

KEVIN ELLIS

cs.cornell.edu/~ellisk/ ◇ kellis@cornell.edu ◇ Office: Gates 354

ACADEMIC AND SCIENTIFIC TIMELINE

Cornell University

Assistant Professor in Computer Science
Ithaca Campus

summer 2021 – present

Common Sense Machines

Research Scientist
Scientific Advisor

*summer 2020 – summer 2021
summer 2021 – present*

Massachusetts Institute of Technology

PhD in Cognitive Science
Thesis: [Algorithms for Learning to Induce Programs](#)
Advisors: Joshua B. Tenenbaum and Armando Solar-Lezama

2014 – 2020

Massachusetts Institute of Technology

B.S. in Physics
Concentration in Linguistics

2010 – 2014

HONORS

ACM Distinguished Dissertation Award Nominee from MIT (2020)

Angus McDonald Award for Excellence in Undergraduate Teaching (2017)

National Science Foundation Graduate Research Fellowship awardee (2015)

MIT Presidential Graduate Fellowship (2014)

Sigma Pi Sigma Physics Honor Society inductee (2014)

TALKS

The Role of Higher-level Knowledge in Discovery Problems: Programs and Hierarchical Bayes

@ Max Planck Institute: Workshop on Artificial Scientific Discovery. June 2021. [Video](#)

What Program Synthesis can Learn from How People Write Code

@ DeepMind. June 2021.

Programming Languages for Design and Fabrication Applications

@ Computational Fabrication Seminar Series. w/ Karl Willis. March 2021. [Video](#)

Growing domain-specific languages alongside neural program synthesizers via wake-sleep program learning

@ Neuro-symbolic Webinar Series. September 2020. [Video](#)

Learning Languages for Visual Programs

@ CVPR Tutorial: Neuro-Symbolic Visual Reasoning and Program Synthesis. June 2020. [Video](#)

Building Machines that Discover Generalizable, Interpretable Knowledge. [Video](#)

@ MIT Brain and Cognitive Sciences (January 2020)

@ Princeton (February 2020)

@ Harvard (February 2020)

@ Cornell (March 2020)

@ UCSD (April 2020)

@ University of Washington (April 2020)

DreamCoder: Growing Libraries of Concepts with Wake-Sleep Program Induction. [Video](#)

@ Dagstuhl Seminar on Approaches and Applications of Inductive Programming (May 2019)

@ International Conference on Probabilistic Programming (October 2018)

@ Cognitive Science workshop on Learning as Program Induction; w/ Mathias Sablé-Meyer (July 2018)

Prospects for building more human-like AI systems.

@ MIT Brain and Cognitive Sciences (November 2017)

Inducing phonological rules: Perspectives from Bayesian program learning. [Video](#)

@ MIT Workshop on Simplicity in Grammar Learning (September 2017)

Learning to Learn Programs from Examples: Going Beyond Program Structure.

@ Microsoft Research Redmond (August 2017)

@ IJCAI (August 2018)

Bayesian program learning: Prospects for building more human-like AI systems. [Video](#)

@ NeurIPS Neural Abstract Machines and Program Induction; w/ Josh Tenenbaum. December 2016

Program Learning in a Probabilistic Setting.

@ UMass Boston (February 2016)

SERVICE

Co-Organizer for AAAI Symposium “Conceptual Abstraction and Analogy in Natural and Artificial Intelligence”

NSF Panel Member (2022)

Reviewer for CogSci, ICLR, & NeurIPS

Program committee member for Bridging AI and Cognitive Science (ICLR Workshop, 2020)

Program committee member for Deep Learning for Code (ICLR Workshop, 2022)

Reviewed papers for Journal of Machine Learning Research (JMLR), Artificial Intelligence Journal, Transactions on Computational Linguistics (TACL), Patterns, & Tools and Algorithms for the Construction and Analysis of Systems (TACAS), Principles of Programming Languages (POPL), SIGGRAPH

