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 & BA Studio Art and Art History 08/2008

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 (extracellular electrophysiology data), generalized linear models (GLMs). **Neural Networks** VAEs, CNNs. **Foundation Models** meta-motivo (RL motor control system)

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)