Colin Conwell

Curriculum Vitae (Update: May 2023)
colinconwell@gmail.com ◆ colinconwell.github.io ◆ google scholar

Employment

Postdoctoral Research Fellow – Harvard University (May 2022 – Present)
Department of Psychology; Advisor: George Alvarez

Education

Harvard University – Cambridge, Massachusetts
Ph.D. Psychology – Cognition, Brain & Behavior, May 2022
Advisors: George Alvarez & Talia Konkle, Harvard Vision Sciences Laboratory

University of Southern California (USC) – Los Angeles, California
B.A. Cognitive Science & International Relations, May 2016
Minor in Comparative Literature
Finalist for University Valedictorian
Philip P. Kirst & Colleen Kirst Endowed Scholarship

Institut d'études politiques de Paris (Sciences Po) – Paris, France
Exchange Student, Security Studies, Spring 2014

Peer-Reviewed Publications

†Spotlight or Oral Presentation | #Worshop Paper | *Work by student mentee

#**Conwell,** C; Ullman, T (2023) *A Comprehensive Benchmark of Human-Like Relational Reasoning for Text-to-Image Foundation Models.* Mathematical & Empirical Understanding of Foundation Models (ME-FOMO @ ICLR) Kigali, Rwanda. [Link]

#**Conwell,** C; Prince JS; Hamblin, C; Alvarez, GA (2023) *Controlled assessment of CLIP-Style Language-Aligned Vision Models in Prediction of Human Visual Brain & Behavior.* Mathematical & Empirical Understanding of Foundation Models (ME-FOMO @ ICLR), Kigali, Rwanda. [Link]

*Subramaniam, V; **Conwell, C**; Wang, C; Kreiman, G; Katz, B; Cases, I; Barbu A (2023) *Using Multimodal DNNs to Study Vision-Language Integration in the Human Brain.* Perks & Pitfalls of Multimodal Representational Learning (MRL @ ICLR), Kigali, Rwanda. [Link]

#**Conwell, C**; Hamblin, C (2022) *Towards Disentangling the Roles of Vision & Language in Aesthetic Experience with Multimodal DNNs.* Shared Visual Representations in Humans & Machines (SVHRM @ NeurIPS), New Orleans, Louisiana [Link]

Bulley, A; Lempert, KM; **Conwell, C**; Irish, M; Schachter DL (2022) *Intertemporal choice reflects value comparison rather than self-control: insights from confidence judgements.* Philosophical Transactions of the Royal Society B, 377(1866), 20210338. [Link, PsyArxiv]

Conwell, C; Mayo, D; Buice, MA; Katz, B; Alvarez, GA; Barbu, A (2021) *Neural Regression, Representational Similarity, Model Zoology & Neural Taskonomy at Scale in Rodent Visual Cortex.* Advances in Neural Information Processing Systems, 34, 5590-5607 [Link]

#**Conwell, C**; Prince, JS; Alvarez, GA; Konkle, T (2021) *What can 5.17 billion regressions tell us about artificial models of the human visual system?* Shared Visual Representations in Humans & Machines (SVHRM @ NeurIPS), Virtual Conference [Link]

*Lakshminarasimhan, K; **Conwell, C** (2021) *Unsupervised Representational Learning Facilitates Human-like Spatial Reasoning*. Shared Visual Representations in Humans & Machines (SVHRM @ NeurIPS) Virtual Conference [Link]

*Wang, B; Mayo, D; Deza, A; Barbu, A; **Conwell, C** (2021) On the Use of Cortical Magnification and Saccades as Biological Proxies for Data Augmentation. Shared Visual Representations in Humans & Machines (SVHRM @ NeurIPS), Virtual Conference [Link]

+**Conwell, C**; Buice, MA; Alvarez, GA; Barbu, A. *Model Zoology & Neural Taskonomy for Better Characterizing Mouse Visual Cortex*. Bridging AI & Cognitive Science (BAICS @ ICLR), Virtual Conference [Link]