PUBLICATIONS

- ICLR 2022 Kensen Shi*, Hanjun Dai*, [Kevin Ellis](#),⁺ Charles Sutton⁺. (**equal contribution, +equal advising*)
[CrossBeam: Learning to Search in Bottom-Up Program Synthesis](#)
- ICLR 2022 Tuan Anh Le, Katherine M. Collins, Luke Hewitt, Kevin Ellis, Siddharth N, Samuel J. Gershman, Joshua B. Tenenbaum
[Hybrid Memoised Wake-Sleep: Approximate Inference at the Discrete-Continuous Interface](#)
- AAAI 2022 Nathanaël Fijalkow, Guillaume Lagarde, Théo Matricon, [Kevin Ellis](#), Pierre Ohlmann, Akarsh Potta
[Scaling Neural Program Synthesis with Distribution-based Search](#)
- PLDI 2021 [Kevin Ellis](#), Catherine Wong, Maxwell Nye, Mathias Sabl-Meyer, Lucas Morales, Luke Hewitt, Luc Cary, Armando Solar-Lezama, Joshua B. Tenenbaum.
[DreamCoder: Bootstrapping Inductive Program Synthesis with Wake-Sleep Library Learning](#)
- FnT in Programming Languages 2021 Swarat Chaudhuri, [Kevin Ellis](#), Oleksandr Polozov, Rishabh Singh, Armando Solar-Lezama, Yisong Yue
[Neurosymbolic Programming](#)
- CogSci 2021 Christopher Yang, [Kevin Ellis](#).
[Phonological Interactions, Process Types, and Minimum Description Length Principles](#)
- Artificial Intelligence 2021 Richard Evans, Matko Bošnjak, Lars Buesing, [Kevin Ellis](#), David Pfau, Pushmeet Kohli, Marek Sergot.
[Making sense of raw input](#)
- ICML 2021 Catherine Wong, [Kevin Ellis](#), Josh Tenenbaum, Jacob Andreas.
[Leveraging natural language for program search and abstraction learning](#)
- NeurIPS 2020 *Oral* Lucas Y. Tian, [Kevin Ellis](#), Marta Kryven, Joshua B. Tenenbaum.
[Learning abstract structure for drawing by efficient motor program induction](#)
- NeurIPS 2020 Yewen Pu, [Kevin Ellis](#), Marta Kryven, Joshua B. Tenenbaum, Armando Solar-Lezama.
[Program Synthesis with Pragmatic Communication](#)
- NeurIPS 2019 [Kevin Ellis](#)*, Maxwell Nye*, Yewen Pu*, Felix Sosa*, Joshua B. Tenenbaum, and Armando Solar-Lezama. (**equal contribution*)
[Write, Execute, Assess: Program Synthesis with a REPL](#)
- ICLR 2019 Yonglong Tian, Andrew Luo, Xingyuan Sun, [Kevin Ellis](#), William T. Freeman, Joshua B. Tenenbaum, and Jiajun Wu
[Learning to Infer and Execute 3D Shape Programs](#)

Topics in Cognitive Science 2019	Willem Zuidema, Robert M. French, Raquel G. Alhama, Kevin Ellis , Tim O'Donnell, Tim Sainburgh, Tim Gentner. Five ways in which computational modeling can help advance cognitive science: lessons from Artificial Grammar Learning
CogSci 2019	Catherine Wong, Kevin Ellis , Mathias Sablé-Meyer, Joshua B. Tenenbaum Modeling Expertise with Neurally-Guided Bayesian Program Induction (Full paper published as abstract)
NeurIPS 2018 <i>Spotlight</i>	Kevin Ellis , Lucas Morales, Mathias Sablé-Meyer, Armando Solar-Lezama, Joshua B. Tenenbaum Learning Libraries of Subroutines for Neurally-Guided Bayesian Program Induction
NeurIPS 2018 <i>Spotlight</i>	Kevin Ellis , Daniel Ritchie, Armando Solar-Lezama, Joshua B. Tenenbaum Learning to Infer Graphics Programs from Hand-Drawn Images
IJCAI 2017	Kevin Ellis , Sumit Gulwani Learning to Learn Programs from Examples: Going Beyond Program Structure
NeurIPS 2016	Kevin Ellis , Armando Solar-Lezama, Joshua B. Tenenbaum Sampling for Bayesian Program Learning
NeurIPS 2015	Kevin Ellis , Armando Solar-Lezama, Joshua B. Tenenbaum Unsupervised Learning by Program Synthesis
AAAI Symposium 2015	Kevin Ellis , Eyal Dechter, Joshua B. Tenenbaum. At the AAAI Symposium on Knowledge Representation and Reasoning: Integrating Symbolic and Neural Approaches Dimensionality Reduction via Program Induction
ECAI 2014	Dianhuan Lin, Eyal Dechter, Kevin Ellis , Joshua B. Tenenbaum, Stephen Muggleton. At European Conference on Artificial Intelligence. Bias reformulation for one-shot function induction