

Bonan Zhao

Email: bzhao2@ed.ac.uk

Website: bonanlab.github.io

Academic Appointments

- 2025-now* **Lecturer in Computational Cognitive Science**
(Equiv. US Assistant Professor)
School of Informatics, 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
£2,000 for attending the conference
- 2022* Chinese Students Award, Great Britain–China Educational Trust
£3,000 for PhD write-up period
- 2022* Good Research Practice Awards (Open Research Award), Edinburgh Research Office
- 2020-2022* Research Support Grants, Department of Psychology, University of Edinburgh
Total £2,125 applied and approved for running online experiments
- 2019-2022* Postgraduate Research Award, College of Arts, Humanities & Social Science, University of Edinburgh
£14,533 annual stipend & tuition fees at overseas rate for three years
- 2016* Springer Best Paper Award, European Summer School in Logic, Language and Information
- 2015-2017* Amsterdam Excellence Scholarship, University of Amsterdam
€12,000 annual stipend & tuition fees at overseas rate for two years
- 2014* Dean's Award, School of Humanities, Tsinghua University
Top 2 students in the school, GPA & service

Publications

Asterisk * marks equal contribution. Underlined are student (mentee) authors.

PREPRINT

- Preprint* Huang, H., Zhao, B., Griffiths, T. G., Vélez, N. Teaching and learning generalizable abstractions. <https://osf.io/preprints/psyarxiv/zxwrv>

PEER-REVIEWED JOURNAL ARTICLES

- 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

- 2024 **Zhao, B.**, Vélez, N., Griffiths, T. G. (2024). Higher uncertainty leads to less exploration in a combinatorial discovery game. In *NeurIPS 2024 Workshop on Bayesian Decision-making and Uncertainty*.
- 2024 Byers, J. B., **Zhao, B.**, Niv, Y. (2024). Modeling goal selection with program synthesis. In *Intrinsically-Motivated and Open-Ended Learning Workshop @NeurIPS2024*.
- 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*.
- 2024 Fascendini, B., **Zhao, B.**, Vélez, N. (2024). Are toddlers intrinsically motivated to explore their own competence? 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.

Conference and Workshop Presentations

- Dec 2024 Higher uncertainty leads to less exploration in a combinatorial discovery game
Poster at NeurIPS 2024 Workshop on Bayesian Decision-making and Uncertainty
- Jul 2024 A rational model of innovation by recombination
Talk at Annual Meeting of the Cognitive Science Society, Rotterdam, The Netherlands
- Jul 2024 Are toddlers curious to learn about their own competence?
Poster at Annual Meeting of the Cognitive Science Society, Rotterdam, The Netherlands
- Mar 2024 Constructing deep concepts through shallow search
Talk at AAAI Spring Symposium on Human-Like Learning, Stanford University, CA, USA
- Mar 2024 Comparing human behavior to an optimal policy for innovation
Poster at AAAI Spring Symposium on Human-Like Learning, Stanford University, CA, USA
- Aug 2023 Bootstrapping compositional generalization with cache-and-reuse
Poster at Computational Cognitive Neuroscience Society Meeting (CCN), Oxford, UK
- Jul 2022 Bootstrap learning complex causal concepts with adaptor grammars
Talk at Edinburgh Computational CogSci Workshop, University of Edinburgh
- Jun 2022 Bootstrap learning of complex causal concepts
Talk at Reasoning Workshop, Edinburgh Laboratory for Integrated Intelligence
- Dec 2021 Building object-based causal programs for human-like generalization
Poster at Causal Inference & Machine Learning: Why now?, NeurIPS, remote
- Jul 2021 Causal programs in generalizations
Talk at Symbolic and sub-symbolic systems in people and machines, CogSci, remote
- Jun 2021 How do people generalize causal relations over objects? A Bayesian non-parametric account
Talk at International Conference of Thinking (ICT), remote
- Aug 2020 Order effects in one-shot causal generalization
Poster at Annual Meeting of the Cognitive Science Society (CogSci), remote
- Aug 2020 Predicting cognitive difficulty of the deductive mastermind game with dynamic epistemic logic models
Poster at Annual Meeting of the Cognitive Science Society (CogSci), Madison, WI, USA
- Jul 2016 Revising social networks with stubborn agents
Talk at North American Summer School on Logic, Language, and Information (NASSLLI), Rutgers, NJ, USA
- Jul 2016 Logic of closeness revision
Poster at Logic and the Foundations of Game and Decision Theory (LOFT), Maastricht, The Netherlands
- Nov 2015 Why my sugar is your poison? Type-based rationality in backward induction
Talk at LABEX CIMI Pluridisciplinary Workshop on Game Theory, Toulouse, France

