

# Haoliang Wang

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## Academic Positions

2024- *Postdoctoral Associate*, Brain and Cognitive Sciences, MIT

## Education

2019-2024 *PhD*, Experimental Psychology, UC San Diego

2015-2019 *BS*, Automation, Xi'an Jiaotong University

## Selected Academic Honors and Awards

2023 Norman Anderson Graduate Travel and Research Award (\$1,255).

2022 Norman Anderson Graduate Travel and Research Award (\$1,500).

2018 PengKang Scholarship (top 1% students for academic excellence).

2017 Samsung Scholarship (top 2% students for academic excellence).

2017 The First Prize of Alumni Scholarship of Xi'an Jiaotong University (top 2% student for academic excellence).

2016 Outstanding Students in Xi'an Jiaotong University (top 5% students for academic excellence).

2016 The First Prize of Contemporary Undergraduate Mathematical Contest in Modeling (CUMCM).

## Publications

\* indicates equal contribution

2026 Maeda, K., McCarthy, W., Tsai, C., Mu, J., **Wang, H.**, Hawkins, R., Fan, J., and Abtahi, P. Gesturing Toward Abstraction: Multimodal Convention Formation in Collaborative Physical Tasks. *Proceedings of the 2026 CHI Conference on Human Factors in Computing Systems*.

2025 **Wang, H.**, Gothoskar, N., Tenenbaum, J., and Smith, K.. From pixels to physics: an image-computable model of physical predictions. *Proceedings of the 47th Annual Meeting of the Cognitive Science Society*.

2024 Jedoui, K., Venkatesh, R., **Wang, H.**, O'Connell, T., Bai, Y., Tenenbaum, J., Fan, J., Smith, K., and Yamins, D.. Towards task-appropriate readout mechanisms for physical scene understanding. *Cognitive Computational Neuroscience 2024*.

2024

- 2023 **Wang, H.**, Jedoui, K., Venkatesh, R., Binder, F., Tenenbaum, J., Yamins, D., Fan, J., and Smith, K.. Probabilistic simulation supports generalizable intuitive physics. *Proceedings of the 46th Annual Meeting of the Cognitive Science Society*.
- 2023 **Wang, H.**, Jedoui, K., Venkatesh, R., Binder, F., Tenenbaum, J., Yamins, D., Fan, J., and Smith, K.. Modeling and evaluating how the brain makes physical predictions. *Society for Neuroscience 2023*.
- 2023 Martinez, J., Binder, F., **Wang, H.**, Haber, N., Fan, J., and Yamins, D.. Measuring and Modeling Physical Intrinsic Motivation. *Proceedings of the 45th Annual Meeting of the Cognitive Science Society*.
- 2022 **Wang, H.**, Allen, K., Vul, E., and Fan, J.. 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.. Communicating understanding of physical dynamics in natural language. *Proceedings of the 44th Annual Meeting of the Cognitive Science Society*.
- 2022 Brockbank\*, E., **Wang\***, **H.**, Yang, J., Mirchandani, S., Bıyık, E., Sadigh, D., and Fan, J.. How do people incorporate advice from artificial agents when making physical judgments? *Proceedings of the 44th Annual Meeting of the Cognitive Science Society*.
- 2021 **Wang, H.**, Polikarpova, N., and Fan, J.. 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.. Theory acquisition as constraint-based program synthesis. *Proceedings of the 43rd Annual Meeting of the Cognitive Science Society*.
- 2021 McCarthy\*, W., Hawkins\*, R., **Wang, H.**, Holdaway, C., and Fan, J.. Learning to communicate about shared procedural abstractions. *Proceedings of the 43rd Annual Meeting of the Cognitive Science Society*.
- 2020 **Wang, H.**, and Fan, J.. Library learning for structured object concepts. *ICML Workshop on Object-Oriented Learning: Perception, Representation, and Reasoning*.

## Conference Presentations

- 2025 From pixels to physics: an image-computable model of physical predictions: Poster presented at *47th Annual Meeting of the Cognitive Science Society*.
- 2024 Probabilistic simulation supports generalizable intuitive physics: Poster presented at *46th Annual Meeting of the Cognitive Science Society*.
- 2023 Modeling and evaluating how the brain makes physical predictions: Poster presented at *Society for Neuroscience 2023*.
- 2022 Generalizing physical prediction by composing forces and objects: Poster presented at *44th Annual Meeting of the Cognitive Science Society*.
- 2022 Communicating understanding of physical dynamics in natural language: Poster presented at *44th Annual Meeting of the Cognitive Science Society*.
- 2021 Learning part-based abstractions for visual object concepts: Poster presented at *43rd Annual Meeting of the Cognitive Science Society*.

- 2021 Theory acquisition as constraint-based program synthesis: Poster presented at *43rd Annual Meeting of the Cognitive Science Society*.
- 2020 Library learning for structured object concepts: Poster presented at *ICML Workshop on Object-Oriented Learning: Perception, Representation, and Reasoning*.

## Teaching Experience

### **UC San Diego, Department of Psychology**

- 2024 PSYCH 105 Cognitive Psychology
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  - 2023 PSYCH 106 Behavioral Neuroscience
  - PSYCH 105 Cognitive Psychology
  - 2022 PSYCH 102 Sensory Neuroscience
  - 2021 PSYCH 105 Cognitive Psychology
  - PSYCH 104 Social Psychology
  - 2020 PSYCH 3 Foundations of Cognitive Psychology
  - 2019 PSYCH 100 Clinical Psychology
- Responsibilities: Guest lecture a class session, assist with exam preparation and teaching, grade written assignments, and hold weekly office hours.*

## Outreach

- 2021 Gave a talk on Bayesian reasoning and program synthesis to high school students in [Pathways2AI](#).

## Mentorship

### **MIT, Department of Brain and Cognitive Sciences**

- 2025- James Roberts, Undergraduate student
- 2025- Tianai Yue, Undergraduate visiting student

### **UC San Diego, Department of Psychology**

- 2022-2023 Nora Chen, Undergraduate honors thesis student, now at UC Berkley.
- 2021-2022 Jane Yang, Undergraduate honors thesis student, now at UT Austin.

## Academic Service

Reviewer of Nature Communications, CogSci, etc.

## Skills

Modelling and Analysis: Python, PyTorch, Julia, [Gen](#), R, MATLAB, C++

Experimental Design: JavaScript, HTML, CSS

Software and Tools: git, Adobe CC,  $\LaTeX$

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