#**Conwell, C**; Doshi, F., Alvarez, GA (2019) *Shared Representations of Physical Stability in Humans, Supervised & Unsupervised Deep Neural Networks*. Workshop on Shared Visual Representations in Humans & Machines (SVHRM @ NeurIPS), Vancouver, British Columbia [Link]

Preprints & Working Papers

Conwell, C; Ullman TD (2021) Testing relational understanding in text-guided image generation. *arXiv* 2208.00005 [Link]

- Press: Voice of America, The Information, Unite.ai

Conwell, C; Prince, JS; Alvarez, GA; Konkle, T (2021) "Large-Scale Benchmarking of Diverse Artificial Vision Models in Prediction of 7T Human Neuroimaging Data". *BioRxiv* [Link]

Conwell, C; Graham, D; Konkle, T; Vessel, EA (2021) "The Perceptual Primacy of Feeling: Affectless machine vision models robustly predict human visual affect and aesthetics". *PsyArxiv* [Link]

Invited Talks

"The Perceptual Primacy of Feeling: Insights on Human Affect + Aesthetics from Machine Vision + Language" December 2022. (NeurIPS SVHRM Workshop)

"Opportunistic Experiments on a Large-Scale Survey of Diverse Artificial Perception Models" November 2022. (Dartmouth Neuroscience Lecture Series)

"Computational Aesthetics in the Age of Deep Learning" September 2022. (Symposium Lead @ International Association for Empirical Aesthetics, Philadelphia, Pennsylvania)

"Deep Learning Safari | Machine Learning for Human Learners: Parts 1 & 2" (A 3 Hour Hands-on Tutorial on Machine Learning, AI and Neuroscience) [Google Colab Link]

- Science of Intelligence Seminar, Massachusetts Institute of Technology (November 2021)
- Center for Brains, Minds and Machines Summer School (Summer 2020; 2021; 2022)
- Depression Clinical & Research Program, Massachusetts General Hospital (June 2019)

"Re-Believing in the NeuroAi Feedback Loop" November 2021. (MIT BCS-CSAIL Seminar)

"Cross-Species Neural Benchmarking" October 2021. (BrainScore Working Group @ MIT)

"Modeling Human Orientation Invariance with Self-Supervised Deep Learning" August 2021. (MIT Center for Brain, Minds, and Machines Annual Retreat)

"Rodents, Borges, and Model-to-Brain Fits" November 2020. (Poggio Lab @ MIT)

"Richer Representation Learning as a Building Block of General Intelligence." July 2019. (Templeton World Charity Foundation Summit at Saint Andrew's University, Scotland)

"Unsupervised Representation Learning as a Stepping Stone to Inference". April 2019. (Cognition, Brain and Behavior Seminar at Harvard University)

"Newborn Chicks & Neural Nets" November 2016. (DiCarlo Lab @ MIT)

"The Ecological Aesthetics of Optimization, Pleiotropy & Decay" Fall 2014. ("Polymathy in Practice" Seminar at The Sidney Harman Academy for Polymathic Study)

"La Chasse aux Musulmans au Myanmar". Spring 2014. ("La Fabrication de l'Ennemi" Seminar @ Sciences Po Paris)

"Lamentations of Land & Lifestyle: Indigenous Institutions & Sustainable Development in Central Ghana" (Blue Kitabu Research Institute – University of Southern California)

Conference Presentations

†Oral Presentation | §Symposium | *Work by student mentee

Conwell, C; Prince JS; Alvarez, GA; Konkle, T (2023) *Language Models of Visual Cortex*. Vision Sciences Society (VSS); Saint Pete's Beach, Florida

§ **Conwell,** C; Brielmann, A; Vessel, EA; Deza, A; Celikors, E; Graham, D (2022) *Computational Aesthetics in the Age of Deep Learning*. International Association for Empirical Aesthetics (IAEA): Philadelphia, Pennsylvania

Conwell, C; Prince JS; Alvarez, GA; Konkle, T (2022) *Opportunistic Experiments on a Large-Scale Survey of Diverse Artificial Models in Prediction of 7T Human fMRI Data*. Cognitive Computational Neuroscience: San Francisco, California.

