Judith E. Fan

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Academic Positions

2023 –	*Assistant Professor*, Psychology and, *by courtesy*, Education & Computer Science, Stanford University
	Affiliated Faculty, Stanford Accelerator for Learning, Stanford Human-Centered Artificial Intelligence, Symbolic Systems, Wu Tsai Neurosciences Institute, Center for Affective Science
2019—2023	*Assistant Professor*, Psychology, University of California, San Diego
	Affiliated Faculty, Neurosciences Graduate Program, Halıcıoğlu Data Science Institute, The Design Lab, Computational Social Sciences Program
2017—2019	*Postdoctoral Scholar*, Psychology, Stanford University
2016	*Postdoctoral Research Associate*, Neuroscience Institute, Princeton University

Education

2011—2016	*PhD*, Psychology, Princeton University
2006—2010	*AB*, Neurobiology and Statistics, Harvard College *summa cum laude*

Selected Honors

2021	Outstanding Faculty Mentorship Award, UC San Diego Graduate Student Association
2017	Robert J. Glushko Prize for Outstanding Doctoral Dissertation, Cognitive Science Society
2017	Finalist for the NIH Director's Early Independence Award
2015	Computational Modeling Paper Prize in Perception & Action, Cognitive Science Society
2013	Early Graduate Student Researcher Award, American Psychological Association
2009	Phi Beta Kappa, Harvard University
2007-2008	John Harvard Scholar, Harvard University (top 5% of class)
2006-2007	Harvard College Scholar, Harvard University (top 10% of class)

2006   Presidential Scholar, U.S. Department of Education (1 of 2 selected from state)

Research Grants

2025-2026   Joyful Learning Seed Grant
>> Source: Stanford Accelerator for Learning
>> Title: Joyful Self-Surprise as an Engine for Learning in Early Childhood
>> Role: Co-PI, w/ Junyi Chu, Adani Abutto, & Hyo Gweon

2025-2026   Joyful Learning Seed Grant
>> Source: Stanford Accelerator for Learning
>> Title: Joyful Mathematics Through Data Investigations
>> Role: Co-PI, w/ Jo Boaler

2025-2026   Learning through Creation with Generative AI Seed Grant
>> Source: Stanford Accelerator for Learning and Stanford Institute for Human-Centered Artificial Intelligence (HAI)
>> Title: Enhancing math learning and engagement through game creation
>> Role: PI, w/ Junyi Chu, Hyo Gweon, Nick Haber, & Hari Subramonyam

2025-2026   People Who Help Other People Learn (PWHOPL) Seed Grant
>> Source: Stanford Accelerator for Learning
>> Title: Helping novice tutors learn to notice student misconceptions in real time
>> Role: PI, w/ Dora Demszky & Susanna Loeb

2024-2026   EDU Core Research Grant
>> Source: National Science Foundation
>> Title: Improved measures of data visualization literacy to advance research and assessment in STEM education
>> Role: PI, w/ Elisa Kreiss, Lace Padilla, & Chris Potts

2024-2025   Hoffman-Yee Research Grant
>> Source: Stanford Institute for Human-Centered Artificial Intelligence (HAI)
>> Title: Integrating Intelligence: Building shared conceptual grounding for interacting with generative AI
>> Role: co-PI, w/ Maneesh Agrawala, Kayvon Fatahalian, Tobi Gerstenberg, Nick Haber, Hari Subramonyam, Jiajun Wu

2023-2024   Generative AI & the Future of Learning Seed Grant
>> Source: Stanford Accelerator for Learning and Stanford Institute for Human-Centered Artificial Intelligence (HAI)
>> Title: Generating descriptions of data visualizations to improve accessibility and learning outcomes in STEM education
>> Role: co-PI, w/ Chris Potts & Elisa Kreiss

2022-2023	School of Social Sciences Research Grant
	Source: UC San Diego
	Title: Measuring, modeling, and improving graph comprehension
	Role: PI
2021-2026	Faculty Early Career Development Program (CAREER) Award
	Source: National Science Foundation
	Title: Mechanisms enabling the flexible expression of visual concepts
	Role: PI
2021-2024	Science of Autonomy Research Grant
	Source: Office of Naval Research
	Title: Harnessing human intelligence for adaptive human-robot collaboration
	Role: co-PI, w/ Dorsa Sadigh
2021-2023	Hoffman-Yee Research Grant
	Source: Stanford Institute for Human-Centered Artificial Intelligence (HAI)
	Title: Curious, self-aware AI agents to build cognitive models and understand developmental disorders
	Role: co-PI, w/ Dan Yamins, Mike Frank, Nick Haber, Fei-Fei Li, & Dennis Wall
2020-2021	Course Development and Instructional Improvement Program Grant
	Source: UC San Diego
	Title: Enhancing the Psychology core methods curriculum: a new emphasis on computational literacy, open-science practices, and project-based collaboration
	Role: PI, w/ Emma Geller and Celeste Pilegard
2015-2016	Council of the Humanities David A. Gardner '69 Magic Project Grant
	Source: Princeton University
	Title: Drawing as a window into the mind
	Role: PI, w/ Nick Turk-Browne

