

- 2024 **K.R. Allen***, K. Smith*, L. Bird, J.B. Tenenbaum, T. Makin, D. Cowie. (2024). Lifelong embodied experience affects cognitive styles for physical problem-solving. *Psychonomic Bulletin & Review*.
- 2023 N. Monath, M. Zaheer, **K. R. Allen**, A. McCallum. (2023). Efficient dual-encoder training with a dynamically maintained index. *AISTATS*.
- 2023 **K.R. Allen***, Y. Rubanova*, T. Guevara, W. Whitney, A. Sanchez-Gonzalez, P. Battaglia, T. Pfaff. (2023). Face Interaction Graph Networks for learning rigid body dynamics. *International Conference on Learning Representations (ICLR)*.
- 2022 **K.R. Allen***, T. Guevara*, K. Stachenfeld*, A. Sanchez-Gonzalez, P. Battaglia, J. Hamrick, T. Pfaff. (2022). Physical Design with Differentiable Learned Simulators. *Neural Information Processing Systems (NeurIPS)*.
- 2022 **K.R. Allen**, T. Guevara, Y. Rubanova, K. Stachenfeld, A. Sanchez-Gonzalez, P. Battaglia, T. Pfaff. (2022). Graph network simulators can learn discontinuous, rigid contact dynamics. *Conference on Robot Learning (CoRL)*.
- 2022 M. Pelz, **K.R. Allen**, J.B. Tenenbaum, L. Schulz. (2022). Foundations of Intuitive Power Analyses in Children and Adults. *Nature Human Behavior*.
- 2022 H. Wang, **K. R. Allen**, E. Vul, J. E. Fan. (2022). Learning composable world models for physical prediction. *Proceedings of the Annual Conference of the Cognitive Science Society*.
- 2021 J. Loula, **K.R. Allen**, J.B. Tenenbaum. (2021). Combining rules and simulation to explain infant physical learning. *Proceedings of the Annual Conference of the Cognitive Science Society (Oral)*.
- 2021 **K.R. Allen***, K. Smith*, L. Bird, J.B. Tenenbaum, T. Makin, D. Cowie. (2021). Meta-strategy learning in physical problem-solving: the effect of embodied experience. *Proceedings of the Annual Conference of the Cognitive Science Society*.
- 2020 **K. R. Allen***, A. Bakhtin*, K. A. Smith, J. B. Tenenbaum, L. van der Maaten. (2020). Ogre: An object-based generalization for reasoning environment. *NeurIPS Workshop on Object Representations for Learning and Reasoning (Oral)*.
- 2020 J. Loula, **K.R. Allen**, J.B. Tenenbaum. (2020). A Task and Motion Approach to the Development of Planning. *Proceedings of the Annual Conference of the Cognitive Science Society*.
- 2020 **K.R. Allen**, K.A. Smith, U. Piterbarg, R. Chen, J.B. Tenenbaum. (2020). Abstract strategy learning underlies flexible transfer in physical problem solving. *Proceedings of the 41st Annual Meeting of the Cognitive Science Society*.
- 2020 **K.R. Allen***, K. Smith*, J.B. Tenenbaum. (2020). Rapid trial-and-error learning with simulation supports flexible tool use and physical reasoning. *Proceedings of the National Academy of Sciences*.
- 2020 J. Loula, **K.R. Allen**, T. Silver, J.B. Tenenbaum. (2020). Learning constraint-based planning models from demonstrations. *International Conference on Intelligent Robots and Systems (IROS)*.
- 2020 T. Silver, **K.R. Allen**, A. Lew, L. Kaelbling, J.B. Tenenbaum. (2020). Few-shot Bayesian imitation learning with logical program policies. *AAAI*.
- 2020 C. Sun, **K.R. Allen**, S. Tonegawa. (2020). Neural and computational basis for organizing episodic experience into event units. *Cosyne*.
- 2019 **K.R. Allen**, E. Shelhamer, H. Shin, J.B. Tenenbaum. (2019). Infinite Mixture Prototypes for Few-Shot Learning. *Proceedings of the International Conference on Machine Learning (ICML)*.
- 2019 V. Xia*, Z. Wang*, **K.R. Allen**, T. Silver, L. Kaelbling. (2019). Learning sparse relational transition models. *Proceedings of the International Conference on Learning Representations (ICLR)*.
- 2019 **K.R. Allen***, K. Smith*, J.B. Tenenbaum. (2019). Rapid Trial-and-Error Learning in Physical Problem Solving. *Proceedings of the Annual Conference of the Cognitive Science Society (Oral)*.
- 2019 J. Loula, T. Silver, **K.R. Allen**, J.B. Tenenbaum. (2019). Discovering a symbolic planning language from continuous experience. *Proceedings of the Annual Conference of the Cognitive Science Society*.
- 2019 J. Gill, **K.R. Allen**, A. Williams, M. Goldman. (2019). High-dimensional filtering supports context-dependent neural integration. *Cosyne*.
- 2018 M. Toussaint, **K. Allen**, K. Smith, J.B. Tenenbaum. (2018). Differentiable Physics and Stable Modes for Tool-Use and Manipulation Planning. *Robotics: Science and Systems (Best paper award)*.
- 2018 F. de Avila Belbute-Peres, K. Smith, **K.R. Allen**, J.B. Tenenbaum, J. Z. Kolter. (2018). End-to-end

