

Bonan Zhao

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Academic Appointments

- 2025-now **Lecturer in Computational Cognitive Science**
(Equiv. US Assistant Professor)
School of Informatics, University of Edinburgh
- GAIL Fellow**
Generative AI Laboratory, University of Edinburgh
- 2023-2024 **Postdoctoral Research Associate**
Department of Computer Science, Princeton University

Education

- 2019-2023 **PhD Psychology**, University of Edinburgh, Edinburgh, Scotland
- 2015-2017 **MSc Logic**, University of Amsterdam, Amsterdam, The Netherlands
- 2011-2015 **BA Philosophy**, Tsinghua University, Beijing, China

Industrial Experience

- 2017-2019 **Data Scientist**, Screen 6 (acquired by Samba TV), Amsterdam, The Netherlands

Awards

- 2024 Travel Award, The 4th International Joint Conference on Learning & Reasoning
- 2022 Good Research Practice (Open Research) Awards, Edinburgh Research Office
- 2020-2022 Research Support Grants, Department of Psychology, University of Edinburgh
- 2019-2022 Postgraduate Research Award, University of Edinburgh
- 2016 Springer Best Paper Award, European Summer School in Logic, Language and Information
- 2015-2017 Amsterdam Excellence Scholarship, University of Amsterdam
- 2014 Dean's Award, School of Humanities, Tsinghua University

Publications

* Equal contribution. † Joint senior authors.

PREPRINT

- 2026 Cano, L. H., Zareski, I. *, Amouri, L. *, Zhao, P. *, Mascini, M., Sansone, E., Pu, Y., **Zhao, B.** †, Kryven, M. † (2026). Prospective compression in human abstraction learning. *ArXiv*.

PEER-REVIEWED JOURNAL ARTICLES

- 2025 Ham, H., **Zhao, B.**, Griffiths, T. G., Vélez, N. Teaching Recombinable Motifs Through Simple Examples. *Cognitive Science*, 49: e70103.
- 2024 **Zhao, B.**, Lucas, C. G., Bramley, N. R. (2024). A model of conceptual bootstrapping in human cognition. *Nature Human Behaviour* 8 (1), 125-136.
- 2023 Bramley, N. R., **Zhao, B.**, Quillien, T., Lucas, C. G. (2023). Local search and the evolution of world models. *Topics in Cognitive Science*, 1-32.
- 2022 **Zhao, B.**, Lucas, C. G., Bramley, N. R. (2022). How do people generalize causal relations over

objects? A non-parametric Bayesian account. *Computational Brain & Behavior*, 5(1), 22-44.

- 2018 Capraro, V., Sippel, J., **Zhao, B.**, Hornischer, L., Savary, M., Terzopoulou, Z., Faucher, P., Griffioen, S. F. (2018). People making deontological judgments in the Trapdoor dilemma are perceived to be more prosocial in economic games than they actually are. *PLoS One*, 13(10), e0205066.

