Kushin Mukherjee
PhD. Student

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

2025 Distinguished Paper Award, McPherson Eye Research Institute, **UW-Madison**
2021-2024 Hertz Travel Award, Department 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
2024 **AI/ML Intern**, Apple
2021 **Summer School Fellow**, MIT Center for Minds, Brains, and Machines
2018 **CSLI Summer Intern**, Stanford University

Working Papers

- **Mukherjee, K.**, Ren, D., Moritz, D. *&* Assogba, Y. (*in prep*). EncQA: Evaluating visual encoding understanding for visualizations in large vision-language models.
- **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.**, Yin, B., 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.**, Rogers, T. T., *&* Schloss, K. B. (*preprinted*). Estimating human color-concept associations from multimodal language models.
- Verma, A., **Mukherjee, K.**, Potts, C., Kreiss, E.*&* Fan, J. (*under review*). CHART-6: Human-Centered Evaluation of Data Visualization Understanding in Vision-Language Models.
- Suresh, S. **Mukherjee, K.**, Giallanza, T., Yu, X., Patil, M., Cohen, J. D., *&* Rogers, T. T. (*under review*). AI-assisted semantic norms for 786 concepts.

Peer-reviewed Publications

2024 **Mukherjee, K.**, *&* Rogers. T. T. (2024). Using drawings and deep neural networks to characterize the building blocks of human visual similarity. *Memory & Cognition.*

2024 **Mukherjee, K.** (2024). Shaping vision through drawing. *Nature Reviews Psychology (Journal Club).*

2024 Verma, A., **Mukherjee, K.**, Kreiss, E., Potts, C., and Fan, J. (2024). Evaluating human and machine understanding of data visualizations. *Proceedings of the 46th Annual Meeting of the Cognitive Science Society.*

2024 **Mukherjee, K.**, Suresh, S., Yu, X., *&* Lupyan, G. (2024). The role of shared labels and shared experiences in representational alignment. *International Conference on Learning Representations (ICLR) Re-Align Workshop*

2024 Suresh, S., Huang, W., **Mukherjee, K.**, *&* Rogers, T.T. (2024). Categories vs semantic features: What shapes the similarities people discern in photographs of objects?. *International Conference on Learning Representations (ICLR) Re-Align Workshop*

2023 Suresh, S., **Mukherjee, K.**, Yu, X., Huang, W., Padua, L., *&* Rogers, T. T. (2023). Conceptual structure coheres in human cognition but not in large language models. *Proceedings of the Conference on Empirical Methods in Natural Language Processing (EMNLP).*

2023 **Mukherjee, K.**, Lu, X., Huey, H., Vinker, Y., Shamir, A., *&* Fan, J. E. (2023). SEVA: Leveraging sketches to evaluate alignment between human and machine visual abstraction. *Advances in Neural Information Processing Systems (NeurIPS), Datasets & Benchmarks Track.*

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). Semantic Feature Verification in `FLAN-T5`. *International Conference on Learning Representations (ICLR), Tiny Papers Track.*

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

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***

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.*

Book Chapters

2024 Schloss, K. B., Schoenlein, M. A., *&* **Mukherjee, K.** (*in press*). Color semantics for visual communication. *In R. B. D. A. Szafir, M. Chen, D. J. Edward, B. Fisher, & L. M. Padilla (Ed.), Visualization Psychology.*

Conference Presentations

2024 **Mukherjee, K.**, Rogers, T. T., *&* Schloss, K. B. (2024). Estimating human color-concept associations from multimodal language models. Poster presented at the 46th Annual Meeting of the Cognitive Science Society.

2024 Verma, A., **Mukherjee, K.**, Kreiss, E., Potts, C., and Fan, J. (2024). Evaluating human and machine understanding of data visualizations. Poster presented at the 46th Annual Meeting of the Cognitive Science Society.

2024 Suresh, S., **Mukherjee, K.**, *&* Rogers, T. T. (2024). Can deep convolutional networks explain the semantic structure that humans see in photographs? Poster presented at the 46th Annual Meeting of the Cognitive Science Society.

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 Suresh, S., **Mukherjee, K.**, *&* Rogers T. T. (2023). Can deep convolutional networks explain the semantic structure that humans see in photographs?. Talk presented at the 23rd Annual Meeting of the Vision Sciences Society.

2023 Fan, J. E., **Mukherjee, K.**, Huey, H., Hebart, M., *&* 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. E. (2019). Communicating semantic part information in drawings. Poster presented at the 41st Annual Meeting of the Cognitive Science Society.

Invited Talks *&* Seminars

2024 EncQA: Evaluating visual encoding understanding for visualizations in large vision-language models, *Apple Human Centered Machine Intelligence Sync.*

2023 Using drawings to understand human semantic cognition, MRC Cognition and Brain Sciences

Unit, *University of Cambridge*.

2023 THINGS-drawings: A large-scale dataset containing human sketches of 1,854 object concepts, Cognitive Brown Bag, *University of Chicago*.

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

2024 - Rainy Jin (UW-Madison)

2024 - Halle Braun (UW-Madison)

2024 - Ria Pattekar (UW-Madison)

2024 - Ankit Mohapatra (UW-Madison)

2023 - 2024 Nancy Davis (UW-Madison)

2022-2023 Jonah Manaligold (UW-Madison)

2022-2023 Janani Sundar (UW-Madison)

2022-2023 Rio Aguina-Kang (UCSD)

2022 Lisa Padua (Albany State)

2020-2021 Brianne E. Sherman (UW-Madison)

Professional Service

Workshop Organization

2024 COGGRAPH: Building bridges between cognitive science and computer graphics, *46th Annual Meeting of the Cognitive Science Society*

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

Ad Hoc Reviewing

Journals & Books
Cognition
Communications Biology
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)
IEEE Visualization Conference (VIS)
ACM Conference on Human Factors in Computing Systems (CHI)

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

References

Dr. Timothy T. Rogers | University of Wisconsin-Madison, Department of Psychology
1202 West Johnson St.
Madison, WI 53706-1611
email: ttrogers@wisc.edu

Dr. Karen B. Schloss | University of Wisconsin-Madison, Department of Psychology
1202 West Johnson St.
Madison, WI 53706-1611
email: kbschloss@wisc.edu

Dr. Judith E. Fan | Stanford University, Department of Psychology
Building 420, 450 Jane Stanford Way
Stanford, CA 94305
email: jefan@stanford.edu