Fellowships

2015-2016	Cognitive Science Graduate Student Fellowship, Princeton University
2015-2016	Cognitive Science Graduate Research Grant, Princeton University
2015-2016	Council on Science and Technology Research Grant, Princeton University
2013-2016	Graduate Research Fellowship, National Science Foundation
2011-2012	Andrew W. Mellon Foundation Research Fellowship in Cultural Policy, Princeton University
2011-2012	Walker McKinney '50 Life Sciences Fellowship, Princeton University
2010-2011	Michael C. Rockefeller Foundation Memorial Fellowship, Harvard University
2009	Mary G. Roberts Mind/Brain/Behavior Thesis Fellowship, Harvard University
2009	Program for Research in Science and Engineering Fellowship, Harvard University
2008	Weissman International Internship Program Fellowship, Harvard University
2008	Lowe Career Decision Loan Fund Recipient, Harvard University
2007	Museum of Comparative Zoology Grants-in-Aid Recipient, Harvard University

2007-2009   Harvard College Research Program Fellowship, Harvard University
2006-2010   T.W. Lewis Foundation Scholar *&* Robert C. Byrd Scholar

Publications

under revision   Verma, A., Mukherjee, K., Potts, C., Kreiss, E., and **Fan, J.** (*under revision*). CHART-6: Human-centered evaluation of data visualization understanding in vision-language models.

under revision   Maeda, K., Tsai, C.-Y., **Fan, J.**, and Abtahi, P. (*under revision*). Multimodal conventions with hand gestures and language in collaborative physical tasks.

under review   **Fan, J.** (*under review*). Generative behaviors as key targets for cognitive models. *Current Directions in Psychological Science.*

under review   Hertzmann, A. and **Fan, J.** (*under review*). How people draw pictures, and the vision-memory bottleneck.

under review   Mukherjee, K., Huey, H., Stoinski, L., Hebart, M., **Fan, J.**, and Bainbridge, W. (*under review*). Drawings of THINGS: A large-scale drawing dataset of 1,854 object concepts.

under review   Binder, F., Matter, M., Kirsh, D., and **Fan, J.** (*under review*). Humans select subgoals that balance immediate and future cognitive costs during physical assembly.

under review   Yang, J., Huey, H., Lu, X., and **Fan, J.** (*under review*). Drawings of specific objects and object categories drive different visual recognition patterns.

2025   Chu, J., Zheng, K., and **Fan, J.** (2025). What makes people think a puzzle is fun to solve? *Proceedings of the 47th Annual Meeting of the Cognitive Science Society.*

2025   Verma, A. and **Fan, J.** (2025). Measuring and predicting variation in the difficulty of questions about data visualizations. *Proceedings of the 47th Annual Meeting of the Cognitive Science Society.*

2025   Zheng, K., Brockbank, E., Schwartz, S. T., Yeager, D., Bryan, C., Dweck, C., and **Fan, J.** (2025). Linking student psychological orientation, engagement, and learning in college-level introductory data science. *Proceedings of the 47th Annual Meeting of the Cognitive Science Society.*

2025   Chen, A., Kim, S., Dharmasiri, A., Russakovsky, O., and **Fan, J.** (2025). Portraying Large Language Models as Machines, Tools, or Companions Affects What Mental Capacities People Attribute to Them. *Proceedings of the 47th Annual Meeting of the Cognitive Science Society.*

2025   Brockbank, E., Gerstenberg, T., **Fan, J.**, and Hawkins, R. (2025). How do we get to know someone? Diagnostic questions for inferring personal traits. *Proceedings of the 47th Annual Meeting of the Cognitive Science Society.*

2025   Zhu, R., Nduku, T., Arieda, J. O., Verma, A., **Fan, J.**, and Frank, M. C. (2025). Investigating children's performance on object- and picture-based vocabulary assessments in global contexts: Evidence from Kisumu, Kenya. *Proceedings of the 47th Annual Meeting of the Cognitive Science Society.*

2025   Brockbank, E., Verma, A., Lloyd, H., Huey, H., Padilla, L., and **Fan, J.** (2025). Measuring convergence between two data visualization literacy assessments. *Cognitive Research: Principles and Implications.*

2025   Vinker, Y., Shahm, T., Zheng, K., Zhao, A., **Fan, J.**, and Torralba, A. (2025). SketchAgent: Language-driven sequential sketch generation. *Computer Vision and Pattern Recognition (CVPR)*.

2024   Allen, K., Brändle, F.,... **Fan, J.**, ... Schulz, E. (2024). Using games to understand the mind. *Nature Human Behaviour*.

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

2024   Venkatesh, R., Chen, H., Feigelis, K., Jedoui, K., Kotar, K., Binder, F., Lee, W., Liu, S., Smith, K., **Fan, J.**, and Yamins, D. (2024). Counterfactual World Modeling for Physical Dynamics Understanding. *European Conference on Computer Vision (ECCV)*.

2024   McCarthy, W., Anderson, S., and **Fan, J.** (2024). How does assembling an object affect memory for it? *Proceedings of the 46th Annual Meeting of the Cognitive Science Society*.

2024   Brockbank, E., Yang, J., Govil, M., **Fan, J.**, and Gerstenberg, T. (2024). Without his cookies, he's just a monster: a counterfactual simulation model of social explanation. *Proceedings of the 46th Annual Meeting of the Cognitive Science Society*.

