

Shromona Ghosh

CONTACT INFORMATION	545 H Cory Hall University of California, Berkeley	e-mail: shromona.ghosh@berkeley.edu webpage : people.eecs.berkeley.edu/~shromona.ghosh
RESEARCH INTERESTS	My research lies at the intersection of Machine Learning, Control Theory and Robotics; and Formal Methods. I am particularly interested in <ul style="list-style-type: none">• Developing formal analysis tools for robotic systems with ML components such as perception, learning-based control;• Developing data-efficient techniques that combine control theory and formal methods to improve overall system performance and safety	
EDUCATION	University of California, Berkeley <i>PhD in Electrical Engineering and Computer Sciences</i> Advised by Prof. Sanjit A. Seshia and Prof. Alberto Sangiovanni-Vincentelli Thesis co-advised by Prof. Claire Tomlin CGPA : 3.96/4.0 Minors: Control Theory and Statistics	2013 - present
	National Institute of Technology Karnataka, Surathkal <i>BTech. in Electronics and Communication Engineering</i> CGPA : 9.44/10	2009 - 2013
INDUSTRIAL INTERNSHIPS	SRI, Menlo Park <i>Research Intern</i> Advised by: Susmit Jha and Nataranjan Shankar Developing an hierarchical safe-control technique with a high level motion planner, synthesized from high level safety specification; and a robust low level motion primitive, that handles model-system mismatch.	May-August 2018
	Microsoft AI Research Lab, Redmond <i>Research Intern</i> Advised by: Ashish Kapoor, Gireeja Ranade and Shaz Qadeer Developed an active-learning based adversarial example generator for verifying complex robotic systems in simulation. The tool has been integrated with many simulators like OpenAI Gym, AirSim and Webots.	May-August 2017
	Cadence Design Systems, San Jose <i>Software Intern</i> Updates the Cadence Design work-flow to include a functional mapper from the reduced logic to gates. The functional mapper is hash table mapping canonical truth tables to minimal gate logic.	June-September 2014
	Texas Instruments, Bangalore, India <i>Digital Design Intern</i> Developed a novel time-efficient and data-efficient Scan Compression Architecture for efficiently testing digital circuits with minimal resource overhead.	May - July 2012
SKILLS	Programming Languages: Python, C++ Simulation Environments: MATLAB, Webots, OpenAI Gym, OpenAI Baselines	
SELECTED AWARDS	<ul style="list-style-type: none">• SanDisk Fellowship, Department of EECS, UC Berkeley, 2013-2014.• Best All Round Talented Outgoing Student , National Institute of Technology Karnataka, 2013.	

SOTER: Programming Safe Robotics System using Runtime Assurance

Ankush Desai, *Shromona Ghosh*, Sanjit A. Seshia, Natarajan Shankar, Ashish Tiwari
In preparation

A New Simulation Metric to Determine Safe Environments and Controllers for Systems with Unknown Dynamics

*Shromona Ghosh**, Somil Bansal*, Alberto Sangiovanni Vincentelli, Sanjit A. Seshia, Claire J. Tomlin
ACM International Conference on Hybrid Systems Computation and Control (HSCC), 2019 (submitted)

Scenic: A Language for Scenario Specification and Scene Generation

Daniel J. Fremont, Tommaso Dreossi, *Shromona Ghosh*, Xiangyu Yue, Alberto Sangiovanni-Vincentelli, Sajit A. Seshia
ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI), 2019 (submitted)

Bridging Hamilton-Jacobi Safety Analysis and Reinforcement Learning

Jaime F. Fisac, Neil F. Lugovoy, Vicenç Rubies Royo, *Shromona Ghosh*, Claire J. Tomlin
International Conference on Robotics and Automation (ICRA), 2019 (submitted)

Verifying Controllers Against Adversarial Examples with Bayesian Optimization

Shromona Ghosh, Felix Berkenkamp, Gireeja Ranade, Shaz Qadeer, Ashish Kapoor
International Conference on Robotics and Automation (ICRA), 2018

Formal Specification for Deep Neural Networks

Sanjit A. Seshia, Ankush Desai, Tommaso Dreossi, Daniel J. Fremont, *Shromona Ghosh*, Edward Kim, Sumukh Shivakumar, Marcell Vazquez-Chanlatte, Xiangyu Yue
International Symposium on Automated Technology for Verification and Analysis (ATVA), 2018 (invited paper)

