

# THOMAS ALEXANDRE LANGLOIS, PhD

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## PROFESSIONAL EXPERIENCE

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**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

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**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

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**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

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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  
 12st Annual Meeting of the Vision Sciences Society, St. Pete Beach, FL, May 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

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**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. [\[Poster\]](#)

**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. [\[Poster\]](#)

**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. [\[Poster\]](#)

#### AREAS OF EXPERTISE

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**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

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**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)