Kushin Mukherjee

Phone: 845-293-9532
Email: kushinm11@gmail.com
Github: https://github.com/kushinm
Website: https://kushinm.github.io./

Education

2019 – *PhD*, Psychology, University of Wisconsin-Madison
Advisors: Timothy T. Rogers, Karen B. Schloss

2015-2019 *AB*, Cognitive Science and Japanese, minor in Mathematics, Vassar College
Thesis advisor: Joshua R. de Leeuw
general honors
departmental honors in Cognitive Science and Japanese

Grants, honors & awards

2021-2023 Hertz Travel Award, Deptartment of Psychology, **UW-Madison**
2021 Center for Brain, Minds, and Machines Summer School Fellow, **MIT**
2021 Kenzi Valentyn Vision Research Award, McPherson Eye Research Institute, **UW-Madison**
2021 Elsevier/Vision Sciences Society Travel Award
2020—2022 Marie Christine Kohler Fellow, Wisconsin Institute for Discovery, **UW-Madison**
2019 Yin-Lien C. Chin Prize for best senior project in Chinese or Japanese, **Vassar College**
2019 Phi Beta Kappa, **Vassar College**
2019 Sigma Xi, **Vassar College**
2018 CSLI Summer Intern, **Stanford University**
2018 Psi Chi, **Vassar College**
2016 Summer Program Scholarship, **Ochanomizu University**
2016 Japan Student Service Organization Scholarship
2015-2019 Sarah Tod Fitz Randolph Scholarship Fund, **Vassar College**

Research Experience

2019- **PhD Candidate**, University of Wisconsin-Madison

- Conducting research in the **Knowledge & Concepts Lab** and **Schloss Visual Reasoning Lab** on visual communication, models of visual perception, and exploration of low-dimensional structure in semantic associations.
- Building neural network models that learn task-specific representations, and investigating semantic structure in those representations.

- Conducting experiments to understand visual communication in data visualizations and human drawings complemented by computional modeling of these behaviors.

2021 **Summer School Fellow**, MIT Center for Minds, Brains, and Machines

- Worked with **Ko Kar** in the **DiCarlo Lab** studying the effect of task demands on core visual object recognition in humans, primates, and deep convolutional neural networks.
- Built online behavioral experiments using JS, constructed biologically inspired convolutional neural networks using PyTorch, and analyzed data using MATLAB and Python.

2018 **CSLI Summer Intern**, Stanford University

- Worked with **Judy Fan** and **Robert Hawkins** in the **Computation and Cognition Lab** studying the semantic structure in sketch drawings.
- Created a JS sketch annotator tool for data collection on Amazon Mechanical Turk and built analysis pipelines using Python.

Working Papers

- **Mukherjee, K.**, *&* Rogers. T. T. (*under revision*). Using drawings and deep neural networks to characterize the building blocks of human visual similarity.
- **Mukherjee, K.**, Rogers, T. T., Lessard, L., Gleicher, M., *&* Schloss, K. B. (*in prep*). Mapping a low-dimensional space of color-concept associations.
- **Mukherjee, K.**, Lessard, L., *&* Schloss, K. B. (*in prep*). How do people map colors to concepts? Modeling assignment inference as evidence accumulation.
- **Mukherjee, K.**, Huey, H., Hebart, M. N., Fan, J. E.,*&* Bainbridge, W. A. (*in prep*). THINGS-drawings: A large-scale dataset containing human sketches of 1,854 object concepts.
- **Mukherjee, K.**, Kar, K. (*in prep*). Assessing the role of vision in atypical facial emotion processing in Autism using Generative Adversarial Networks.

Journal Publications

in press Schloss, K. B., Schoenlein, M. A., *&* **Mukherjee, K.** (*in press*). Color semantics for visual communication. *Visualization Psychology.*

2021 **Mukherjee, K.**, Yin, B., Sherman B. E., Lessard, L. *&* Schloss, K. B. (2021). Context matters: Semantic discriminability theory for perceptual encoding systems. *IEEE Transactions on Visualization and Computer Graphics.* ****Best paper honorable mention award***

Proceedings & Workshop Papers

2023 **Mukherjee, K.**, Kim, N. Y, Alamooti, S. T., Adolphs, R., & Kar, K.. (2023). Leveraging Artificial Neural Networks to Enhance Diagnostic Efficiency in Autism Spectrum Disorder: A Study on Facial Emotion Recognition. *Conference on Cognitive Computational Neuroscience.*

2023 **Mukherjee, K.**, Lu, X., Huey, H., Vinker, Y., Shamir, A., & Fan, J. E. (2023). Evaluating machine comprehension of sketch meaning at different levels of abstraction. *Proceedings of the 45th Annual Meeting of the Cognitive Science Society.*

2023 Suresh, S., **Mukherjee, K.** & Rogers, T. T. (2023). Behavioral estimates of conceptual structure are robust across tasks in humans but not large language models. *ICLR Tiny Papers Track.*

2023 **Mukherjee, K.**, Suresh, S. & Rogers. T. T. (2023). Human-machine cooperation for semantic feature generation. *ICLR Tiny Papers Track.*

2020 **Mukherjee, K.**, & Rogers, T. T. (2020). How does task structure shape representations in deep neural networks? *2nd NeurIPS Workshop on Shared Visual Representations in Human and Machine Intelligence.*

2019 **Mukherjee, K.**, Hawkins, R. D., & Fan, J. E. (2019). Communicating semantic part information in drawings. *Proceedings of the 41st Annual Meeting of the Cognitive Science Society.*

Conference Presentations

2023 **Mukherjee, K.**, Kim, N. Y, Alamooti, S. T., Adolphs, R., & Kar, K.. (2023). Leveraging Artificial Neural Networks to Enhance Diagnostic Efficiency in Autism Spectrum Disorder: A Study on Facial Emotion Recognition. Talk and Poster presented at the Conference on Cognitive Computational Neuroscience.