2024   Wang, H., Jedoui, K., Venkatesh, R., Binder, F., Tenenbaum, J., **Fan, J.**, Yamins, D., and Smith, K. (2024). Probabilistic simulation supports generalizable intuitive physics. *Proceedings of the 46th Annual Meeting of the Cognitive Science Society*.

2024   McCarthy, W., Matejka, J., Willis, K., **Fan.**, J., and Pu, Y. Communicating design intent using drawing and text. *ACM Creativity and Cognition*.

2024   Huey, H., Leake, M., Aneja, D., Fisher, M., and **Fan, J.** How do video content creation goals impact which concepts people prioritize when generating B-roll imagery? *ACM Creativity and Cognition*.

2024   Bourouis, A., **Fan, J.**, and Gryaditskaya, Y. (2024). Open vocabulary semantic scene sketch understanding. *Computer Vision and Pattern Recognition (CVPR)*.

2024   Holt, S., **Fan, J.**, and Barner, D. (2024). Creating ad hoc graphical representations of number. *Cognition*.

2024   Long, B., **Fan, J.**, Chai, Z., and Frank, M. (2023). Parallel developmental changes in children's drawing and recognition of visual concepts. *Nature Communications*.

2023   McCarthy, W., Kirsh, D., and **Fan, J.** (2023). Consistency and variation in reasoning about physical assembly. *Cognitive Science*.

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

2023   Tung, H.-Y., Ding, M., Chen, Z., Bear, D., Gan, C., Tenenbaum, J., Yamins, D., **Fan, J.**, and Smith, K. (2023). Physion++: Evaluating physical scene understanding that requires online inference of different physical properties. *In Advances in Neural Information Processing Systems (Datasets & Benchmarks Track)*.

2023   **Fan, J.**, Bainbridge, W., Chamberlain, R., and Wammes, J. (2023). Drawing as a versatile cognitive tool. *Nature Reviews Psychology*.

2023   Hawkins, R., Sano, M., Goodman, N., and **Fan, J.** (2023). Visual resemblance and interaction history jointly constrain pictorial meaning. *Nature Communications*.

2023 Huey, H., Lu, X., Walker, C. and **Fan, J.** (2023). Explanatory drawings prioritize functional properties at the expense of visual fidelity. *Cognition.*

2023 Long, B., Wang, Y., Christie, S., Frank, M., and **Fan, J.** (2023). Developmental changes in drawing production under different memory demands in a U.S. and Chinese sample. *Developmental Psychology.*

2023 Lu, X., Wang, X., and **Fan, J.**. (2023). Learning dense correspondences between photos and sketches. *International Conference on Machine Learning (ICML).*

2023 Gweon, H., **Fan, J.**, Kim, B. (2023). Beyond imitation: Machines that understand and are understood by humans. *Philosophical Transactions of the Royal Society A.*

2023 Binder, F., Mattar, M., Kirsh, D., and **Fan, J.** (2023). Humans choose visual subgoals to reduce cognitive cost. *Proceedings of the 45th Annual Meeting of the Cognitive Science Society.*

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

2023 Huey*, H., Oey*, L., Lloyd, H., and **Fan, J.** (2023). How do communicative goals guide which data visualizations people think are effective? *Proceedings of the 45th Annual Meeting of the Cognitive Science Society.*

2023 Martinez, J., Binder, F., Wang, H., Haber, N., **Fan, J.**, and Yamins, D. (2023). Humans choose visual subgoals to reduce cognitive cost. *Proceedings of the 45th Annual Meeting of the Cognitive Science Society.*

2022 Wong*, C., McCarthy*, W., Grand*, G., Friedman, Y., Tenenbaum, J., Andreas, J., Hawkins, R., and **Fan, J.** (2022). Identifying concept libraries from language about object structure. *Proceedings of the 44th Annual Meeting of the Cognitive Science Society.*

2022 Brockbank*, E., Wang*, H., Yang, J., Mirchandani, S., Erdem Bıyık, E., Sadigh, D., and **Fan, J.** (2022). How do people incorporate advice from artificial agents when making physical judgments? *Proceedings of the 44th Annual Meeting of the Cognitive Science Society.*

2022 Huey*, H., Long*, B., Yang, J., George, K., and **Fan, J.** (2022). Developmental changes in the semantic part structure of drawn objects. *Proceedings of the 44th Annual Meeting of the Cognitive Science Society.*

2022 Wang, H., Allen, K., Vul, E., and **Fan, J.** (2022). Generalizing physical prediction by composing forces and objects. *Proceedings of the 44th Annual Meeting of the Cognitive Science Society.*

2022 Wang, H., Yang, J., Tamari, R., and **Fan, J.** (2022). Communicating understanding of physical dynamics in natural language. *Proceedings of the 44th Annual Meeting of the Cognitive Science Society.*

2021 *Bear, D., *Wang, E., *Mrowca, D., *Binder, F., Tung, H.-Y., RT, P, Holdaway, C., Tao, S., Smith, K., Sun, F.-Y., Li, F.-F., Kanwisher, N., Tenenbaum, J., **Yamins, D., and ****Fan, J.** (2021). Physion: Evaluating physical prediction from vision in humans and machines. *In Advances in Neural Information Processing Systems (Datasets & Benchmarks Track) 2021.*

