Judith E. Fan

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Academic Positions

2019 —	*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

Academic Honors

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
2013	Object Perception, Attention, and Memory (OPAM) Student Travel Award
2011-2012	Walker McKinney '50 Life Sciences Fellowship, Princeton University
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)

Fellowships & Grants

2021-2026	Faculty Early Career Development Program (CAREER), National Science Foundation
2021-2023	Science of Autonomy, Office of Naval Research
2020-2021	Course Development and Instructional Improvement Program Grant, UC San Diego
2015-2016	Council of the Humanities David A. Gardner '69 Magic Project Grant, Princeton University
2015-2016	Council on Science and Technology Research Grant, Princeton University
2015-2016	Cognitive Science Graduate Student Fellowship, Princeton University
2015-2016	Cognitive Science Graduate 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
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
2006-2010	Robert C. Byrd Scholar

Publications

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.*
2019	**Fan J.**, Hawkins R., Wu M., & Goodman N. (2019). 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). GeoGlot: Learning to Ground Referential Language in Geometry. *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.*

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 Colloquia

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, Conference on Computer Vision and Pattern Recognition, June 2021.

2021   Cognitive tools for learning and communication.
Stevens Institute of Technology, March 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, September 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.
International Conference on Learning Representations 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.

Selected Conference Presentations

2021	McCarthy W., Kirsh D., & Fan J. (2021). Exploring the role of prototyping in physical construction. Poster to be presented at the *Society for Philosophy and Psychology Annual Meeting.*
2020	McCarthy W., Kirsh D., & **Fan J.** (2020). Learning to build physical structures better over time. Talk presented at the *42nd Annual Meeting of the Cognitive Science Society.*
2020	McCarthy, W., and **Fan, J.** (2020). Rapid policy updating in human physical construction. Spotlight talk presented at the *ICML Workshop on Object-Oriented Learning: Perception, Representation, and Reasoning.*
2020	Wang, H., and **Fan, J.** (2020). Library learning for structured object concepts. Poster presented at the *ICML Workshop on Object-Oriented Learning: Perception, Representation, and Reasoning.*
2019	Fan J. & Hawkins R. (2019). Visual content and social context jointly determine pictorial meaning. Poster presented at the *Society for Philosophy and Psychology Annual Meeting.*
2019	Fan J., Dinculescu M., & Ha D. (2019). collabdraw: an environment for collaborative sketching with an artificial agent. Poster presented at the *2019 ACM SIGCHI Conference on Creativity and Cognition.*
2019	Hawkins R.*, Sano, M.*, Goodman N., Fan J. (2019). Graphical convention formation during visual communication. Talk presented at 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. Poster presented at 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. Talk presented at the *41st Annual Meeting of the Cognitive Science Society.*

2018   Fan J., Hawkins R., Wu M., & Goodman, N. Modeling contextual flexibility in visual communication. Talk presented at the *Vision Sciences Society Annual Meeting in St. Pete's Beach, FL May 2018.*

2018   Long, B., Fan J., & Frank, M. Drawing as a window in the development of object category representations. Talk presented at the *Cognitive Science Society Annual Meeting in Madison, WI July 2018.*

2018   Long, B., Fan J., & Frank, M. Drawing as a window in the development of object category representations. Poster presented at the *Vision Sciences Society Annual Meeting in St. Pete's Beach, FL May 2018.*

2018   Wammes, J., Fan, J., Lee R., Gunn J., Yamins,, D. Norman K., & Turk-Browne, N. Changing object representations during visual production training. Poster presented at the *Vision Sciences Society Annual Meeting in St. Pete's Beach, FL May 2018.*

2017   Fan J., Yamins D., & Norman, K., & Turk-Browne, N. Consequences of visual production on object representations. Dynamic poster presented at the *Society for Neuroscience Annual Meeting in Washington, DC, November, 2017.*

2017   Fan J., Yamins D., & Turk-Browne, N. Visual production induces categorical perception. Poster presented at the *Vision Sciences Society Annual Meeting in St. Pete's Beach, FL May 2017.*

2016   Fan J., Yamins D., & Turk-Browne, N. Dynamic visual feedback is sufficient to improve drawing. Poster presented at the *Vision Sciences Society Annual Meeting in St. Pete's Beach, FL May 2016.*

2015   Fan J., Yamins D., & Turk-Browne, N. Common object representations for visual recognition and production. Talk given at *Cognitive Science Society Annual Meeting in Pasadena, CA July 2015. * Computational Modeling Paper Prize in Perception & Action*

2015   Fan J., Yamins D., & Turk-Browne, N. How drawing alters object representations. Poster presented at the *Vision Sciences Society Annual Meeting in St. Pete's Beach, FL May 2015.*