† **Conwell, C**; Graham, D; Konkle, T; Vessel, EA (2022) *Purely Perceptual Machines Robustly Predict Human Visual Arousal, Valence, & Aesthetics*. Vision Sciences Society: Saint Pete's Beach, Florida

Conwell, C; Alvarez, GA (2021) *A Signature of Orientation Invariance in Humans & (Some) Deep Neural Networks*. Vision Sciences Society: Saint Pete's Beach, Florida

† **Conwell, C**; Graham, D; Vessel, EA (2021) *The Perceptual Primacy of Beauty*. International Association for Empirical Aesthetics: Online.

Conwell, C; Mayo, D; Barbu, A (2021) *Large-scale benchmarking of deep neural network models reveals patterns similar to those observed in macaque visual cortex*. Cosyne: Online

† **Conwell, C**; Buice, MA; Alvarez, GA; Barbu, A. *Model Zoology & Neural Taskonomy for Better Characterizing Mouse Visual Cortex*. Bridging AI in Cognitive Science (BAICS @ ICLR), Online

Conwell, C; Doshi, F; Alvarez, GA (2019) *Human-Like Judgments of Stability Emerge from Purely Perceptual Features: Evidence from Supervised and Unsupervised Neural Networks*. Cognitive Computational Neuroscience: Berlin, Germany

Conwell, C; Alvarez, GA (2019) *Leveling the Field: Comparing the Visual Perception of Stability across Humans and Machines*. Vision Sciences Society: Saint Pete's Beach, Florida.

De Freitas, J; Kim, KH; Haber, D; **Conwell, C**; Alvarez, GA; Yamins, D (2019) *Intrinsic Curiosity May Give Rise to Animate Attention*. Vision Sciences Society, Saint Pete's Beach, Florida.

Conwell, C; Alvarez, GA (2018) *Pride Before the Fall: Modeling the Intuitive Physics of Stability Judgments Using DCNNs*. Cognitive Computational Neuroscience: Philadelphia, Pennsylvania.

Conwell, Colin; Alvarez, GA (2018) *Your Visual System (Probably) Knows More Physics than You Do*. Vision Sciences Society: Saint Pete's Beach, Florida.

Public Writing

"Artificial Intelligence Is Not Able to 'Press the Delete Key' on Humanity Just Yet".
The Guardian, September 2015 [Link]

Software

DeepDive: Read-out Anything from DeepNets | [Github Link]

Conwell, Van Genugten & Mair. SmacofMesh: Restricted Multidimensional Scaling on Arbitrary Geometries in R (An Extension of the Smacof Package) | Forthcoming on CRAN

Peer Review

Ad-Hoc Reviewer (Machine Learning)
- NeurIPS, ICLR

Ad-Hoc Reviewer (Cognitive Neuroscience)
- Journal of Vision, Cognitive Science

Honors & Distinctions

Bok Center Award for Distinction and Excellence in Teaching, *Harvard University* – 2019; 2020; 2021

Sosland Family Graduate Fellowship, *Harvard University* – 2016-2017

Critical Language Scholarship (Turkish | Azerbaijan), *United States Department of State* – 2016

Boren Scholarship (French & Wolof | Senegal), *National Security Education Program* – 2015

Finalist for University Valedictorian, *University of Southern California* – 2015

School of International Relations Award for Excellence, *University of Southern California* – 2015

Rotary International Youth Exchange Scholarship (Turkey), *Rotary International* – 2010

Research Grants

Hodgson Psychology Research Innovation Fund ($20,000) – Harvard University – 2023
- "Towards Robust Brain-Conditioned Diffusion Modeling by way of Large-Scale Brain-to-Model Mappings + Perceptual Loss"
- Collaborators: George Alvarez (Department of Psychology)

Dean's Competitive Fund for Promising Scholarship ($38,083) – Harvard University, 2018
- "Eyes to the Horizon": Collaboration with the Peabody Essex Museum, the Program in Wellness and Aesthetics at the Massachusetts General Hospital, and the Harvard Vision Sciences Lab
- Collaborators: George Alvarez (Department of Psychology), Nancy Etcoff (Harvard Medical School, Massachusetts General Hospital); Tedi Asher (Peabody Essex Museum)

