

# ABHINAV VERMA

<http://averma.tech/>

Computer Science ◦ University of Texas at Austin

(217) 721-9461 ◦ [verma@utexas.edu](mailto:verma@utexas.edu)

## RESEARCH INTERESTS

---

My research lies at the intersection of machine learning and formal methods. I am especially concerned with building trustworthy intelligent systems, using learning models that are provably safe, human interpretable, reliable, and robust to domain shifts.

## EDUCATION

---

### University of Texas at Austin

Ph.D. student ◦ Computer Science

Advisor: Prof. Swarat Chaudhuri

*August 2020 - Present*

*Austin, TX*

### Rice University (Transferred to UT)

Ph.D. student ◦ Computer Science

*August 2016 - August 2020*

*Houston, TX*

### University of Oregon

M.S. ◦ Mathematics

*September 2012 - June 2014*

*Eugene, OR*

### Indian Institute of Science

M.S. ◦ Mathematics

Thesis: Irreducible Representations of the  
Symmetric Group and the General Linear Group

*August 2008 - July 2011*

*Bangalore, India*

### University of Delhi - Hindu College

B.A. Honors ◦ Mathematics

*July 2005 - June 2008*

*New Delhi, India*

## PUBLICATIONS

---

Google Scholar Profile: <https://scholar.google.com/citations?user=jM1HeCIAAAAJ>

### Peer-Reviewed

1. Programmatically Interpretable Reinforcement Learning  
[Abhinav Verma](#), Vijayaraghavan Murali, Rishabh Singh, Pushmeet Kohli, Swarat Chaudhuri  
35th International Conference on Machine Learning (**ICML**) 2018.  
Acceptance Rate: 29.1%  
Accepted as a Long Talk: Top 9% of submitted papers.
2. Representing Formal Languages: A Comparison of Finite Automata and Recurrent Neural Networks  
Joshua J. Michalenko, Ameesh Shah, [Abhinav Verma](#), Swarat Chaudhuri, Ankit B. Patel  
7th International Conference on Learning Representations (**ICLR**) 2019.  
Acceptance Rate: 31.4%
3. Control Regularization for Reduced Variance Reinforcement Learning  
Richard Cheng, [Abhinav Verma](#), Gábor Orosz, Swarat Chaudhuri, Yisong Yue, Joel W. Burdick  
36th International Conference on Machine Learning (**ICML**) 2019.  
Acceptance Rate: 22.6%

4. Imitation-Projected Programmatic Reinforcement Learning  
Abhinav Verma, Hoang M. Le, Yisong Yue, Swarat Chaudhuri  
33rd Conference on Neural Information Processing Systems (**NeurIPS**) 2019.  
Acceptance Rate: 21.6%
5. Learning Differentiable Programs with Admissible Neural Heuristics  
Ameesh Shah, Eric Zhan, Jennifer J Sun, Abhinav Verma, Yisong Yue, Swarat Chaudhuri  
34th Conference on Neural Information Processing Systems (**NeurIPS**) 2020.  
Acceptance Rate: 20.1%
6. Neurosymbolic Reinforcement Learning with Formally Verified Exploration  
Greg Anderson, Abhinav Verma, Isil Dillig, Swarat Chaudhuri  
34th Conference on Neural Information Processing Systems (**NeurIPS**) 2020.  
Acceptance Rate: 20.1%

### Technical Report

- Verifiable and Interpretable Reinforcement Learning through Program Synthesis  
Abhinav Verma  
Doctoral Consortium at The 33rd AAAI Conference on Artificial Intelligence (**AAAI**) 2019.

### AWARDS & HONORS

---

- **Fellowship**, J.P. Morgan AI Research PhD Fellowship 2020.  
\$100,000 award to support tuition, stipend, and travel.
- **Research Award**, Dean Award, School of Engineering, Rice University 2019.
- **Bronze**, ACM Student Research Competition at Conference on Programming Language Design and Implementation (PLDI) 2018.
- **Bronze**, ACM Student Research Competition at The 45th ACM SIGPLAN Symposium on Principles of Programming Languages (POPL) 2018.
- **Fellowship**, Council of Scientific & Industrial Research (NSF-Equivalent), India 2011.
- **Scholarship**, Ministry of Human Resource Development, India 2008-2010.

### MENTORING

---

Six students co-advised, three from underrepresented groups, two associated publications.

#### Current

- **Masters**, Surya S Dwivedi, University of Texas at Austin.  
Project: Reinforcement learning for F1Tenth cars.
- **Undergraduate**, Myra Cheng, Caltech.  
Project: Machine learning for behavioral neuroscience.
- **Undergraduate**, Joshua Deng, University of Texas at Austin.  
Project: Learning programmatic models of RNA splicing.

