

EDUCATION	<i>Ph.D. Computer Science, Iowa State University, Ames, IA, USA</i>	2016– ongoing
	<i>M.S.E. Embedded Systems, University of Pennsylvania, Philadelphia, PA, USA</i>	2013–2015
	<i>B.E. Instrumentation and Control, University of Delhi, New Delhi, India</i>	2009–2013
EXPERIENCE	Research Assistant , Iowa State University <i>Symbolic Model Checking of Large Design Spaces</i> Mentor: Kristin Yvonne Rozier	Aug 2015 – present
	<ol style="list-style-type: none"> 1. Designing algorithms for checking “sets” of models and properties, and 2. Developing novel extensions to the NuSMV model checker, and new model-set checkers. 	
	Formal Verification Engineer Intern , Apple, Cupertino, CA <i>Formal Verification of SoC Designs</i> Mentor: Tim Pruss	May 2019 – Aug 2019
	<ol style="list-style-type: none"> 1. Formally verified critical cryptography hardware designs in Apple SoCs, and 2. Performed equivalence checking between Haskell-generated C code and Verilog RTL. 	
	Research Intern , IBM, Austin, TX <i>Formal Verification of Multi-Property Testbenches</i> Mentors: Jason Baumgartner and Alexander Ivrii	Aug 2018 – May 2019
	<ol style="list-style-type: none"> 1. Developed techniques to group and partition properties for formal verification, and 2. Added multiple property verification support to IBM’s model checker. 	
	Formal Verification Engineer Intern , Apple, Cupertino, CA <i>Software Verification using Theorem Proving</i> Mentor: John Matthews	May 2018 – Aug 2018
	<ol style="list-style-type: none"> 1. Formally verified C code using Isabelle/HOL theorem prover, and 2. Developed a custom SMT tactic for word-level and non-linear integer arithmetic. 	
	Research Intern , Fondazione Bruno Kessler, Trento, Italy <i>Formal Verification of NextGen Air Traffic Controller</i> Mentor: Alessandro Cimatti	May 2015 – Aug 2015
	<ol style="list-style-type: none"> 1. Added extensions to include asymmetric information sharing between aircraft, 2. Developed a contract-based design case-study of a sample railroad system, and 3. Analyzed extraction of SMV models from LLVM bitcode and control flow graphs. 	
	Embedded Systems Programmer , University of Pennsylvania <i>Wireless and Invasive Brain-Computer Interfaces</i> Mentor: Jan Van der Spiegel	Jan 2014 – Apr 2015
	<ol style="list-style-type: none"> 1. Designed a wireless brain-sensor interface system to control prosthetics, and 2. Researched the use of compressive sensing and learning to minimize data outflow. 	
	Undergraduate Intern , Texas Instruments, New Delhi, India <i>ARM-based Microcontroller Development Platforms</i> Mentor: Dhananjay Gadre	Dec 2011 – Apr 2013
	<ol style="list-style-type: none"> 1. Responsible for complete hardware/software design of ARM-based learning kits, 2. Commercially launched two learning kits, Stellaris Guru and Stellaris Shuru, and 3. Composed pedagogy materials and co-authored an undergraduate lab manual. 	

PUBLICATIONS

Peer-Reviewed Conferences

- C1 Rohit Dureja, Jason Baumgartner, Alexander Ivrii, Robert Kanzelman, and Kristin Y. Rozier. Boosting Verification Scalability via Structural Grouping and Semantic Partitioning of Properties. In *Proceedings of Formal Methods in Computer-Aided Design (FMCAD)*, San Jose, California, October 2019. IEEE/ACM
- C2 Rohit Dureja, Jianwen Li, Geguang Pu, Moshe Y. Vardi, and Kristin Y. Rozier. Intersection and Rotation of Assumption Literals Boosts Bug-Finding. In *Proceedings of Verified Software: Theories, Tools, and Experiments (VSTTE)*, New York, USA, July 2019. Springer, Cham
- C3 Jianwen Li, Rohit Dureja, Geguang Pu, Kristin Y. Rozier, and Moshe Y. Vardi. SimpleCAR: An Efficient Bug-Finding Tool Based On Approximate Reachability. In *Proceedings of Computer Aided Verification (CAV)*, Oxford, United Kingdom, July 2018. Springer, Cham
- C4 Rohit Dureja and Kristin Y. Rozier. More Scalable LTL Model Checking via Discovering Design-Space Dependencies (D^3). In *Proceedings of Tools and Algorithms for the Construction and Analysis of Systems (TACAS)*, Thessaloniki, Greece, April 2018. Springer, Cham
- C5 Rohit Dureja and Kristin Y. Rozier. FuselC3: An Algorithm for Checking Large Design Spaces. In *Proceedings of Formal Methods in Computer-Aided Design (FMCAD)*, Vienna, Austria, October 2017. IEEE/ACM. Talk video: <https://goo.gl/Gs92G2>

