCE

Massachusetts Institute of Technology (MIT), Brain and Cognitive Sciences (BCS) Cambridge, MA

Postdoctoral Associate (and visiting scholar at NYU Department of Psychology) 09/2024 — Present

- Implemented **information theoretic models** and quantitative analyses for **natural language processing** tasks
- Modeled efficient compression in human verb and noun usage using the **Information Bottleneck Principle (IB)**
- Designed, developed and deployed **large-scale web applications** for crowdsourcing human annotations over **Prolific**
- Published research findings in the **Proceedings of the Cognitive Sciences Society**. [[CogSci 2025](#)]

University of Texas at Austin, Center for Perceptual Systems (CPS) Austin, TX

Research Affiliate Postdoctoral Fellow 02/2023 — 09/2024

- Investigated how **visuomotor neurons** in the primate brain integrate sensory information with prior expectations
- Developed **Bayesian models** of non-human primate behavioral and neural response data
- Developed **drift diffusion models (DDMs)** of evidence accumulation in neural spiking activity in PFC
- Published research findings in the **Proceedings of the National Academy of Sciences (PNAS)** [[PNAS 2025](#)]

Princeton University, Department of Computer Science Princeton, New Jersey

Postdoctoral Research Associate 08/2018 — 02/2023

- Developed **Bayesian computational models** of perceptual inference and memory using **efficient coding theory**
- Designed, developed and deployed **large-scale web applications** investigating visual memory in over 10,000 subjects
- Built and evaluated computer vision **neural network models** to compare human visual selectivity to machine attention
- Presented findings in **Neural Information Processing Systems (NeurIPS)** as an oral presentation. [[NeurIPS 2021](#)]
- Published research findings in the **Proceedings of the National Academy of Sciences (PNAS)** [[PNAS 2021](#)]
- Published work in **ICML** [[ICML 2023](#)], and the **Proceedings of the Cognitive Sciences Society** [[CogSci 2019](#)]

EDUCATION

UC Berkeley, Department of Psychology (Cognition, Brain, & Behavior Program) Berkeley, CA

PhD, Psychology (Cognition Track) 08/2018

UC Berkeley, Electrical Engineering and Computer Sciences (EECS) Berkeley, CA

MS, Computer Science 08/2018

Georgetown University, College of Arts & Sciences Washington, DC

BA, Psychology (Cognitive Science) & BA Studio Art and Art History 08/2008

PUBLICATIONS

Langlois, T.A., Seethapathi, N., Levy, R., Zaslavsky, N. (2025). Efficient Compression in Locomotion Verbs Across Languages. In *Proceedings of the 47th Annual Conference of the Cognitive Sciences Society*. [[CogSci 2025](#)]

Langlois*, T.A., Charlton, J.*, Goris, R. (2024). Bayesian Inference by Visuomotor Neurons in Prefrontal Cortex. In *Proceedings of the National Academy of Sciences (PNAS)* 122(13). [[PNAS 2025](#)] [[Supplementary Information](#)]

Griffiths, T.L., Sanborn, Adam N., Marjieh, R., **Langlois, T.A.**, Xu, J., Jacoby, N. (2023). Bayesian models of cognition: Reverse-engineering the mind. Chapter 10: Estimating Subjective Probability Distributions. In *MIT Press*. [[Chapter 10](#)]

Marjeh, R., Sucholutsky, I., **Langlois, T.A.**, Jacoby, N., Griffiths, T. (2023). Analyzing Diffusion as Serial Reproduction. In *International Conference on Machine Learning (ICML)*. [\[ICML 2023\]](#)

Langlois*, T.A., Zhao*, H.C., Grant, E., Dasgupta, I., Jacoby, N., Griffiths, T. (2021). Passive Attention in Artificial Neural Networks Predicts Human Visual Selectivity. In *Advances in Neural Information Processing Systems (NeurIPS)*, 35. Accepted (Oral), ArXiv preprint: 2107.07013. [\[NeurIPS 2021\]](#) [\[Supplementary Information\]](#)

Langlois*, T.A., Jacoby*, N., Suchow, J., Griffiths, T. (2021). Serial Reproduction Reveals the Geometry of Visuospatial Representations. In *Proceedings of the National Academy of Sciences (PNAS)*, 118(13). [\[PNAS 2021\]](#) [\[Supplementary Information\]](#)