2021 Binder, F., Mattar, M., Kirsh, D. and **Fan, J.** (2021). Visual scoping operations for physical assembly. *Proceedings of the 43rd Annual Meeting of the Cognitive Science Society.*

2021   Holdaway, C., Bear, D., Radwan, S., Frank, M., Yamins, D., and **Fan, J.** (2021). Measuring and predicting variation in the interestingness of physical structures. *Proceedings of the 43rd Annual Meeting of the Cognitive Science Society.*

2021   Holt, S., Barner, D., and **Fan, J.** (2021). Improvised numerals rely on 1-to-1 correspondence. *Proceedings of the 43rd Annual Meeting of the Cognitive Science Society.*

2021   Huey, H., Walker, C., and **Fan, J.** (2021). How do the semantic properties of visual explanations guide causal inference? *Proceedings of the 43rd Annual Meeting of the Cognitive Science Society.*

2021   Kachergis, G., Radwan, S., Long, B., **Fan, J.**, Lingelbach, M., Bear, D., Yamins, D., and Frank, M. (2021). Predicting children's and adults' preferences in physical interactions via physics simulation. *Proceedings of the 43rd Annual Meeting of the Cognitive Science Society.*

2021   *McCarthy, W., *Hawkins, R., Wang, H., Holdaway, C., and **Fan, J.** (2021). Learning to communicate about shared procedural abstractions. *Proceedings of the 43rd Annual Meeting of the Cognitive Science Society.*

2021   McCarthy, W., Mattar, M., Kirsh, D. and **Fan, J.** (2021). Connecting perceptual and procedural abstractions in physical construction. *Proceedings of the 43rd Annual Meeting of the Cognitive Science Society.*

2021   Wang, H., Polikarpova, N., and **Fan, J.** (2021). Learning part-based abstractions for visual object concepts. *Proceedings of the 43rd Annual Meeting of the Cognitive Science Society.*

2021   Wang, H., Vul, E., Polikarpova, N., and **Fan, J.** (2021). Theory acquisition as constraint-based program synthesis. *Proceedings of the 43rd Annual Meeting of the Cognitive Science Society.*

2021   Yang, J. and **Fan, J.** (2021). Visual communication of object concepts at different levels of abstraction. *Proceedings of the 43rd Annual Meeting of the Cognitive Science Society.*

2020   McCarthy, W., Holdaway, C., Hawkins, R., and **Fan, J.** (2020). Emergence of compositional abstractions in human collaborative assembly. *NeurIPS Workshop on Object Representations for Learning and Reasoning.*

2020   McCarthy, W., and **Fan, J.** (2020). Rapid policy updating in human physical construction. *ICML Workshop on Object-Oriented Learning: Perception, Representation, and Reasoning.*

2020   Wang, H., and **Fan, J.** (2020). Library learning for structured object concepts. *ICML Workshop on Object-Oriented Learning: Perception, Representation, and Reasoning.*

2020   McCarthy W., Kirsh D., & **Fan J.** (2020). Learning to build physical structures better over time. *Proceedings of the 42nd Annual Meeting of the Cognitive Science Society.*

2020   **Fan J.**, Wammes J., Gunn J., Yamins D., Norman K., Turk-Browne N. (2020). Relating visual production and recognition of objects in human visual cortex. *Journal of Neuroscience.*

2020   Xu T., **Fan J.**, & Dow S. (2020). Schema and metadata guide the collective generation of relevant and diverse insights. *Proceedings of the 8th AAAI Conference on Human Computation and Crowdsourcing.*

2020   **Fan J.**, Hawkins R., Wu M., & Goodman N. (2020). Pragmatic inference and visual abstraction enable contextual flexibility during visual communication. *Computational Brain & Behavior.*

2019   Achlioptas, P., **Fan J.**, Hawkins R., Guibas L., & Goodman N. (2019). ShapeGlot: Learning language for shape differentiation. *International Conference on Computer Vision (ICCV).*

2019   Hawkins R.*, Sano, M.*, Goodman N., & **Fan J.** (2019). Graphical convention formation during visual communication. *Proceedings of the 41st Annual Meeting of the Cognitive Science Society.* * equal contribution; Sayan Gul Travel Award

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

2019   Long B., **Fan J.**, Chai R., & Frank M. (2019). Developmental changes in the ability to draw distinctive features of object categories. *Proceedings of the 41st Annual Meeting of the Cognitive Science Society.*

2019   **Fan J.**, Dinculescu M., & Ha D. (2019). Collabdraw: An environment for collaborative sketching with an artificial agent. *Proceedings of the 2019 ACM SIGCHI Conference on Creativity and Cognition.*

2018   Cullen S., **Fan J.**, van der Brugge E., & Elga A. (2018). Improving analytical reasoning and argument understanding: A quasi-experimental field study of argument visualization. *npj Science of Learning.*

2018   **Fan J.**, Yamins D., & Turk-Browne, N. (2018) Common object representations for visual production and recognition. *Cognitive Science.*

2018   Long, B., **Fan J.**, & Frank M. (2018) Drawing as a window into developmental changes in object representations. *Proceedings of the 40th Annual Conference of the Cognitive Science Society.*

2016   **Fan J.**, Hutchinson, J., and Turk-Browne, N. (2016) When past is present: Substitutions of long-term memory for sensory evidence in perceptual judgments. *Journal of Vision.* 16(8), 1-12.