PEER-REVIEWED CONFERENCE PROCEEDINGS & WORKSHOPS

- 2026 Ham, H., Arumugam. D., Correa, C. G., **Zhao, B.**, Griffiths, T. G., Vélez, N. (2026). Rational teachers should 'lie' to bounded students. In *Proceedings of the 48th Annual Meeting of the Cognitive Science Society*.
- 2026 Zhao, P., Sansone, E., Kryven, M.[†], **Zhao, B.**[†] (2026). Online library learning in human visual puzzle solving. In *Proceedings of the 48th Annual Meeting of the Cognitive Science Society*.
- 2026 Whitaker, E., Quillien, T., **Zhao, B.** (2026). An evolutionary model of recombination in social learning. In *Proceedings of the 48th Annual Meeting of the Cognitive Science Society*.
- 2026 Zhu, Y. M., **Zhao, B.** (2026). A rational model of growth mindset theory. In *Proceedings of the 48th Annual Meeting of the Cognitive Science Society*.
- 2025 **Zhao, B.**, Mieczkowski, E., Arumugam. D., Vélez, N., Griffiths, T. G. (2025). Discovering hidden laws in innovation by recombination. In *Proceedings of the 47th Annual Meeting of the Cognitive Science Society*.
- 2025 Sucholutsky, I., **Zhao, B.**, Hwang, H., Chen, A., Russakovsky, O., Griffiths, T. G. (2025). Learning a doubly-exponential number of concepts from few examples. In *Proceedings of the 47th Annual Meeting of the Cognitive Science Society*.
- 2025 Fascendini, B., **Zhao, B.**, Vélez, N. (2025). Are two-year-olds intrinsically motivated to explore their own competence? In *Proceedings of the 47th Annual Meeting of the Cognitive Science Society*.
- 2025 He, X., **Zhao, B.**, Bramley, N. R. (2025). Bootstrapping in geometric puzzle solving. In *Proceedings of the 47th Annual Meeting of the Cognitive Science Society*.
- 2025 Hong, Y., Wang. C., **Zhao, B.** (2025). State sensitivity in an additive discovery game. In *Proceedings of the 47th Annual Meeting of the Cognitive Science Society*.
- 2024 **Zhao, B.**, Vélez, N., Griffiths, T. G. (2024). Higher uncertainty leads to less exploration in a combinatorial discovery game. In *Workshop on Bayesian Decision-making and Uncertainty, NeurIPS*.
- 2024 Byers, J. B., **Zhao, B.**, Niv, Y. (2024). Modeling goal selection with program synthesis. In *Intrinsically-Motivated and Open-Ended Learning Workshop, NeurIPS*.
- 2024 Zhang, E., **Zhao, B.** (2024). The Art of Knowing When to Stop: Analysis of Optimal Stopping in People and Machines. In *The 4th Workshop on Mathematical Reasoning and AI, NeurIPS*.
- 2024 **Zhao, B.**, Vélez, N., Griffiths, T. G. (2024). A rational model of innovation by recombination. In *Proceedings of the 46th Annual Meeting of the Cognitive Science Society*.
- 2024 Sucholutsky, I., **Zhao, B.**, Griffiths, T. G. (2024). Using compositionality to learn many categories from few examples. In *Proceedings of the 46th Annual Meeting of the Cognitive Science Society*.
- 2023 Gong, T., **Zhao, B.**, McIntosh, R. D., Lucas, C. G. (2023). A rational model of spatial neglect. In *Proceedings of the 45th Annual Meeting of the Cognitive Science Society*.
- 2023 Gong, T., **Zhao, B.**, McIntosh, R. D., Lucas, C. G. (2023). Understanding spatial neglect: A Bayesian perspective. In *Proceedings of the Computational Cognitive Neuroscience Society Meeting*.
- 2023 **Zhao, B.**, Lucas, C. G., Bramley, N. R. (2023). Bootstrapping compositional generalization with cache-and-reuse. (2023). In *Proceedings of the Computational Cognitive Neuroscience Society Meeting*.

- 2022 **Zhao, B.**, Bramley, N. R., Lucas, C. (2022). Powering up causal generalization: A model of human conceptual bootstrapping with adaptor grammars. In *Proceedings of the 44th Annual Meeting of the Cognitive Science Society*.
- 2022 Xia, Z. *, **Zhao, B.** *, Quillien, T., Lucas, C. (2022). Dissecting causal asymmetries in inductive generalization. In *Proceedings of the 44th Annual Meeting of the Cognitive Science Society*.
- 2022 Marchant, N., **Zhao, B.**, Bramley, N. R., Morales, D., Chaigneau, S. E. (2022). Categorizing perceived causal events. In *Proceedings of the Annual Meeting of the 44th Cognitive Science Society*.
- 2021 **Zhao, B.**, Lucas, C. G., Bramley, N. R. (2021). Building object-based causal programs for human-like generalization. In *Causal Inference & Machine Learning Workshop, NeurIPS*.
- 2021 Valentin, S., **Zhao, B.**, Jiang, C., Bramley, N. R., Lucas, C. (2021). Symbolic and sub-symbolic systems in people and machines. In *Proceedings of the 43rd Annual Meeting of the Cognitive Science Society*.
- 2020 **Zhao, B.**, Bramley, N. (2020). Order Effects in One-shot Causal Generalization. In *Proceedings of the 42nd Annual Meeting of the Cognitive Science Society*.
- 2018 **Zhao, B.***, van de Pol, I.* , Raijmakers, M. E., Szymanik, J. (2018). Predicting cognitive difficulty of the deductive mastermind game with dynamic epistemic logic models. In *Proceedings of the 40th Annual Meeting of the Cognitive Science Society*.

BOOK

- 2022 van Emde Boas, P., van Emde Boas, G., Xie, K., **Zhao, B.** (2022). *Analyzing the Logic of Sun Tzu in "The Art of War", Using Mind Maps*. Springer.

Invited Talks

† Named seminars and conference panels.