Langlois, T.A., Jacoby, N., Suchow, J., Griffiths, T. (2019). Orthogonal multi view three dimensional object representations in memory revealed by serial reproduction. In *Proceedings of the 41st Annual Conference of the Cognitive Science Society*. [\[CogSci 2019\]](#)

Langlois*, T.A., Jacoby*, N., Suchow, J., Griffiths, T. (2017). Uncovering visual priors in spatial memory using serial reproduction. In *Proceedings of the 39th Annual Conference of the Cognitive Science Society*. [\[CogSci 2017\]](#)

Palmer, S.E. & **Langlois, T.A.** (2017). Effects of Implied Motion and Facing Direction on Positional Preferences in Single Object Pictures. In *Perception*, 46(7), 815-829. [\[Perception 2017\]](#) [\[Supplementary Information\]](#)

Palmer, S.E., **Langlois, T.A.**, Schloss, K. (2016). Music to Color Associations of Single Line Piano Melodies in Non synesthetes. In *Multisensory Research*, 29(1-3), 157-193. [\[Multisensory Research 2016\]](#) [\[Supplementary Information\]](#)

SELECTED INVITED TALKS & PRESENTATIONS

University of Illinois Urbana-Champaign (UIUC), Champaign, Illinois, February 2025

Yale University, New Haven, CT, December, 2024

MIT CogLunch, Cambridge, MA, October, 2024

NYU ConCats, New York City, NY, October 2024

Redwood Center for Theoretical Neuroscience, University of California, Berkeley, August, 2024

UT Austin Dialogues, Austin, October 2023

Stanford University Wu Tsai Neurosciences Institute, January 2023

Redwood Center for Theoretical Neuroscience, University of California, Berkeley, December 2021

Harvard University, Harvard Vision Lab, December 2021

Max Planck Institute for Empirical Aesthetics (MPIEA), Frankfurt, October 2021

NYU ConCats, New York City, October 2021

Facebook Research Labs (AR/VR), New York City, 2020

Max Planck Institute for Empirical Aesthetics (MPIEA), Frankfurt, November 2019

Proceedings of the 41st Annual Conference of the Cognitive Science Society, Montreal, July 2019

Princeton University ImageX Labs (PIXL) lunch talk, Princeton University, Princeton, May 2018

Proceedings of the 39th Annual Conference of the Cognitive Science Society, London, July 2017
Redwood Center for Theoretical Neuroscience, University of California, Berkeley, April, 2017

SELECTED POSTERS

Goris, R., **Langlois, T.A.**, Charlton, J. (2024). Bayesian Inference by Visuomotor Neurons in Prefrontal Cortex. Presented at the 12st Annual Meeting of the Vision Sciences Society, St. Pete Beach, FL, May 2024.

Langlois, T.A., Charlton, J., Goris, R. (2023). Bayesian Inference by Visuomotor Neurons in Prefrontal Cortex. Program/poster No. PSTr433.21. 2023 Society for Neuroscience Meeting. Washington, DC: Society for Neuroscience, 2023.

Langlois, T. A.*, Zhao, H.C.*, Grant, E., Dasgupta, I., Griffiths, T. & Jacoby, N. (2021). Passive Attention In Neural Networks Predicts Human Visual Selectivity. Advances in Neural Information Processing Systems (NeurIPS), 35.

Langlois, T. A., Jacoby, N., Suchow, J., & Griffiths, T. (2019). Orthogonal multi-view three-dimensional object representations in memory revealed by serial reproduction. Proceedings of the 41st Annual Conference of the Cognitive Science Society.

Langlois, T. A., Jacoby, N., Suchow, J., & Griffiths, T. (2019). Biases in Visual Memory Reflect Precision not Prototypes. Presented at the 18th Annual Meeting of the Vision Sciences Society, St. Pete Beach, FL, May 2019.

AREAS OF EXPERTISE

Bayesian models of cognition: Ideal observer models, efficient coding theory, the Information Bottleneck (IB) principle. **Data analysis** Signal detection theory, neural data analysis, generalized linear models (GLMs). **Neural Networks** VAEs, CNNs. **Foundation Models** meta-motivo, LLaVa

TECHNICAL SKILLS

MATLAB, R (Simulations, statistical modeling, analysis, data visualization)

Python (Data science, machine learning, data visualization)

Tensorflow, Pytorch, Keras (neural network design, training, evaluation)

Git (Version control)