2016   **Fan J.** and Turk-Browne, N. (2016) Incidental biasing of attention from long-term memory. *Journal of Experimental Psychology: Learning, Memory, & Cognition.* 42(6), 970-977.

2016   **Fan J.**, Turk-Browne, N., & Taylor, J. (2016) Error-driven learning in statistical summary perception. *Journal of Experimental Psychology: Human Perception and Performance*, 42(2), 266–280.

2015   **Fan J.**, Yamins D., & Turk-Browne, N. (2015) Common object representations for visual recognition and production. *Proceedings of the 37th Annual Meeting of the Cognitive Science Society.*

2015   **Fan J.** (2015) Drawing to learn: how producing graphical representations enhances scientific thinking. *Translational Issues in Psychological Science.* 1(2), 170-181.

2014   **Fan J.** and Suchow, J. (2014) The crowd is self-aware. *Behavioral and Brain Sciences*, 37(1), 81-82.

2013   **Fan J.** and Turk-Browne, N. (2013) Internal attention to features in visual short-term memory guides object learning. *Cognition*, 129(2), 292-308.

2013   **Fan J.**, Turk-Browne, N., & Taylor, J. (2013) Feedback-driven tuning of statistical summary representations. *Visual Cognition*, 21(6), 685-689.

2013   **Fan J.** (2013) Can ideas about food inspire real social change? The case of Peruvian gastronomy. *Gastronomica*, 13(2), 31-42.

2010   Strange B., Kroes M., **Fan J.**, & Dolan R. (2010) Emotion causes targeted forgetting of established memories. *Frontiers in Behavioral Neuroscience.* 4, 1-13.

2009   Sharot T., Shiner T. Brown A., **Fan J.**, & Dolan, R. (2009) Dopamine enhances expectation of pleasure in humans. *Current Biology*, 24(19), 2077-1080.

Invited Talks

2025   Cognitive tools for uncovering useful abstractions
University of Maryland, College Park, September 2025

2025   Cognitive tools for making the invisible visible
Massachusetts Institute of Technology, March 2025

2025   Measuring, modeling, and improving data visualization literacy
Women in Data-Driven Discovery (WiD3), Stanford University, March 2025

2025   Cognitive tools for uncovering useful abstractions
Arizona State University, February 2025

2025   Cognitive tools for visual communication
Aarhus University, January 2025

2024   Cognitive tools for uncovering useful abstractions
Workshop on Analyzing High-dimensional Traces of Intelligent Behavior, Institute for Pure & Applied Mathematics, University of California, Los Angeles, September 2024

2024   Cognitive tools for uncovering useful abstractions
Princeton University, April 2024

2024   Cognitive tools for uncovering useful abstractions
Johns Hopkins University, April 2024

2024   Cognitive tools for uncovering useful abstractions
University of California, Irvine, March 2024

2024   Cognitive tools for uncovering useful abstractions
University of California, Santa Cruz, March 2024

2024   Cognitive tools for uncovering useful abstractions
Stanford HAI Seminar Series, February 2024

2024   Putting cognitive science to work to accelerate human learning
Stanford AI + Education Summit, February 2024

2024   Cognitive tools for uncovering useful abstractions
TU Darmstadt, February 2024

2023   Cognitive tools for uncovering useful abstractions
User Interface Software and Technology (UIST) Keynote, October 2023

2023   What enables the mind to make sense of so many kinds of visual media?
Stanford CSLI Workshop on Iconicity & Cognition, September 2023

2023   Cognitive tools for uncovering useful abstractions
National Taiwan University, August 2023

2023   Learning to communicate about shared procedural abstractions
Computational Summer School on Modeling Social and Collective Behavior (COSMOS), July 2023.

2023	Advancing cognitive science and AI through Cognitive-AI Benchmarking
	Conference on Human-Compatible Artificial Intelligence, June 2023.
2023	How do visual content and communicative context determine pictorial meaning?
	Studies in Language, Information, Meaning, and Expression, May 2023.
2023	Discovering abstractions that bridge perception, action, and communication
	Workshop on Neurosymbolic Generative Models at ICLR, May 2023.
2023	How do visual content and social context influence pictorial meaning?
	Second Salzburg Workshop on Imagistic Cognition, May 2023.
2023	Discovering abstractions that bridge perception, action, and communication
	Invited Symposium on "Learning and generalization in humans and machines" at Cognitive Neuroscience Society, March 2023.
2023	Cognitive technologies for uncovering useful abstractions
	University of California, Santa Barbara, March 2023.
2023	Cognitive technologies for uncovering useful abstractions
	Carnegie Mellon University, February 2023.
2023	Cognitive tools for uncovering useful abstractions
	University of Oregon, January 2023.
2022	Towards human-like understanding of 3D physical scenes
	ECCV: Language for 3D Scenes Workshop, October 2022.
2022	Physion: Evaluating physical prediction from vision in humans and machines
	ECCV: Visual object-oriented Learning meets Interaction (VOLI) Workshop, October 2022.
2022	Cognitive technologies for uncovering useful abstractions
	University of California, Merced, September 2022.
2022	Cognitive technologies for uncovering useful abstractions
	Diverse Intelligences Summer Institute, August 2022.
2022	Cognitive tools for uncovering useful abstractions
	Max-Planck Institute for Biological Cybernetics, July 2022.
2022	Learning to communicate about shared procedural abstractions
	CVPR: Artificial Social Intelligence Workshop, June 2022.
2022	Physion: Evaluating physical prediction in humans and machines
	CVPR: Graph Machine Learning for Visual Computing Tutorial, June 2022.
2022	Cognitive tools for uncovering useful abstractions
	University of California, Irvine, April 2022.
2022	Cognitive tools for uncovering useful abstractions
	University of Wisconsin-Madison, March 2022.
2022	Cognitive tools for uncovering useful abstractions
	Dartmouth College, February 2022.
2022	Cognitive tools for uncovering useful abstractions
	Stanford University, February 2022.
2022	Cognitive tools for uncovering useful abstractions
	University of California, Los Angeles, January 2022.

