

STEVEN HOLTZEN

Northeastern University
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EDUCATION

University of California, Los Angeles. Ph.D., Computer Science, 2021.

- Dissertation: *Exploiting Program Structure for Scaling Probabilistic Programming.*
- Co-advisors: Guy Van den Broeck and Todd Millstein.

University of California, Los Angeles. M.S., Computer Science, 2017.

University of California, Los Angeles. B.S., Computer Science, 2015.

EMPLOYMENT

Northeastern University Boston, MA
Assistant Professor, Khoury College of Computer Science Aug. 2021 –

University of California, Los Angeles Los Angeles, CA
Research Assistant, Department of Computer Science Sept. 2017 – Aug. 2021

Sandia National Laboratories Livermore, CA
Member of Technical Staff, department of Cyber Data Analytics. Sept. 2015 – Aug. 2021

RESEARCH INTERESTS

My research focuses on programming languages, artificial intelligence, and machine learning. My goal is to design systems that make probabilistic modeling fast, accessible, and useful for solving every day reasoning tasks. To achieve this I am interested in probabilistic programming languages, foundations of probabilistic inference, tractable probabilistic modeling, automated reasoning, and probabilistic verification.

HONORS AND AWARDS

2021 *UCLA Computer Science Outstanding Graduating Ph.D. Student.*
Awarded to one graduating Ph.D. student from the UCLA computer science department.

2020 *ACM SIGPLAN Distinguished Paper Award.*
Awarded at OOPSLA 2021 for *Scaling Exact Inference for Discrete Probabilistic Programs.*

2020–2021 *UCLA Dissertation Year Fellowship.*
Full tuition support plus stipend for one year.

2017 *UCLA Computer Science Outstanding Master's Student Award*
Awarded to one graduating M.S. student in from the UCLA computer science department.

2015–2017 *National Physical Sciences Consortium Fellowship*
Full tuition plus stipend for two years.

TEACHING

- Instructor, **CS 7480: Topics in Programming Languages: Probabilistic Programming**
Northeastern University.
A special topics seminar course on probabilistic programming languages.
Webpage: <https://www.khoury.northeastern.edu/home/sholtzen/CS7480Fall121/>
- Teaching Assistant, **CS 30: Principles and Practices of Computing**.
University of California, Los Angeles.
Introductory course on computer science for new programmers.
- Teaching Assistant, **CS 267A: Probabilistic Programming & Relational Learning**
University of California, Los Angeles.
Graduate-level course.

PROFESSIONAL ACTIVITIES & SERVICE

Program Committee Member

- 2022 – Programming Language Design and Implementation (PLDI)
- 2021 – International Conference on Machine Learning (ICML)
- 2021 – Uncertainty in Artificial Intelligence (UAI)
- 2020 – International Conference on Machine Learning (ICML). *Top 33% Reviewer.*
- 2020 – Languages for Inference (LAFI 2020).
- 2020 – Conference on Artificial Intelligence (AAAI)
- 2020 – Uncertainty in Artificial Intelligence (UAI)
- 2019 – Conference on Artificial Intelligence (AAAI)
- 2019 – International Conference on Machine Learning (ICML)
- 2019 – Neural Information Processing Symposium (NeurIPS). *Top 50% Reviewer.*
- 2018 – Uncertainty in Artificial Intelligence (UAI)

Journal Reviewing

- Journal of Artificial Intelligence Research
- Artificial Intelligence Journal
- Machine Learning

Organizing Service

- Co-organizer of the Relational Representation Learning Workshop at NeurIPS 2018.

INVITED TALKS

Exploiting Symmetry for Scaling Discrete Factor Graph Inference

- (2021) DATA Lab at Northeastern University

Designing Languages for Probabilistic Reasoning

- (2021) Harvard University Programming Languages Reading Group

Languages for Probabilistic Reasoning

- (2021) Northeastern University
- (2021) University of Notre Dame
- (2021) University of California, Merced
- (2021) Oregon State University

Scaling Exact Inference for Discrete Probabilistic Programs

- (OOPSLA 2021) ACM SIGPLAN Conference on Systems, Programming, Languages, and Applications: Software for Humanity.
- (2021) Rutgers University Computer Science Systems Reading Group

Modular Exact Inference for Discrete Probabilistic Programs

- International Conference on Probabilistic Programming (ProbProg 2020)

Generating and Sampling Orbits for Lifted Probabilistic Inference

- Uncertainty in Artificial Intelligence, 2019.
Oral full presentation, 35 of 450 submissions invited.

CONFERENCE PUBLICATIONS

A * annotation denotes equal contribution. Author orders follow the standard convention of being ordered by contribution, typically resulting in junior authors first and senior authors last.