Invited Talks

<i>Oct 2024</i>	Concepts and Cognition Lab , Princeton University, USA
<i>Sep 2024</i>	Tsing Ch'a Sessions , Tsinghua University, Beijing, China
<i>Aug 2024</i>	IMPression in ACTion Lab , University of California, San Diego, remote
<i>Jul 2024</i>	Computational Models of Structure-based Cognition Symposium , The Fifth International Conference on Analogy, Amsterdam, The Netherlands
<i>Apr 2024</i>	PDP Seminar Series , Princeton University, USA
<i>Feb 2024</i>	Cognitive Science Colloquium , University of California, Irvine, USA
<i>Nov 2023</i>	OpenTalks , Chinese Open Science Network (COSN), remote
<i>Oct 2023</i>	NYUConcats , New York University, USA
<i>Oct 2022</i>	Max Planck Institute for Biological Cybernetics , Tübingen, Germany
<i>Oct 2022</i>	Human Cognitive Neuroscience seminar , University of Edinburgh, UK
<i>Sep 2022</i>	Computational Cognitive Science Lab , Princeton University, remote
<i>Sep 2022</i>	Computation & Cognition Lab , Stanford University, remote
<i>May 2022</i>	Computational Cognitive Science Lab , University of Melbourne, remote
<i>Mar 2022</i>	Logic and Interactive Rationality , University of Amsterdam, remote
<i>Mar 2022</i>	London Judgment and Decision Making Seminar , UCL, London, UK
<i>Feb 2022</i>	Causality in Cognition Lab , Stanford University, remote
<i>Jul 2021</i>	Computational Principles of Intelligence Lab , MPI Tübingen, remote
<i>Oct 2017</i>	DTU Compute , Technical University of Denmark, Copenhagen, Denmark
<i>May 2017</i>	Donders Institute for Brain, Cognition and Behaviour , Nijmegen, The Netherlands
<i>Apr 2016</i>	Cool Logic , Institute for Logic, Language and Computation, Amsterdam, The Netherlands

Teaching

<i>2022-2023</i>	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)
<i>2020-2023</i>	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)
<i>2018-2019</i>	HackYourFuture (free coding school for refugees), Amsterdam, The Netherlands Git and command line interface (lead lecturer) SQL and Database (co-lead lecturer) JavaScript (TA)

Service

AD-HOC REVIEWER

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

ORGANIZING & OUTREACH

- 2024 Program Committee, International Joint Conference on Learning & Reasoning (IJCLR)
- 2023- Outreach volunteer, Chinese Open Science Network (COSN)
- 2021-2022 Open Research Facilitator, University of Edinburgh
Organized 12 workshops and tutorials about open research practices
Built and maintained school-wise open research information hub
- 2019-2022 EdinCoCoSci lab meetings, University of Edinburgh
- 2016-2017 Logic Tea seminar series, University of Amsterdam

Mentoring

- 2023-2024 Ham Huang, PhD Psychology, Princeton University
- 2024 Evelene Zhang, BS Cognitive Science, Carleton College
- 2023 Lucas Linzmeier, BS Computer Science, Princeton University
- 2021 Zeyu Xia, MSc Informatics, University of Edinburgh

References

Neil R. Bramley neil.bramley@ed.ac.uk
 Christopher G. Lucas c.lucas@ed.ac.uk
 Thomas L. Griffiths tomg@princeton.edu
 Natalia Vélez nvelez@princeton.edu
 Sonja Smets S.J.L.Smets@uva.nl

January 1, 2025