2021	Visual content and social context jointly determine pictorial meaning
	Psychonomics Symposium: Beyond the Button Press: Studying the Mind Through Drawings, November 2021.
2021	Cognitive tools for learning and communication
	Configural Processing Consortium Keynote Talk, November 2021.
2021	Cognitive tools for learning and communication
	University of Edinburgh Computational Cognitive Science Seminar, October 2021.
2021	Cognitive technologies for visual communication
	CogSci 2021 Workshop: Symbolic and sub-symbolic systems in people and machines, July 2021.
2021	Drawing games as a window into concepts, communication, and collaboration.
	CogSci 2021 Workshop: Using games to understand intelligence, July 2021.
2021	Cognitive technologies for making the invisible visible
	Diverse Intelligences Summer Institute, July 2021.
2021	Relating visual production and recognition in human visual cortex.
	Wellcome Trust Centre for Neuroimaging, June 2021.
2021	Cognitive tools for making the invisible visible.
	Workshop on Sketch-Oriented Deep Learning, CVPR, June 2021.
2021	Cognitive tools for learning and communication.
	Nokia Bell Labs, February 2021.
2021	Cognitive tools for learning and communication.
	Department of Cognitive, Linguistic & Psychological Sciences, Brown University, February 2021.
2020	Cognitive tools for learning and communication.
	Institute for Cognitive Science, University of Michigan, December 2020.
2020	Cognitive tools for making the invisible visible.
	Department of Philosophy, University of Southern California, June 2020.
2020	Emergence of graphical communication protocols.
	Robotics: Science & Systems Workshop: Emergent Behaviors in Human-Robot Systems, July 2020.
2020	Cognitive tools for making the invisible visible.
	ICLR Workshop on Bridging AI and Cognitive Science, Addis Ababa, Ethiopia, April 2020.
2019	Cognitive tools for learning and communication.
	Design @ Large, UC San Diego, La Jolla, CA, May 2019.
2019	Cognitive tools for learning and communication.
	Halıcıoğlu Data Science Institute, UC San Diego, La Jolla, CA, January 2019.
2018	Cognitive tools for learning and communication.
	Hult International Business School, San Francisco, CA, April 2018.
2018	Drawing as a window into the mind.
	Netflix, Los Gatos, CA, April 2018.
2018	Cognitive tools for learning and communication.
	University of California Berkeley, Berkeley, CA, February 2018.

2018	Cognitive tools for learning and communication.
	University of California San Diego, La Jolla, CA, January 2018.
2018	Cognitive tools for learning and communication.
	Indiana University, Bloomington, IN, January 2018.
2017	Drawing as a window into the mind.
	Rhode Island School of Design, Providence, RI, November 2017.
2017	Role of cognitive actions in learning.
	Annual Meeting of the Cognitive Science Society, London, UK, July 2017.
2016	Drawing as a window into the mind.
	Princeton University Art Museum, Princeton, NJ, October 2016.
2016	Drawing as cognitive technology.
	Drawing and the Brain Symposium, Indiana University Center for Art + Design, Bloomington, IN, April 2016.
2016	Drawing to learn: how visual production refines object representations.
	Indiana University in Bloomington, IN, April 2016.
2015	Drawing as a window into learning.
	Educational Testing Service, Princeton, NJ, October, 2015.
2015	Common object representations for visual recognition and production.
	University of British Columbia, Vancouver, BC, March, 2015.
2015	Drawing as a window into the mind.
	Smart Design, New York City, NY, March, 2015.
2013	Can ideas about food lead to real social change?
	Princeton Woodrow Wilson School Bernstein Gallery Art Exhibit on "Cooking for Change", Princeton, NJ, May 2013.
2011	Apégate a la causa! La gastronomía peruana como fenómeno social total.
	Faculty of Social Sciences, Pontificia Universidad Católica del Perú, Lima, Peru, July 2011.

Conference Presentations

2024	Cognitive Science Society.
2024	CVPR.
2024	Society for Philosophy and Psychology.
2023	NeurIPS.
2023	Cognitive Science Society.
2023	International Conference on Machine Learning (ICML).
2023	Vision Sciences Society.
2023	International Conference on Learning Represenations (ICLR) Workshop on Neurosymbolic Generative Models.
2023	Cognitive Neuroscience Society.
2022	Cognitive Science Society.
2022	Computer Vision and Pattern Recognition (CVPR).

