

# CHRISTOPHER HAMBLIN

40 Dundee Rd Arlington, MA 02476

781-572-6159 ◊ chrishamblin@fas.harvard.edu ◊ github.com/chrishamblin7 ◊ [www.chrishamblin.xyz](http://www.chrishamblin.xyz)

## EDUCATION

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**Harvard University – Cambridge MA**

September 2019 - May 2024

*PhD Psychology*

GPA 4.0/4.0

Advisor George Alvarez, Vision Sciences Lab

Thesis Committee: Talia Konkle, Martin Wattenberg, and Thomas Serre

**Tufts University – Medford MA**

September 2011 - May 2015

*Bachelors of Science in Mathematics and Philosophy*

GPA 3.7/4.0

Magna Cum Laude

Highest Honors Thesis for *The Phenomenology of Bayesian Predictive Coding*

## RESEARCH EXPERIENCE

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**Harvard Vision Sciences Lab – Cambridge MA**

Sep 2019 - Present

*PhD Candidate*

- Broadly, researched methods for 'reading out' latent algorithms in deep-learned computer vision models.
- Developed novel techniques for feature visualization and attribution with saliency maps in discriminative models.
- Leverage pruning methods to decompose networks into modular sub-functions (circuits).
- Developed software tools for the fast, intuitive exploration of the latent representations and circuits in computer vision models.
- Led modeling efforts on projects comparing the representational geometry of the neural network embedding space for images to those inferred from psycho-physical and fMRI data.

**Stanford Cognitive Systems Neuroscience Lab – Palo Alto CA**

May 2017 - Present

*Computational Research Assistant*

- Updated/maintained in house lab data processing pipeline and data structures for use with high performance cluster, Google cloud services, and docker containers.
- Standardization, cleaning, and anonymization of 20 years of collected fMRI, EEG, and behavioral data.
- Design and coding of all lab's task-based fMRI experiment stimuli and neuropsychological assessments.
- Launch and maintain web server collecting data from novel assessments for quickly diagnosing mathematical learning disability in children.
- Database management for lab's custom participant database.
- Linux administration and IT support for all lab members.

## OTHER WORK EXPERIENCE

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**Harvard College – Cambridge, MA**

September 2021 - May 2023

*Teaching Fellow*

- **Game Theory and Human Behavior:** Taught 4 sections and graded papers for course on game theory's influence on social science. Developed own curriculum based on live game playing. (*1 semester*)
- **Introduction to Statistics for Behavioral Sciences:** Taught 2 sections on classical statistical tests using R. (*2 semesters*)
- High student ratings resulted in teaching award for all semesters taught.

**STEM CAMP – Medford, MA**

July 2013 - August 2015

*Founder/Head Teacher - Engineering Summer Camp*

- Co-founded and taught three 8-week summer camps for middle-schoolers covering a wide range of hands-on engineering projects.
- Wrote and implemented 450 hours of STEM curriculum.
- Projects included rocket gilders, model airplanes, AM radios, electric motors, speakers, robotics with LEGO mind-storms, put-put boats, harmonographs, Rube Goldberg machines, musical instrument design, kinetic sculpture etc.

**The Piano Van – New Zealand**

October 2015 - May 2017

*Self Employed – Pianist*

- Converted cargo vans into campers with custom system for transporting a piano.
- Traveled across New Zealand and the United States as a street pianist, piano tuner, and technician.
- Keyboardist for *American Symphony of Soul* – Sound of Boston Album of the Year 2016

## TECHNICAL SKILLS

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**Scripting Languages**

Python, MATLAB, R, JavaScript,

**Software & Tools**

Pytorch, LaTeX, Github, SQL, Mongo, Blender,  
HTML+css, AWS, SLURM

## PUBLICATIONS

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**Hamblin C** & Konkle T. & Alvarez G. Understanding Inhibition with Maximally Tense Images. (*In prep NEURIPS 2024*)

**Hamblin C** & Konkle T. & Alvarez G. Optimizing for possible feature combinations in discriminative vision models. (*Computational Cognitive Neuroscience Conference 2024*)

Prince J. & Park J. & **Hamblin C** & Alvarez G. & Konkle T. Dissecting visual population codes with brain-guided feature accentuation. (*Computational Cognitive Neuroscience Conference 2024*)

**Hamblin C** & Konkle T. & Alvarez G. Feature Accentuation: Revealing "What" Features Respond to in Natural Images (2024) *arXiv:2206.01627 (In prep NEURIPS 2024)*

Conwell C, Prince J, **Hamblin C** & Alvarez G. Controlled assessment of CLIP-style language-aligned vision models in prediction of brain & behavioral data (2023) *ME-FoMo workshop @ ICLR*

**Hamblin C**, Konkle T. & Alvarez G. Pruning for interpretable circuits in CNNs (2022) *arXiv:2206.01627*

Conwell C & **Hamblin C**. Towards Disentangling the Roles of Vision & Language in Aesthetic Experience with Multimodal DNNs (2022) *SVRHM Workshop @ NeurIPS*

Janini D, **Hamblin C**, Deza A, & Konkle T. General object-based features account for letter perception (2022) *PLOS Computational Biology*

## TALKS & POSTERS

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**Hamblin C** & Konkle T. & Alvarez G. Diverse visual feature selectivity is enabled through inhibitory feature surrounds in deep neural network models (*Vision Science Society 2024*)

**Hamblin C** & Konkle T. & Alvarez G. Uncovering the hidden computations of deep neural networks by tracing the trajectory manifold from images to feature activations (*Vision Science Society 2023*)

**Hamblin C** & Konkle T. & Alvarez G. Understanding the Invariances of Visual Features with Separable Subnetworks (*Vision Science Society 2022*) (talk)

**Hamblin C** & Alvarez G. VISCNN: A Tool for Visualizing Interpretable Subgraphs in CNNs (*Vision Science Society 2021*)