CHRISTOPHER HAMBLIN

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SUMMARY

Innovative and results-driven PhD graduate in vision science from Harvard University with focused on computer vision and neural network interpretability. Offers a strong foundation neural network modeling combined with a unique perspective from the cognitive sciences. Proven track record in pioneering research methods for interpreting latent algorithms in computer vision models and leveraging advanced computational techniques to bridge the gap between artificial intelligence and biological visual systems. Seeking to apply extensive research expertise and technical skills in a challenging machine learning role to drive advancements in AI applications.

EDUCATION

Harvard University – ***Cambridge MA*** September 2019 - May 2024
PhD Psychology GPA 4.0/4.0
Advisor George Alvarez, Vision Sciences Lab

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

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

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

Scripting Languages	Python, MATLAB, R, JavaScript,
Software & Tools	Pytorch, LaTeX, Github, SQL, Mongo, Blender, HTML+css, AWS, SLURM

PUBLICATIONS

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

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

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)*