differentiable physics for learning and control. *Proceedings of the 32nd International Conference on Neural Information Processing Systems (NeurIPS) (Spotlight)*.

- 2018 J. Hamrick*, **K. Allen***, V. Bapst, T. Zhu, K. McKee, J.B. Tenenbaum, P.W. Battaglia. (2018). Relational inductive bias for physical construction in humans and machines. *Proceedings of the Annual Conference of the Cognitive Science Society*.
- 2016 **K. Allen**, I. Yildirim, J.B. Tenenbaum. (2016). Integrating identification and perception: A case study of familiar and unfamiliar face processing. *In Proceedings of the 38th Annual Conference of the Cognitive Science Society*.
- 2015 **K. Allen**, I. Yildirim, J.B. Tenenbaum. (2015). A model of familiar and unfamiliar face processing. *NeurIPS Workshop on Black Box Inference and Learning (Spotlight)*.
- 2015 **K. Allen**, J. Jara-Ettinger, T. Gerstenberg, M. Kleiman-Weiner, J.B. Tenenbaum. (2015). Go fishing! Responsibility judgments when cooperation breaks down. *In Proceedings of the 37th Annual Conference of the Cognitive Science Society*.
- 2015 E. Pless, J. Queriolo, N. Pinter-Wollman, S. Crow, **K. Allen**, D.M. Gordon. (2015). Interactions increase foragers availability and activity in harvester ants. *PLoS One*.
- 2014 **K. Allen**, G. Carenini and R. Ng. (2014). Detecting Disagreement in Conversations using Pseudo-Monologic Rhetorical Structure. *In Proceedings of the 2014 Conference on Empirical Methods in Natural Language Processing (EMNLP)*.
- 2014 ATLAS Collaboration (listed author for substantial contributions). (2014). Search for high-mass dilepton resonances in pp collisions at $\sqrt{s}=8$ TeV with the ATLAS detector. *Physics Review D*.

OTHER

- 2018 T. Silver*, **K. R. Allen***, J.B. Tenenbaum, L. P. Kaelbling. (2018). Residual Policy Learning. *arXiv*.
- 2018 P. W. Battaglia, ..., **K. R. Allen**, (2018). Relational inductive biases, deep learning, and graph networks. *arXiv*.
- 2016 **K. Allen**, L. Hewitt, J. Wu, J.B. Tenenbaum. (2016). Analysis-by-synthesis for speech recognition. *Women in Machine Learning at NeurIPS*.

Invited Talks

- Jul 2024 Physical problem-solving in minds and machines
DLRL Summer School
- Jun 2024 Physical problem-solving in minds and machines
Lower level intelligence workshop at the Simons Institute
- Mar 2024 Physical problem-solving in minds and machines
AI and Cognitive Development Workshop
- Dec 2023 Physical problem-solving in minds and machines
UC Davis
- Dec 2023 Simulation from States and Sensors
Stanford Vision AI Lab
- Dec 2023 Simulation from States and Sensors
Temporal Graph Learning NeurIPS Workshop
- Jul 2023 Abstractions for planning and reasoning
CogSci Abstractions Workshop
- May 2023 Relational representations for reasoning in humans and machines
Columbia Center for Theoretical Neuroscience Seminar
- May 2023 Intuitive Physics: no one tool for the job
Workshop on Imagistic Cognition - Vienna
- Mar 2023 Physical problem-solving in minds and machines
New York University
- Mar 2023 Physical problem-solving in minds and machines
University of British Columbia
- Mar 2023 Physical problem-solving in minds and machines
University of Washington