2022	Society for Philosophy and Psychology Annual Meeting.
2021	Annual Meeting of the Psychonomic Society.
2021	Cognitive Science Society.
2021	Computer Vision and Pattern Recognition (CVPR).
2021	Society for Philosophy and Psychology Annual Meeting.
2020	Robotics: Science & Systems Workshop: Emergent Behaviors in Human-Robot Systems.
2020	Cognitive Science Society.
2020	ICML Workshop on Object-Oriented Learning: Perception, Representation, and Reasoning.
2020	ICLR Workshop on Bridging AI and Cognitive Science.
2019	Cognitive Science Society. *Sayan Gul Travel Award.*
2019	Society for Philosophy and Psychology Annual Meeting.
2019	ACM SIGCHI Conference on Creativity and Cognition.
2018	Vision Sciences Society.
2018	Society for Neuroscience.
2017	Vision Sciences Society.
2017	Cognitive Science Society. *Glushko Dissertation Prize.*
2016	Vision Sciences Society.
2015	Vision Sciences Society.
2015	Cognitive Science Society. *Computational Modeling Paper Prize.*
2014	Vision Sciences Society.
2014	ACM SIGGRAPH.
2013	Vision Sciences Society.
2013	Annual Meeting on Object Perception, Attention, and Memory (OPAM). *Student Travel Award*
2013	Annual Meeting of the Psychonomic Society.
2012	Vision Sciences Society.
2012	New School for Social Research Sociology Conference.
2010	Vision Sciences Society.

Advising

STUDENTS

Stanford

Postdoctoral Scholars

2023 —	Erik Brockbank (*NSF SBE Postdoc Fellow*; co-mentored by Tobi Gerstenberg)
2024 —	Junyi Chu (*Stanford HAI Postdoc Fellow*; co-mentored by Hyo Gweon)
2024 —	Lio Wong (*Stanford HAI Postdoc Fellow*)
2025 —	Kushin Mukherjee

PhD Students

2023 —	Sean Anderson (*NSF Graduate Fellow*)

2024 —	Linas Nasvytis
2024 —	Alexa Tartaglini (*Stanford Computer Science*)

Dissertation Committee

2022	Elias Wang (*Stanford Electrical Engineering*)
2023 —	Sarah Wu
2024	Lio Wong (*MIT Brain & Cognitive Sciences*)
2024 —	Shawn Schwartz
2024 —	Veronica Boyce
2024 —	Effie Li
2024 —	Joy Hsu (*Stanford Computer Science*)
2024 —	Rose Wang (*Stanford Computer Science*)
2024 —	Ian Huang (*Stanford Computer Science*)
2024 —	Honglin Chen (*Stanford Computer Science*)
2025 —	Sharon Zhang (*Stanford Computer Science*)

Selected Undergraduates and Master's

2024 —	Nora Dee
2024 —	Vryan Feliciano
2018 — 2019	Renata Chai
2018 — 2019	Xin Yuan
2018 — 2019	Kushin Mukherjee
2018 — 2019	Megumi Sano (*Sayan Gul Travel Award*)
2017	Karl Mulligan

UC San Diego

PhD Students

2019 — 2024	Haoliang Wang
2019 — 2024	Holly Huey (co-advised by Caren Walker)
2019 — 2024	Will McCarthy (co-advised by David Kirsh)
2020 — 2024	Felix Binder (co-advised by David Kirsh)
2020 — 2022	Cameron Holdaway (co-advised by Ed Vul)
2019 —	Sebastian Holt (co-advised by David Barner)
2021 — 2023	Hannah Lloyd (co-advised by Celeste Pilegard)
2022 — 2023	Lauren Oey (co-advised by Ed Vul)
2022 — 2023	Erik Brockbank (co-advised by Ed Vul)

Qualifying Exam Committee

2021	Yang Wang
2021	Cameron Holdaway

2022	Hyojeong (Jenny) Yoo

Dissertation Committee

2022	Helen Wang (*UCSD Neuroscience*)
2023	Tone Xu (*UCSD Cognitive Science*)
2023	Sunyoung Park
2023	Isabella DeStefano
2023	Aubrey Lau
2024	James Qi
2024	Zheng Guo (*UCSD Computer Science & Engineering*)
2024	Mohan Gupta

Selected Undergraduates

2019 — 2022	Justin Yang, Honors: *UCSD Chancellor's Research Scholarship, HDSI Research Scholarship, Triton Research & Experiential Learning Scholarship*
2019 — 2024	Xuanchen Lu, Honors: *UCSD Psychology Research Perseverence During COVID Award*
2019 — 2020	Julia Xu, Honors: *HDSI Research Scholarship*
2020 — 2023	Sirui Tao, Honors: *HDSI Research Scholarship*
2020 — 2021	Zhe Huang, Honors: *Triton Research & Experiential Learning Scholarship*
2021 — 2022	Jane Yang, Honors: *Triton Research & Experiential Learning Scholarship*
2022 — 2024	Zoe Tait, Honors: *UCSD Chancellor's Research Scholarship*
2022 — 2025	Rio Aguina-Kang

Princeton

Selected Undergraduates

2015 — 2016	Laura Herman
2016	Jessica Ji
2015	Jordan Gunn
2015	Rachel Klebanov
2013 - 2014	Ryan O'Connell
2013	Annie Chen
2012-2013	Max Luo

