



Judith Ellen Fan

Assistant Professor of Psychology and, by courtesy, of Education

Bio

BIO

I direct the Cognitive Tools Lab (<https://cogtoolslab.github.io/>) at Stanford University. Our lab aims to reverse engineer the human cognitive toolkit — in particular, how people use physical representations of thought to learn, communicate, and solve problems. Towards this end, we use a combination of approaches from cognitive science, computational neuroscience, and artificial intelligence.

ACADEMIC APPOINTMENTS

- Assistant Professor, Psychology
- Assistant Professor (By courtesy), Graduate School of Education

ADMINISTRATIVE APPOINTMENTS

- Assistant Professor, University of California, San Diego, (2019-2023)

HONORS AND AWARDS

- CAREER, National Science Foundation (2021-2026)
- Outstanding Faculty Mentorship Award, UC San Diego Graduate Student Association (2021)
- Robert J. Glushko Prize for Outstanding Doctoral Dissertation, Cognitive Science Society (2017)

PROFESSIONAL EDUCATION

- PhD, Princeton University , Psychology (2016)
- AB, Harvard College , Neurobiology & Statistics (2010)

LINKS

- Cognitive Tools Lab: <https://cogtoolslab.github.io/>

Research & Scholarship

RESEARCH INTERESTS

- Assessment, Testing and Measurement
- Brain and Learning Sciences
- Data Sciences
- Higher Education
- Psychology

- Technology and Education

Teaching

COURSES

2023-24

- Bids for Scale in Psychological Science: PSYCH 267A (Win)
- Introduction to Statistical Methods: Precalculus: PSYCH 10, STATS 160, STATS 60 (Aut)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Rose Wang

Postdoctoral Faculty Sponsor

Junyi Chu

Doctoral (Program)

Sean Anderson

Postdoctoral Research Mentor

Erik Brockbank

Publications

PUBLICATIONS

- **Parallel developmental changes in children's production and recognition of line drawings of visual concepts.** *Nature communications*
Long, B., Fan, J. E., Huey, H., Chai, Z., Frank, M. C.
2024; 15 (1): 1191
- **Consistency and Variation in Reasoning About Physical Assembly.** *Cognitive science*
McCarthy, W. P., Kirsh, D., Fan, J. E.
2023; 47 (12): e13397
- **Creating ad hoc graphical representations of number.** *Cognition*
Holt, S., Fan, J. E., Barner, D.
2023; 242: 105665
- **Developmental changes in drawing production under different memory demands in a U.S. and Chinese sample.** *Developmental psychology*
Long, B., Wang, Y., Christie, S., Frank, M. C., Fan, J. E.
2023; 59 (10): 1784-1793
- **Drawing as a versatile cognitive tool** *NATURE REVIEWS PSYCHOLOGY*
Fan, J. E., Bainbridge, W. A., Chamberlain, R., Wammes, J. D.
2023; 2 (9): 556-568
- **Socially intelligent machines that learn from humans and help humans learn.** *Philosophical transactions. Series A, Mathematical, physical, and engineering sciences*
Gweon, H., Fan, J., Kim, B.
2023; 381 (2251): 20220048
- **Visual resemblance and interaction history jointly constrain pictorial meaning.** *Nature communications*
Hawkins, R. D., Sano, M., Goodman, N. D., Fan, J. E.
2023; 14 (1): 2199

- **Common Object Representations for Visual Production and Recognition** *COGNITIVE SCIENCE*
Fan, J. E., Yamins, D. K., Turk-Browne, N. B.
2018; 42 (8): 2670-2698
- **Improving analytical reasoning and argument understanding: a quasi-experimental field study of argument visualization.** *NPJ science of learning*
Cullen, S., Fan, J., van der Brugge, E., Elga, A.
2018; 3: 21