Mar 2023	Physical problem-solving in minds and machines <i>UMass Amherst</i>
Feb 2023	Physical problem-solving in minds and machines <i>University of Toronto</i>
Feb 2023	Physical problem-solving in minds and machines <i>McGill University</i>
Jan 2023	Physical problem-solving in minds and machines <i>UC San Diego</i>
Jan 2023	Physical problem-solving in minds and machines <i>UC Berkeley</i>
Jan 2023	Physical problem-solving in minds and machines <i>Carnegie Mellon University</i>
Dec 2022	Graph networks for innovation and design <i>NeurIPS Frontiers of Graph Learning Workshop</i>
Dec 2022	Relational inductive biases for human-level innovation and planning with tools <i>Conference on Robot Learning (CoRL) Workshop on Geometry, physics, and human knowledge as inductive bias in robot learning</i>
Oct 2022	Robust modeling and manipulation with learned simulators <i>International Conference on Intelligent Robots and Systems (IROS) Workshop on the Role of Uncertainty in Manipulation</i>
Aug 2022	Rational simulation <i>Computational Cognitive Neuroscience GAC Workshop on Simulation</i>
Jul 2022	Learning to act with objects, relations and physics <i>Glushko Symposium</i>
Jun 2022	Physical design with graph network simulators <i>Princeton Plasma Physics Lab Seminar</i>
Apr 2022	Towards more human-like, structured behavioral priors for tool use and construction <i>ICRA Workshop on Behavior Priors</i>
Apr 2022	The surprising diversity of human tool use <i>ICRA Workshop on Predicting Human Motion</i>
Mar 2022	Relational representations for reasoning in humans and machines <i>COMputational SYstems NEuroscience (COSYNE) Workshop on Inductive biases</i>
Feb 2022	Towards a recipe for physical reasoning in humans and machines <i>UCL NeuroAI Seminar</i>
Dec 2021	Intuitive Physics: no one tool for the job <i>NeurIPS Workshop on Physical Reasoning and Inductive Biases for the Real World</i>
Nov 2021	Towards a recipe for physical reasoning in humans and machines <i>NYU Brains, Minds and Machines Colloquium</i>
Oct 2021	Towards a recipe for physical reasoning in humans and machines <i>Causality in Cognition Lab at Stanford</i>
Aug 2021	Towards a recipe for physical reasoning in humans and machines <i>Cognitive Tools Lab at UCSD</i>
Jul 2021	Symbolic planning and simulation in the physical world <i>CogSci 2021 Workshop: Symbolic and sub-symbolic systems in people and machines</i>
Jul 2021	Physical Reasoning in Games <i>CogSci 2021 Workshop: Using Games to Understand Intelligence</i>
Jul 2021	Less Supervision, More Structure <i>International Conference on Machine Learning Unsupervised Reinforcement Learning Workshop</i>
Jun 2021	Safety through structured learning in physical problem-solving environments <i>International Conference on Robotic Automation 2021 Workshop on Safe Control</i>
Apr 2021	Towards a recipe for physical reasoning in humans and machines <i>CogAI Seminar</i>
Mar 2021	Meta-strategy learning in physical problem-solving: the effect of embodied experience <i>UCL Plasticity Lab</i>
Mar 2021	The power of structured action and dynamics models <i>MonREAL/Montreal Robot Learning Seminar</i>
Dec 2020	Learning to act and predict with objects, physics and modes

University of Pennsylvania GRASP Lab

- Nov 2020 Rapid learning and generalization in physical problem solving
Indiana University Cognitive Science Colloquium
- Nov 2020 Learning to act and predict with objects, physics and modes
UMass Amherst: Machine Learning and Friends Colloquium
- Oct 2020 Rapid learning and generalization in physics-based puzzle solving
Cognitive and Neural Computation Lab - Yale
- Sep 2020 Rapid learning and generalization in physics-based puzzle solving
Computational Principles of Intelligence Lab
- Apr 2020 Learning to act and predict with objects, physics and modes
Facebook AI Research
- Apr 2020 Learning to act and predict with objects, physics and modes
Google Brain
- Mar 2020 Rapid trial-and-error learning with simulation supports creative physical reasoning and tool use
MIT Brain and Cognitive Sciences Interview Weekend

Advising

- 2024- Jack Dewey (Research Assistant at MIT)
- 2023- Matthew Lai (PhD student through UCL / DeepMind)
- 2023 - 2024 Ziyi Wu (Student Researcher at Google DeepMind)
- 2020 Robert Chen (now Senior student at MIT)
- 2018 - 2020 Ulyana Piterbarg (now PhD student at NYU)
- 2019 Gabrielle Kaili-May Lu (now Senior student at MIT)
- 2019 Mariana Gomez (now Data Scientist at General Motors)
- 2018 - 2019 Hanul Sky Shin (now Research Scientist at Samsung)
- 2018 Jade Yu, co-advised with Prof. Tim O'Donnell (now PhD student at University of Toronto)
- 2018 Nathalie Fernandez (now Research Assistant at MIT)
- 2018 Yunhan Zhao (now PhD student at UC Irvine)
- 2018 Soumya Ram (now Data Scientist at Microsoft)
- 2016 - 2018 Jessy Lin (now PhD student at UC Berkeley)
- 2017 - 2018 Austin Garrett (now AI Software Engineer at IBM)
- 2016 - 2017 James Bloxham, co-advised with Prof. Tim O'Donnell (now Research Engineer at MosaicML)