OTHER MENTORSHIP

2024-2025	HAI Student Affinity Group: Debugging Dali: An Exploration of AI Art, Faculty Mentor
2020	Mentor, Científico Latino Graduate Student Mentorship Initiative
2017-2018	Stanford Center for the Study of Language & Information, Mentor
2019-2022	Faculty Mentor, Cognitive Science Society Annual Meeting
2012–2016	Princeton Wilson College, Resident Graduate Advisor

2015-2016	Princeton Cognitive Science Program Graduate Student Fellow
2013-2014	Princeton Psychology Senior Thesis Writing Group Leader

Teaching

STANFORD

2025	PSYCH / DATASCI / EDUC 149: Data Science and the Science of Learning
2024	COLLEGE 101: Why College? Your Education and the Good Life
2024	PSYCH 10: Introduction to Statistical Methods: Precalculus
2024	PSYCH 267A: Bids for Scale in Psychological Science
2023	PSYCH 10: Introduction to Statistical Methods: Precalculus

UC SAN DIEGO

Instructor-of-Record

2022	PSYC 201A: Quantitative Methods in Psychology
2022	PSYC 60: Introduction to Statistics
2022	PSYC 193L: Science of Learning Data Science
2021	PSYC 230: Computational Approaches to Visual Abstraction
2021	PSYC 60: Introduction to Statistics
2021	PSYC 230: Computational Approaches to Visual Abstraction
2020	PSYC 193: Perception & Computation
2020	PSYC 60: Introduction to Statistics
2019	PSYC 272: Computational Approaches to Visual Abstraction

Guest Lectures

2025	NEPR 207: Neurosciences Cognitive Core (Stanford)
2025	SYMSYS 1: Minds and Machines (Stanford) x2
2025	SYMSYS 280: Symbolic Systems Research Seminar (Stanford)
2021	PSYC 523b: Cognitive Psychology (Yale)
2021	PHIL 281: Non-Linguistic Representation (UCLA)
2020	NEU 200C: Basic Neuroscience
2020	PSYC 111A: Research Methods
2020	COGS 200: Faculty Research Seminar

Professional Service

2025-	Stanford Undergraduate Data Science Program Advisory Board
2023-2025	Stanford Psychology Statistics Committee
2023-2025	Stanford Psychology Graduate Admissions Committee
2023-2025	Stanford Psychology Media & Outreach Committee
2020-2023	UCSD Marshall College Commencement Representative
2020-2023	UCSD Pathways2AI Initiative, Co-Founder
2020-2023	UCSD Psychology Undergraduate Research Assistant Common Application Initiative, Co-Chair

SERVICE TO THE FIELD

Workshops Organized

2025	CogSci Workshop: Minds in the making: Cognitive science and design thinking
2024	CogSci Workshop: COGGRAPH: Building bridges between cognitive science and computer graphics
2024	CourseKata Researcher Workshop (DREAM): Insights from data about current state of data science education
2023	CogSci Workshop: How does the mind discover useful abstractions?
2023	CogSci Workshop: Advancing cognitive science and AI through Cognitive-AI Benchmarking
2022	ECCV Workshop: 1st Challenge on Machine Visual Common Sense: Perception, Prediction, Planning
2022	CogSci Workshop: Images2Symbols: Drawing as as Window into the Mind
2022	CCN Generative Adversarial Collaboration: To what extent does the brain simulate the external world?
2022	CogSci Discussion Group: Neural Network Models of Cognition
2022	CVPR Sketch Deep Learning Workshop

Program and Awards Committees

2025	Symposium Committee, Cognitive Science Society
2020-2024	Program Committee, Cognitive Science Society
2022, 2024, 2025	Program Committee, Cognitive Computational Neuroscience (CCN) Meeting
2021, 2024	Program Committee, Conference on the Theory and Application of Diagrams
2021	Program Committee, ACM Creativity and Cognition
2020	Program Committee, NeurIPS Object Representations for Learning and Reasoning Workshop
2020	Program Committee, ICML Object-Oriented Learning Workshop

2020   Awards Committee, Cognitive Science Society

Editorial Service

Guest Editor, Memory & Cognition

Grant Reviewing

Panelist, NSF Integrative Strategies for Understanding Neural and Cognitive Systems (NCS)
Panelist, NSF Perception, Action & Cognition
Panelist, NSF Cognitive Neuroscience
Panelist, NSF EDU Core Research
Panelist, NSF Computational Cognition (CompCog)

Journal Reviewing

Cognition
Cognitive Research: Principles and Implications
Cognitive Science
Developmental Science
Frontiers in Psychology
Empirical Studies of the Arts
Gastronomica
Journal of Experimental Psychology: General
Journal of Experimental Psychology: Human Perception and Performance
MIT Handbook of Attention
Memory & Cognition
Nature Human Behaviour
Nature Commnuications
npj Science of Learning
Open Mind
PLoS Computational Biology
Proceedings of the National Academy of Sciences
Philosophical Transactions of the Royal Society B
Psychonomic Bulletin & Review
Psychological Review
Psychological Science
Quarterly Journal of Experimental Psychology
Thinking Skills & Creativity
Translational Issues in Psychological Science

Conference Reviewing

ACM Creativity and Cognition
ACM SIGGRAPH
Cognitive Science Society
Cognitive Computational Neuroscience
Conference on the Theory and Application of Diagrams
NeurIPS Datasets & Benchmarks