Mind, Brain, Behavior Graduate Fellowship ($9,357) – Harvard University
- "Eyes to the Horizon" | Supervisor: George Alvarez (Department of Psychology)

Provost's Undergraduate Research Fellowship ($3,000) – University of Southern California
- "Physical and Material Cognition at the Onset of Visual Object Experience" – Summer 2014 Supervisor: Justin Wood (Department of Psychology)

Student Opportunities in Academic Research ($3000) – University of Southern California

-"Visual and Textual Studies in Vegetal Ontology and the Ecological Curve" – Spring 2015
Supervisors: Natania Meeker & Antonia Szabari (Department of French & Italian)
-"Differences in Object and Scene Processing at the Onset of Visual Experience" – Fall 2014
Supervisor: Justin Wood (Department of Psychology)
-"Reasoning about Belief in Eyewitness Memory/Child Testimony" – Fall 2013
Supervisor: Henrike Moll (Department of Psychology)

Summer Undergraduate Research Fellowship - University of Southern California
-"Muslim-Buddhist Conflict in Southeast Asia" (Pattani, Thailand; Myanmar) – Summer 2013

Blue Kitabu Research Fellowship ($5000) – University of Southern California
-"Indigenous Institutions and Sustainable Development" (Cape Coast, Ghana) – Summer 2012

Teaching

Machine Learning for Human Learners | Lecture Series
Introductory seminar for audiences of varying technical backgrounds, designed specifically to 'democratize' machine learning by introducing modern tools and software libraries, such as Google Colaboratory and Huggingface.

- Science of Intelligence Seminar, Massachusetts Institute of Technology (2021)
- Center for Brains, Minds and Machines Summer School (2020; 2021)
- Massachusetts General Hospital Depression & Clinical Research Unit (2019);
- Templeton World Charity Foundation Summit (2019)

Science of Intelligence (as Research Project Consultant for Prof. Tomaso Poggio)
MIT, Brain and Cognitive Sciences, Fall 2021

Biological & Artificial Intelligence (as Teaching Fellow for Prof. Gabriel Kreiman)
Harvard University, Department of Molecular & Cellular Biology, Spring 2019; 2020; 2021

- Consulting for undergraduates and graduates completing projects ranging from literature reviews to modeling experiments.
- Harvard University Bok Center Certificate of Distinction and Excellence in Teaching.

Decisionmaking (as Teaching Fellow for Prof. Thomas Ullman)
Harvard University, Department of Psychology (Spring 2020)

- Weekly sections for undergraduates and tutorials in decisionmaking experiments

What Game Theory Reveals About Social Behavior (as Teaching Fellow for Prof. Bethany Burum)
Harvard University, Department of Human Evolutionary Biology, Spring 2019

- Consulting for ungraduates completing weekly assignments and a final project exploring game-theoretic models of common patterns in human social behavior.
- Harvard University Bok Center Certificate of Distinction and Excellence in Teaching

Graduate Seminar in Multivariate Statistics (as Teaching Fellow for Prof. Thomas Rusch)
Harvard University, Department of Psychology, Spring 2020; 2021

- Weekly lectures and tutorials for graduate students covering advanced statistical concepts in the R programming language.

Introduction to Statistics for the Behavioral Sciences (as Teaching Fellow for Prof. Thomas Rusch)
Harvard University, Department of Psychology, Spring 2019

- Weekly sections for undergraduates covering the fundamentals of statistics using the R programming language.

Psychopharmacology (as Teaching Fellow for Prof. Scott Lukas)
Harvard University, Department of Psychology, Fall 2018

- Weekly sections for undergraduates discussing the philosophy, practice and applications of psychopharmacology.

Deep Learning for Social Scientists in Python & R | Seminar
Seminar for graduates & undergraduates, designed to introduce social scientists to both theory and applications of deep learning with popular software packages including Keras® & H²0®.