2014   Fan J., Yamins D., DiCarlo, J., & Turk-Browne, N. Mapping core similarity among visual objects across image modalities. Poster presented at *ACM SIGGRAPH 2014 in Vancouver, BC, Canada, August 2014.*

2014   Fan J. & Turk-Browne, N. Feature distributions constrain object perception. Poster presented at the *Vision Sciences Society Annual Meeting in St. Pete's Beach, FL, May 2014.*

2014   Everaert, J., Fan, J., Koster, E., & Turk-Browne, N. Attentional capture from emotional associations in long-term memory. Poster presented at the *Vision Sciences Society Annual Meeting in St. Pete's Beach, FL, May 2014.*

2013   Fan, J., Turk-Browne, N., & Taylor, J. Feedback-driven tuning of statistical summary representations. Talk given at the *Annual Meeting on Object Perception, Attention, and Memory in Toronto, Ontario, Canada, November 2013. * Student Travel Award*

2013	Fan, J., Hutchinson, J., & Turk-Browne, N. Incidental expression of visual long-term memory in online perception. Poster presented at the *Annual Meeting of the Psychonomic Society in Toronto, Ontario, Canada, November 2013.*
2013	Fan, J. and Turk-Browne, N. Visual long-term memory for objects biases perceptual attention. Poster presented at the *Vision Sciences Society Annual Meeting in Naples, FL, May 2013.*
2012	Fan, J. and Turk-Browne, N. Accessing visual memory distorts object representations. Talk given at the *Vision Sciences Society Annual Meeting in Naples, FL, May 2012.*

Advising

Students

UC San Diego

Graduate Students

2019 —	Haoliang Wang
2019 —	Holly Huey (co-advised by Caren Walker)
2019 —	Will McCarthy (co-advised by David Kirsh)
2019 —	Sebastian Holt (co-advised by David Barner)
2020 —	Tone Xu (co-advised by Steven Dow)
2020 —	Felix Binder (co-advised by David Kirsh)
2020 —	Cameron Holdaway (co-advised by Ed Vul)

Qualifying Exam Committee

2020	Lauren Oey
2020	Erik Brockbank
2021	Mohan Gupta
2021	Yang Wang
2021	Cameron Holdaway
2021	James Qi

Dissertation Committee

2021	Aubrey Lau
2021	Helen Wang

Selected Undergraduates

2019 —	Justin Yang, Honors: *Chancellor's Research Scholarship, HDSI Research Scholarship*
2019 —	Xuanchen Lu
2019—20	Julia Xu, Honors: *HDSI Research Scholarship*

Stanford

Renata Chai (Master's, Stanford, 2018-19), Xin Yuan (Master's, Tsinghua University, 2018-19), Kushin Mukherjee (undergraduate, Vassar, 2018-19), Megumi Sano (undergraduate, Stanford,

2018-19), Karl Mulligan (undergraduate, Rutgers, 2017)

Princeton

Laura Herman (undergraduate, Princeton, 2015-16), Jessica Ji (undergraduate, Princeton, 2016), Jordan Gunn (undergraduate, Princeton, 2015), Rachel Klebanov (undergraduate, Princeton, 2015), Ryan O'Connell (undergraduate, Princeton, 2013-14), Annie Chen (undergraduate, Carnegie Mellon, 2013), Max Luo (undergraduate, University of Pennsylvania, 2012–2013)

Appointments

2017-2018	Stanford Center for the Study of Language & Information, Mentor
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

UC San Diego

Instructor-of-Record

2021	PSYC 60: Introduction to Statistics, Instructor
2021	PSYC 230: Computational Approaches to Visual Abstraction, Instructor
2020	PSYC 193: Perception & Computation, Instructor
2020	PSYC 60: Introduction to Statistics, Instructor
2019	PSYC 272: Computational Approaches to Visual Abstraction, Instructor

Guest Lectures

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

Service to the University

2020	Marshall College Commencement Representative
2020-	Pathways2AI Initiative, Co-Founder

2020-	Psychology Undergraduate Research Assistant Common Application Initiative, co-Chair

Service to the Field

2020-2021	Mentor, Científico Latino Graduate Student Mentorship Initiative
2021	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
2020	Program Committee, Cognitive Science Society

Ad Hoc Reviewer

Cognition
Cognitive Research: Principles and Implications
Cognitive Science
Developmental Science
Gastronomica
Journal of Experimental Psychology: General
Journal of Experimental Psychology: Human Perception and Performance
MIT Handbook of Attention
Psychonomic Bulletin & Review
Psychological Review
Quarterly Journal of Experimental Psychology
Translational Issues in Psychological Science

Affiliations

Association for Computing Machinery (2019–), Cognitive Science Society (2015–), Association for Psychological Science (2014–), American Psychological Association (2011–), Vision Sciences Society (2010–), Society for Neuroscience (2008–), American Association for the Advancement of Science (2008–)