2023 **Mukherjee, K.**, Lessard, L., & Schloss K. B. (2023). How do people map colors to concepts? Modeling assignment inference as evidence accumulation. Talk presented at the 23rd Annual Meeting of the Vision Sciences Society.

2023 **Mukherjee, K.**, Huey, H., Hebart, M., Fan, J. E. & Bainbridge, W. (2023). THINGS-drawings: A large-scale dataset containing human sketches of 1,854 object concepts. Talk presented at the 23rd Annual Meeting of the Vision Sciences Society.

2023 **Mukherjee, K.**, Lu, X., Huey, H., Vinker, Y., Shamir, A., & Fan, J. E. (2023). Evaluating machine comprehension of sketch meaning at different levels of abstraction. Poster presented at the 23rd Annual Meeting of the Vision Sciences Society.

2022 Armendariz, M., **Mukherjee, K.**, Shang, J., & Kar, K. (2022). Probing the functional relevance of side-reads and bypass-connections in the primate ventral stream during visual object recognition using deep neural networks. Poster presented at the 22nd Annual Meeting of the Vision Sciences Society.

2022 **Mukherjee, K.**,Schloss, K. B, Lessard, L., Gleicher, M., & Rogers, T.T. (2022). Color-concept associations reveal an abstract conceptual space. Poster presented at the 22nd Annual Meeting of the Vision Sciences Society.

2021 **Mukherjee, K.**, Rogers, T.T., Lessard, L., Gleicher, M., & Schloss, K. B. (2021). Mapping a low-dimensional space of color-concept associations. Poster presented at the 21st Annual Meeting of the Vision Sciences Society. ***Elsevier/Vision Sciences Society Travel Award***

2021 **Mukherjee, K.**, Yin, B., Sherman B. E., Lessard, L. & Schloss, K. B. (2021). Context matters: Semantic discriminability theory for perceptual encoding systems. Talk presented at the 62nd Annual Meeting of the Psychonomic Society..

2021 **Mukherjee, K.**, Yin, B., Sherman B. E., Lessard, L. & Schloss, K. B. (2021). Context matters: Semantic discriminability theory for perceptual encoding systems. Talk presented at VIS 2021.

2020 **Mukherjee, K.**, & Rogers, T. T. (2020). How does task structure shape representations in deep neural networks?. Poster presented at the 2nd NeurIPS Workshop on Shared Visual Representations in Human and Machine Intelligence.

2020 **Mukherjee, K.**, & Rogers, T. T. (2020). Finding meaning in simple sketches: How do humans and deep networks compare?. Poster presented at the 20th Annual Meeting of the Vision Sciences Society.

2019 **Mukherjee, K.**, Hawkins, R. D., & Fan, J. (2019). Communicating semantic part information in drawings. Poster presented at the 41st Annual Meeting of the Cognitive Science Society.

Invited Talks

2023 THINGS-drawings: A large-scale dataset containing human sketches of 1,854 object concepts, Cognitive Tools Lab, *UC San Diego*

2023 Evaluating machine comprehension of sketch meaning at different levels of abstraction, Stanford NeuroAI Lab, *Stanford University*

2023 Tutorial on matrix completion techniques for the behavioral sciences, *AI and Society Seminar, UW-Madison*

2023 Using drawings and deep neural networks to characterize the building blocks of human visual similarity, *Wisconsin Institute for Discovery Seminar Series*

2022 Using line drawings to understand what deep learning models see, *McPherson Eye Research Institute Seminar*

Teaching

Graduate Teaching Assistant, University of Wisconsin-Madison

2022 PSYCH 454, *Behavioral Neuroscience*

2021 PSYCH 210, *Statistics for Psychology*

2020 PSYCH 414, *Cognitive Psychology*

Undergraduate Teaching Assistant, Vassar College

2017 COGS 211, *Perception and Action*

Advising

Undergraduate students

2022-2023 Jonah Manaligold (UW-Madison)
2022-2023 Janani Sundar (UW-Madison)
2022- Rio Aguina-Kang (UCSD)
2022 Lisa Padua (Albany State)
2020-2021 Brianne E. Sherman (UW-Madison)

Professional Service

Workshop Organization

2022 Images2Symbols: Drawing as as Window into the Mind, *44th Annual Meeting of the Cognitive Science Society*

Ad Hoc Reviewing

Journals & Books
Nature Reviews Psychology
Visualization Psychology

Conference Proceedings and Workshops
NeurIPS Workshop on Shared Visual Representations in Humans and Machines (SVRHM)
Conference on Computational Cognitive Neuroscience (CCN)

Departmental Service

2020-2022 University of Wisconsin-Madison Psychology Colloquium Committee
2017-2019 Vassar College Cognitive Science Majors' Committee, *Chair*
2016-2017 Vassar College Student Association Finance Committee

Affiliations

2019- Cognitive Science Society
2020- Vision Sciences Society
2021-2022 Psychonomics Society