- Harvard University, Department of Psychology (2021)

Mentorship

Harvard College Honors Thesis Students

- Hart Fogel (Neuroscience & Computer Science)
- William Bryk (Physics & Computer Science)
- Damian Liu (Psychology & Computer Science)

Harvard College Undergraduate Research Interns

- Hannah Eckstein (Psychology)
- Isabella Kang (Psychology)
- Kidist Alemu (Neuroscience)
- Alyssa Chen (Neurobiology)
- Alexander Davies (Computer Science & Neuroscience)

MIT Center for Brains, Minds & Machines Graduate Mentees

- Klavdia Zemlianova (NYU)
- Aylin Kallmayer (Goethe-Uni Frankfurt)
- Serena Bono (ETH Zurich)
- Natalia Matos (Yale)
- Lan Luo (Duke)
- Paolo Muratore (SISSA)
- Binxu Wang (Harvard)
- Lauren Aulet (Emory)
- Sammy Floyd (MIT)
- Michael Lopez-Brau (Yale)
- Kaushik Lakshminarasimhan (Columbia)

Harvard Mind Brain, Behavior High School Summer Program

- Marina Ebrahim
- Ananya Salem

Other Mentees + Research Assistants:

- Jason Li (Artificio, Inc)
- Leah Bartle (Pittsburgh)
- Jason Dsouza (IIT Delhi)
- Fenil Doshi (IIT Delhi)
- Prashant Raju (Arkansas)
- Hunaid Hameed (Osnabruck)

Community Service

Rotary International – Izmir, Turkey; Chester County, Pennsylvania; Los Angeles, California
-Rotaract District 5280 (Greater Los Angeles Area) Executive Board Member, 2012 –2015
-Collaborations: Jumpstart, TELACU (Upward Bound), NALEO & *¡Ya Es Hora! Ciudadania*

USC Center for Research on Crime and Social Control – Los Angeles, California
-Volunteer, Los Angeles GRYD Project (Gang Reduction | Youth Development), Spring 2013

Student Conservation Association – Denali, Alaska; Various Locations
-Conservation Crew Member, Summers 2008, 2009, 2010

Selected Experience

Research Technician (Psychology | Animal Behavior) – University of Southern California
-Principal Investigator: Justin Wood (Department of Psychology), September 2013 – June 2015

Research Assistant (Comparative Literature) – University of Southern California
-Principal Investigators: Natania Meeker & Antonia Szabari (Department of French & Italian), August 2014 – May 2015

Research Assistant (Political Psychology) – University of Southern California
-"Homo Diplomaticus Project" | Principal Investigators: Brian Rathbun and Joshua Kertzer (School of International Relations; Harvard Kennedy School) – Fall 2014

Selected Involvement

MIT Center for Brains, Minds & Machines (CBMM) Sumer School – Woods Hole, Massachusetts
- Teaching Fellow, Summer 2021, 2022
- Sponsored Student, Summer 2019

Diverse Intelligences Institute – Saint Andrews, Scotland
-Fellow, University of St Andrews, Summer 2018 & Summer 2019

Sidney Harman Academy for Polymathic Study – Los Angeles, California
-Goethe Society Fellow & Academy Member, Fall 2013 to Spring 2015
-Fellow, "Weimar on the Pacific" Conference (Co-Hosted by *the Legatum Institute*), Fall 2013

Corpus Callosum (Art, Science & Engineering Society) – Los Angeles, California
-Project Manager ("Biomass! From Wasted Water") – Spring 2015

Miscellaneous

'Best Male Actor in a Play', *Tevfik D'Or* (International French Theatre Contest, Turkey) – 2011
Finalist (with Chen-Ping Yu) for Prodigy Finance Exploratory Visualization Contest - 2017

Competences

Professional Proficiency in French
Elementary Proficiency in Turkish, Spanish & Wolof (Senegal)
Data Analytics & Machine Learning (R, Python)
Blender® 3D Animation & Modeling
Web Programming (Javascript, HTML, CSS)