- May 2026 **CogSciCon**, Edinburgh, UK
- Nov 2025 **Centre for AI in Assistive Autonomy**, Edinburgh, UK
- Sep 2025 † **RLDM Seminar**, Max Planck Institute for Biological Cybernetics, Tübingen, Germany
- June 2025 † **NeuroChat**, Tianqiao & Chrissy Chen Institute of Brain Sciences, remote
- May 2025 † **The Sixth International Conference on the Mathematics Of Neuroscience and AI**, Split, Croatia
- Mar 2025 **Autonomous Agents Research Group**, University of Edinburgh, Edinburgh, UK
- Oct 2024 **Concepts and Cognition Lab**, Princeton University, USA
- Sep 2024 **Tsing Ch'a Sessions**, Tsinghua University, Beijing, China
- Aug 2024 **IMPrESSION in ACTION Lab**, University of California, San Diego, remote
- Jul 2024 † **Computational Models of Structure-based Cognition Symposium**, The Fifth International Conference on Analogy, Amsterdam, The Netherlands
- Apr 2024 **PDP Seminar Series**, Princeton University, USA
- Feb 2024 † **Cognitive Science Colloquium**, University of California, Irvine, USA
- Nov 2023 **OpenTalks**, Chinese Open Science Network (COSN), remote
- Oct 2023 † **NYUConcats**, New York University, USA
- Oct 2022 **Max Planck Institute for Biological Cybernetics**, Tübingen, Germany
- Oct 2022 **Human Cognitive Neuroscience seminar**, University of Edinburgh, UK
- Sep 2022 **Computational Cognitive Science Lab**, Princeton University, remote
- Sep 2022 **Computation & Cognition Lab**, Stanford University, remote

- May 2022* **Computational Cognitive Science Lab**, University of Melbourne, remote
- Mar 2022* † **Logic and Interactive Rationality**, University of Amsterdam, remote
- Mar 2022* † **London Judgment and Decision Making Seminar**, UCL, London, UK
- Feb 2022* **Causality in Cognition Lab**, Stanford University, remote
- Jul 2021* **Computational Principles of Intelligence Lab**, MPI Tübingen, remote
- Oct 2017* **DTU Compute**, Technical University of Denmark, Copenhagen, Denmark
- May 2017* **Donders Institute for Brain, Cognition and Behaviour**, Nijmegen, The Netherlands
- Apr 2016* **Cool Logic**, Institute for Logic, Language and Computation, Amsterdam, The Netherlands

Service

AD-HOC REVIEWER

- Journals* Artificial Intelligence; Cognition (6); Cognitive Science (2); Journal of Cognition; Journal of Experimental Psychology: Applied; Journal of Experimental Psychology: Learning, Memory, and Cognition; Psychological Science; Open Mind (2); Open Philosophy; Science Advances; Scientific Reports.
- Conferences* Annual Meeting of the Cognitive Science Society (CogSci) 2020–2026
 Conference on Cognitive Computational Neuroscience (CCN) 2023-2026
 International Joint Conference on Learning & Reasoning (IJCLR) 2024

ORGANIZING & OUTREACH

- 2025-2026 Program Committee, Annual Meeting of the Cognitive Science Society (CogSci)
- 2024 Program Committee, International Joint Conference on Learning & Reasoning (IJCLR)
- 2023-2024 Outreach volunteer, Chinese Open Science Network (COSN)
- 2021-2022 Open Research Facilitator, University of Edinburgh

Teaching

- 2025- **School of Informatics**, University of Edinburgh, UK
 Seminar in Cognitive Modeling (lecturer)
 Cognitive Science (tutor)
- 2022-2023 **Centre for Data, Culture & Society**, University of Edinburgh, UK
 Data Carpentry (instructor)
 Introduction to Descriptive Statistics (instructor)
 Version Control with git and GitHub (instructor + course design)
 Data Visualization with R (co-instructor)
 Open Research Practices (co-instructor)
- 2020-2023 **School of Philosophy, Psychology and Language Sciences**, University of Edinburgh, UK
 Causal Cognition (tutorial, TA)
 Logic 1 (tutorial, TA)
 Introduction to Cognitive Science (Python lab, TA)
 Univariate Statistics and Methodology using R (R lab, TA)
 Data Analysis for Psychology in R (R lab, TA)
- 2018-2019 **HackYourFuture** (free coding school for refugees), Amsterdam, The Netherlands
 Git and command line interface (lead lecturer)
 SQL and Database (co-lead lecturer)
 JavaScript (TA)

Mentoring & Advising

PhD Students

2026- Thomas Jackson (Primary, Edinburgh Informatics)

Research Internship

2026 Pinzhe Zhao (BA Cognitive Science, Edinburgh PPLS)

2024 Evelene Zhang (BS Cognitive Science, Carleton College)

Masters Dissertation

2026 Sherry Hou, Rahmah Nurdini, Zeren Tao, Yijun Chen, Wendi Huang (Edinburgh)

2025 Migara Kumarasinghe, Eve Whitaker, Te Dong, Haozhe Sun (Edinburgh)

Undergraduate Dissertation

2026 Stelios Neakleous, Tahreem Akeel (Edinburgh)

2025 Zachary S. Siegel (Princeton)

2024 Lucas Linzmeier (Princeton)

May 8, 2026