#### Graduated

- **Masters**, Ameesh Shah, Rice University.  
Project: Learning differentiable programs with admissible neural heuristics.  
Currently: Graduate Student at UC Berkeley.

- **Undergraduate**, Jacqui Lee, Rice University.  
Project: Adaptive therapies for Sepsis via reinforcement learning.  
Currently: Graduate Student at MIT.
- **Intern**, Nirha Patel, University of California, San Diego.  
Project: Evolutionary algorithms for reinforcement learning.  
Currently: Developer at Yahoo.

## TEACHING EXPERIENCE

---

### **Rice University**

*January 2017 - December 2019*

#### Teaching Assistant

- COMP 539: Software Engineering Methodology.  
Project based graduate course on software engineering.
- COMP 503: Reasoning About Software.  
Graduate course on formal methods and automated reasoning.
- COMP 310: Advanced Object-Oriented Programming and Design.  
Senior undergraduate course on OOP.

### **Wolfram Research**

*January 2015 - August 2016*

#### Certified Instructor

- Conducted online corporate training for Mathematica users.
- Helped develop and improve courses based on newly introduced functionality.

### **University of Oregon**

*September 2012 - June 2014*

#### Standalone Instructor

Approximately forty students in each class.

- Math 105: University Mathematics.  
Introduction to logic, combinatorics, and probability.  
Core requirement for BS degree.
- Math 111: College Algebra.  
Foundational course in algebra, functions, and mathematical modeling.  
Calculus preparation course, prerequisite for higher-level math courses.
- Math 112: Elementary Functions.  
Focus on mathematical induction and trigonometric functions.  
Precalculus designed for math, biology, physiology, and CS majors.

#### Teaching Assistant

- Math 243: Introduction to Probability and Statistics.  
Undergraduate course on statistical reasoning.

### **Dr. B. R. Ambedkar University**

*January 2012 - April 2012*

#### Teaching Assistant

- M01: Introduction to Mathematical Thinking.  
First course on abstract mathematics.

## RESEARCH POSITIONS

---

### **SRI International**

*Research Intern*, Mentor: Susmit Jha

*June 2019 - August 2019*

*Menlo Park, CA*

- Researched interpretable reinforcement learning via program synthesis.
- Integrated vision models with programmatic reinforcement learning.

### **Microsoft Research**

*Research Intern*, Mentor: Christoph M. Wintersteiger

*June 2017 - September 2017*

*Cambridge, UK*

- Researched methods to use deep neural networks for quantifier instantiation in Z3.
- Intern in the Programming Principles and Tools group.

### **Wolfram Research**

*Technology Engineer*

*August 2014 - August 2016*

*Champaign, IL*

- Researched integrating automated theorem proving into the Wolfram Language.
- Helped identify and implement new functionality based on cutting edge research.

## SERVICE

---

### **Referee**

- The 9th International Conference on Learning Representations (ICLR) 2021.
- Machine Learning (Springer Journal).
- The 34th Conference on Neural Information Processing Systems (NeurIPS) 2020.
- The 23rd International Conference on Artificial Intelligence and Statistics (AISTATS) 2020.
- The 32nd International Conference on Computer-Aided Verification (CAV) 2020.
- The 12th NASA Formal Methods Symposium (NFM) 2020.

## INVITED PARTICIPATION

---

- Neurosymbolic Learning Seminar, University of Pennsylvania 2020.
- The New York Academy of Sciences, 14th Annual Machine Learning Symposium 2020.
- International Conference on Computer-Aided Verification (CAV), New York 2019.
- International Conference on Machine Learning, Long Beach 2019.
- International Conference on Learning Representations, New Orleans 2019.
- International Conference on Neural Information Processing Systems, Vancouver 2019.
- Doctoral Consortium at AAAI Conference on Artificial Intelligence, Honolulu 2019.
- Deep Learning and Reinforcement Learning Summer School, University of Alberta 2019.
- Marktoberdorf Summer School on Engineering Secure and Dependable Software Systems 2018.
- International Conference on Machine Learning, Stockholm, Sweden 2018.
- Wolfram Technology Conference, Champaign, Illinois 2014.
- Western Algebraic Geometry Symposium, University of Colorado, Boulder 2014.
- Graduate Student Topology and Geometry Conference, University of Texas, Austin 2014.
- Pacific Northwest Geometry Seminar, Stanford University 2014.
- Midwest Dynamical Systems Meeting, University of Illinois at Urbana-Champaign 2013.
- Workshop on Unitary Representations of Real Reductive Groups, University of Utah 2013.