(CAV 2021) *Model Checking Finite-Horizon Markov Chains with Probabilistic Inference.*

Steven Holtzen*, Sebastian Junges*, Marcell Vazquez-Chanlatte, Todd Millstein, Sanjit A. Seshia, and Guy Van den Broeck. International Conference on Computer-Aided Verification (CAV), 2021.

(ASPLOS 2021) *Logical Abstractions for Noisy Variational Quantum Algorithm Simulation.*

Yipeng Huang, Steven Holtzen, Todd Millstein, Guy Van den Broeck, and Margaret R. Martonosi. Architectural Support for Programming Languages and Operating Systems (ASPLOS), 2021.

(OOPSLA 2020) *Scaling Exact Inference for Discrete Probabilistic Programs.*

Steven Holtzen, Guy Van den Broeck, and Todd Millstein. Proc. ACM Program. Lang. 4 (OOPSLA), 2020.

(UAI 2020) *On the Relationship Between Probabilistic Circuits and Determinantal Point Processes.*

Honghua Zhang, Steven Holtzen, and Guy Van den Broeck. Uncertainty in Artificial Intelligence (UAI), 2020.

(UAI 2019) *Generating and Sampling Orbits for Lifted Probabilistic Inference.*

Steven Holtzen, Todd Millstein, and Guy Van den Broeck. Uncertainty in Artificial Intelligence (UAI), 2019.

(ICML 2018) *Sound Abstraction and Decomposition of Probabilistic Programs.*

Steven Holtzen, Guy Van den Broeck, and Todd Millstein. International Conference on Machine Learning (ICML), 2018.

(UAI 2017) *Probabilistic Program Abstractions.*

Steven Holtzen, Guy Van den Broeck, and Todd Millstein. Uncertainty in Artificial Intelligence (UAI), 2017.

(IROS 2016) *Inferring Human Intent from Video by Sampling Hierarchical Plans.*

Steven Holtzen*, Yibiao Zhao*, Tao Gao, Josh Tenenbaum, and Song-Chun Zhu. IEEE International Conference on Intelligent Robots and Systems (IROS), 2016.

WORKSHOP & NON-ARCHIVAL PUBLICATIONS

(PROBPROG 2021) *flip-hoisting: A Probabilistic Program Optimization for Exact Inference.*

Yu-Hsi Cheng, Steven Holtzen, Guy Van den Broeck, Todd Millstein. The International Conference on Probabilistic Programming (PROBPROG), 2021.

(PROBPROG 2020) *Modular Exact Inference for Discrete Probabilistic Programs.*

Steven Holtzen, Todd Millstein, Guy Van den Broeck. The International Conference on Probabilistic Programming (PROBPROG), 2020.

(StarAI 2020) *Generating and Sampling Orbits for Lifted Probabilistic Inference.*

Steven Holtzen, Todd Millstein, Guy Van den Broeck. International Workshop on Statistical Relational AI (StarAI), 2020.

(WQCS 2020) *Logic Formulas as Program Abstractions for Quantum Circuits: A Case Study in Noisy Variational Algorithm Simulation.*

Yipeng Huang, Steven Holtzen, Todd Millstein, Guy Van den Broeck, and Margaret Martonosi. International Workshop on Quantum Computing Software at Supercomputing 2020 (WQCS), 2020.

(TPM 2019) *Symbolic exact inference for discrete probabilistic programs.*

Steven Holtzen, Todd Millstein, Guy Van den Broeck. Workshop on Tractable Probabilistic Modeling (TPM), 2019.

(LAFI 2019) *Factorized exact inference for discrete probabilistic programs.*

Steven Holtzen, Joe Qian, Todd Millstein, Guy Van den Broeck. Workshop on Languages for Inference at POPL 2019 (LAFI), 2019.

(PPS 2018) *Probabilistic Program Inference with Abstractions.*

Steven Holtzen, Guy Van den Broeck, Todd Millstein. Workshop on Probabilistic Programming Languages, Semantics, and Systems at POPL 2018 (PPS), 2018.

(StarAI 2017) *Probabilistic Program Abstractions.*

Steven Holtzen, Todd Millstein, Guy Van den Broeck. International Workshop on Statistical Relational AI (StarAI), 2017.

MENTORSHIP & ADVISEES

- Yu-Hsi Cheng. Undergraduate at University of California, Los Angeles. Co-advised with Guy Van den Broeck and Todd Millstein.
- William Cao. Undergraduate at University of California, Los Angeles. Co-advised with Guy Van den Broeck and Todd Millstein.