Counterexample-Guided Data Augmentation

Tommaso Dreossi, *Shromona Ghosh*, Xiangyu Yue, Kurt Keutzer, Alberto Sangiovanni-Vincentelli, Sanjit A. Seshia
International Joint Conference on Artificial Intelligence (IJCAI), 2018

Time Series Learning using Monotonic Logical Properties

Marcell Vazquez-Chanlatte, *Shromona Ghosh*, Jyotirmoy Deshmukh, Alberto Sangiovanni-Vincentelli, Sanjit A. Seshia
International Conference on Runtime Verification (RV), 2018

Generating Dominant Strategies for Continuous Two-Player Zero-Sum Games

Marcell Vazquez-Chanlatte, *Shromona Ghosh*, Alberto Sangiovanni-Vincentelli, Sanjit A. Seshia
IFAC Conference on Analysis and Design of Hybrid Systems (ADHS), 2018

Diagnosis and Repair for Synthesis from Signal Temporal Logic Specifications

Shromona Ghosh, Dorsa Sadigh, Pierluigi Nuzzo, Vasumathi Raman, Alexandre Donze, Alberto Sangiovanni-Vincentelli, S. Shankar Sastry, Sanjit A. Seshia
ACM International Conference on Hybrid Systems Computation and Control (HSCC), 2016

Robust Online Monitoring of Signal Temporal Logic

Jyotirmoy V. Deshmukh, Alexandre Donz, *Shromona Ghosh*, Xiaoqing Jin, Garvit Juniwal, Sanjit A. Seshia
International Conference on Runtime Verification (RV), 2015
Best Paper Award

A Minimum Discounted Reward Hamilton-Jacobi Formulation for Computing Reachable Sets

Anayo K. Akametalu, *Shromona Ghosh*, Jaime F. Fisac, Claire J. Tomlin
IEEE Transactions on Automatic Control (TAC), 2019 (submitted)

Robust Online Monitoring of Signal Temporal Logic

Jyotirmoy V. Deshmukh, Alexandre Donz, *Shromona Ghosh*, Xiaoqing Jin, Garvit Juniwal, Sanjit A. Seshia
Formal Methods in System Design (FMSD), 2017

WORKSHOP
PUBLICATIONS

A Formalization of Robustness for Deep Neural Networks

Tommaso Dreossi*, *Shromona Ghosh**, Alberto Sangiovanni-Vincentelli, Sanjit A. Seshia
*Verification of Neural Networks (VNN) Workshop at
Association for the Advancement of Artificial Intelligence (AAAI), 2019 (submitted)*

Systematic Testing of Convolutional Neural Networks for Autonomous Driving

Tommaso Dreossi*, *Shromona Ghosh**, Alberto Sangiovanni-Vincentelli, Sanjit A. Seshia
*Reliable Machine Learning in the Wild (RMLW) Workshop at
International Conference on Machine Learning (ICML), 2017*

INDUSTRIAL
PUBLICATIONS

SmartScan + OPMISR: A Novel Scan Compression Architecture for Multi-Site Testing

Rubin Parekhji, Ramesh Chandal, *Shromona Ghosh*, Ramesh Suthapalli, G. Swathi, Deepak Gaur
Cadence (CDN) Live Conference 2012
Best Paper Award in Digital Front End Track

PROGRAM
COMMITTEE
MEMBER

1. **Monitoring and Testing of Cyber-Physical Systems** at Cyber-Physical Week, 2019
2. **ACM International Conference on Hybrid Systems Computation and Control (HSCC) Repeatability Evaluation (RE)** at Cyber-Physical Week, 2019
3. **ACM International Conference on Hybrid Systems Computation and Control (HSCC) Repeatability Evaluation (RE)** at Cyber-Physical Week, 2018

PEER REVIEWING

1. **International Conference on Robotics and Automation (ICRA)**, 2019
2. **ACM International Conference on Hybrid Systems Computation and Control (HSCC)** 2019
3. **International Conference on Robotics and Automation (ICRA)**, 2018
4. **International Conference on Computer-Aided Verification (CAV)**, 2018
5. **ACM International Conference on Hybrid Systems Computation and Control (HSCC)** 2018

TEACHING
EXPERIENCE

EECS 149: Introduction to Embedded System

Graduate Student Instructor

UC Berkeley, Fall 2018

EECS 249A: Embedded System Design: Modeling, Analysis, and Synthesis UC Berkeley, Spring 2016

Graduate Student Instructor