Teaching

- Fall 2015 - 2021 **MIT: Computational Cognitive Science**
Advisor and Teaching Assistant (~120 students)
Led recitations every three weeks, held office hours, assisted with grading, and advised students developing research-based class projects. For 2018 - 2021, provided advising on student projects only.
- Summer 2016 - 2019 **Marine Biological Laboratory: Brains, Minds and Machines Summer School**
Advisor and Teaching Assistant (~40 students)
Advised students on research projects in *Development of Intelligence* and *Core Knowledge* pillars.
Supported students during tutorials on probabilistic programming, optimization, and running online experiments.
- Winter 2013 **UBC: Introduction to Computer Science**
Teaching Assistant (~50 students)
Assisted with multiple recitation sessions of introductory computer science course for students who have never taken computer science. Worked in the lab with students, held office hours, and assisted with grading.

Service

WORKSHOP ORGANIZATION

<i>RSS 2022</i>	Co-Organizer for RSS Workshop on Differentiable Physics for Robotics
<i>CogSci 2021</i>	Co-Organizer for Cognitive Science Society (CogSci) Workshop on Games for Understanding Intelligence
<i>NeurIPS 2020</i>	Co-Organizer for Neural Information Processing Systems (NeurIPS) Workshop on Differentiable computer vision, graphics, and physics in machine learning
<i>CVPR 2020</i>	Program Chair for Computer Vision and Pattern Recognition (CVPR) Workshop on Learning with less labels
<i>NeurIPS 2019</i>	Co-Organizer for Neural Information Processing Systems (NeurIPS) Workshop on Perception as generative reasoning
<i>NeurIPS 2018</i>	Co-Organizer for Neural Information Processing Systems (NeurIPS) Workshop on Modeling the Physical World
<i>CogSci 2017</i>	Co-Organizer for Cognitive Science Society (CogSci) Workshop on Deep Learning for Cognitive Science

REVIEWING

<i>Cognitive</i>	Cognitive Science Society Annual Meeting (CogSci), Proceedings of the National Academy of Sciences (PNAS), Nature Human Behavior (NHB)
<i>Neuroscience</i>	Neuron, Computational and Systems Neuroscience (COSYNE)
<i>Robotics</i>	International Conference on Robotics and Automation (ICRA), Robotics: Science and Systems (RSS), International Conference on Intelligent Robots and Systems (IROS)
<i>Machine Learning</i>	The Society for AI and Statistics (AISTATS), International Conference on Machine Learning (ICML), International Conference on Learning Representations (ICLR), Neural Information Processing Systems (NeurIPS), Women in Machine Learning (WiML), SIGGRAPH, Transactions on Machine Learning (TMLR)
<i>Other</i>	NSF CAREER Grants in Cognitive Neuroscience, NSF Computational Neuroscience Grants

OUTREACH AND LEADERSHIP

<i>2021 -</i>	Mentor in DeepMind Mentorship Program Provided mentorship for students from under-represented groups in research and industry.
<i>2020 - 2022</i>	Developer of Exhibition on Tool Use and Robotics at MIT Museum Created and designed an activity on our work about tool use for the MIT Museum.
<i>2019 - 2020</i>	Boston Museum of Science Communicator Participated in "Meet a Scientist" outreach events, after school programs, and developed an activity based on my own research for visitors to the museum.
<i>2019 - 2020</i>	Graduate application assistance program Volunteered to help underrepresented students applying to MIT's Brain and Cognitive Sciences PhD program with writing their application materials.
<i>2018 - 2019</i>	REFS (Resources for easing friction and stress) for Brain and Cognitive Sciences Trained to become certified conflict resolution mediator, and established peer-to-peer counselling program within Brain and Cognitive Sciences.
<i>2016 - 2021</i>	Center for Brains, Minds and Machines (CBMM) Trainee Leadership Council Planned and organized events for professional and social development of trainees in the CBMM program.
<i>2017 - 2020</i>	Guest Lecturer for Crofton House School Gave guest lectures on paths to STEM careers for high-school girls.
<i>2016</i>	CodeIt Mentor With the Society for Women Engineers, I helped facilitate a series of weekly 4 hour Scratch programming classes for middle school girls.
<i>2013 - 2014</i>	Founder of Physics Mentorship program (UBC) Founded and led mentorship program for undergraduate students in Physics at the University of British Columbia (UBC).
<i>2013 - 2014</i>	GIRLsmarts SAP Student Leader As a student leader for the inaugural GIRLsmarts grade 7 program, in partnership with SAP, I helped to design a Music & Technology workshop for grade 7 girls. This included interviewing students, organizing groups of SAP volunteers for workshop creation, and overseeing the activity in February.

References

Joshua B. Tenenbaum (PhD advisor) jbt@mit.edu

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June 23, 2024