

review). Face Interaction Graph Networks for learning rigid body dynamics. *International Conference on Learning Representations (ICLR)*.

- under review* **K.R. Allen***, F. Braendle*, ..., E. Schulz. (under review). Using games to understand the mind. *Nature Human Behavior*.
- in revision* **K.R. Allen***, K. Smith*, L. Bird, J.B. Tenenbaum, T. Makin, D. Cowie. (in revision). Lifelong embodied experience affects cognitive strategies for physical problem-solving. *Psychonomic Bulletin & Review*.
- 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

- 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 Relational representations for reasoning in humans and machines
IST Toulouse Seminar
- Dec 2022 Graph networks for innovation and design
NeurIPS Frontiers of Graph Learning Workshop
- Dec 2022 Relational inductive biases for human-level innovation and planning with tools
Conference on Robot Learning (CoRL) Workshop on Geometry, physics, and human knowledge as inductive bias in robot learning
- Oct 2022 Robust modeling and manipulation with learned simulators
International Conference on Intelligent Robots and Systems (IROS) Workshop on the Role of Uncertainty in Manipulation
- Aug 2022 Rational simulation
Computational Cognitive Neuroscience GAC Workshop on Simulation
- Jul 2022 Learning to act with objects, relations and physics
Glushko Symposium
- Jun 2022 Physical design with graph network simulators
Princeton Plasma Physics Lab Seminar
- Apr 2022 Towards more human-like, structured behavioral priors for tool use and construction
ICRA Workshop on Behavior Priors
- Apr 2022 The surprising diversity of human tool use
ICRA Workshop on Predicting Human Motion
- Mar 2022 Relational representations for reasoning in humans and machines
COMputational SYstems NEuroscience (COSYNE) Workshop on Inductive biases
- Feb 2022 Towards a recipe for physical reasoning in humans and machines

UCL NeuroAI Seminar

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

Advising

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

<i>Fall 2015 - 2021</i>	MIT: Computational Cognitive Science <i>Advisor and Teaching Assistant (~120 students)</i> 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.
<i>Summer 2016 - 2019</i>	Marine Biological Laboratory: Brains, Minds and Machines Summer School <i>Advisor and Teaching Assistant (~40 students)</i> Advised students on research projects in <i>Development of Intelligence</i> and <i>Core Knowledge</i> pillars. Supported students during tutorials on probabilistic programming, optimization, and running online experiments.
<i>Winter 2013</i>	UBC: Introduction to Computer Science <i>Teaching Assistant (~50 students)</i> 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)
<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)
<i>Other</i>	NSF CAREER Grants in Cognitive Neuroscience

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.

- 2016 - 2021 **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.
- 2017 - 2020 **Guest Lecturer for Crofton House School**
Gave guest lectures on paths to STEM careers for high-school girls.
- 2016 **CodeIt Mentor**
With the Society for Women Engineers, I helped facilitate a series of weekly 4 hour Scratch programming classes for middle school girls.
- 2013 - 2014 **Founder of Physics Mentorship program (UBC)**
Founded and led mentorship program for undergraduate students in Physics at the University of British Columbia (UBC).
- 2013 - 2014 **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
Leslie P. Kaelbling lpk@csail.mit.edu
Brenden Lake brenden@nyu.edu
Dan Yamins yamins@stanford.edu
Andrew McCallum mccallum@cs.umass.edu
Judy Fan jefan@ucsd.edu

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