Journals

- J6 Rohit Dureja and Kristin Y. Rozier. Incremental Design-Space Model Checking via Resuable Reachable State Approximations. (*under submission*)
- J7 Rohit Dureja and Kristin Y. Rozier. A Case Study in Safety, Security, and Availability of Wireless-Enabled Aircraft Communication Networks. (*under submission*)
- J8 Dhananjay V. Gadre and Rohit Dureja. An Inexpensive Approach to Integrate Physical Computing Curriculum in the Classroom. (*in preparation*)

Patents

- P9 Rohit Dureja, Jason Baumgartner, Alexander Ivrii, and Robert Kanzelman. *Grouping and Partitioning of Properties for Logic Verification*. U.S. Patent Application 16/411193 (*Pending*)

Miscellaneous

- M10 Rohit Dureja and Kristin Y. Rozier. From One to Many: Checking A Set of Models. In *Formal Methods in Computer-Aided Design (FMCAD) Student Forum*, Austria, Vienna, October 2017
- M11 Rohit Dureja, Eric W. D. Rozier, and Kristin Y. Rozier. A Case Study in Safety, Security, and Availability of Wireless-Enabled Aircraft Communication Networks. In *Proceedings of AIAA Aviation Technology, Integration, and Operations Conference (AVIATION)*, Denver, Colorado, USA, June 2017. AIAA
- M12 Rohit Dureja and Kristin Y. Rozier. Comparative Safety Analysis of Wireless Communication Networks in Avionics. In *Formal Methods in Computer-Aided Design (FMCAD) Student Forum*, Mountain View, California, USA, October 2016

Books and Book Chapters

- B13 Dhananjay V. Gadre, Rohit Dureja, and Shanjit S. Jajmann. *Getting Started with Stellaris ARM Cortex-M Embedded Processors*. Universities Press, 2013

TECHNICAL PRESENTATIONS

- “Grouping and Partitioning of Properties for Formal Verification”, IBM, Austin, TX, May 7, 2019.
- “Formal Verification of Designs with Multiple Properties”, IBM, Austin, TX, December 19, 2018.
- “Theoretical Foundations of the UAS in the NAS Problem.” *Lightning Talk*, NSF CPS PI Meeting, Washington, DC, November 15, 2018.
- “Applied Formal Methods - Design-Space Analysis via SAT-based Model Checking.” *Guest Lecture*, COMS 512 - Formal Methods in Software Engineering, Iowa State University, Ames, IA, February 20–22, 2018.

	<ul style="list-style-type: none"> • “Scalable Design Space Analysis for Future Traffic Management.” CPS Challenges for Unmanned and Autonomous Systems Workshop, Washington, DC, November 14, 2017. • “Making Undecidable Problems Decidable in Practice.” Software Engineering Seminar, Department of Computer Science, Iowa State University, Ames, IA, October 12, 2017.
SELECTED COURSE PROJECTS	<ul style="list-style-type: none"> • <i>UAV Security Exploit</i>. Designed a one-click man-in-the-middle (MITM) attack with ARP poisoning to acquire unauthenticated control of a drone. • <i>Modeling and Verification of a Pacemaker</i>. Modeled a pacemaker using UPPAAL and synthesized code to run on a 32-bit ARM microcontroller. • <i>Veterinary Patient Records</i>. Gathered requirements for a patient record system; culminated in a complete requirements specification document, and a prototype. • <i>Network Sniffer</i>. Designed a powerful network packet sniffer capable of collecting socket-connection information and data, SMTP messages and profile connections. • <i>Viral Marketing</i>. Experimentally evaluated the correlation between social network and spread of influence models to maximize information spread. • <i>US Presidential Elections</i>. Designed a predictor model to predict popular vote and electoral college winner of 2016 US presidential elections.
SKILLS	<p><i>Languages & Software:</i> C/C++, Python, \LaTeX, Matlab.</p> <p><i>Technologies:</i> Git, CMake, HTML/CSS, SQL, MongoDB.</p>
PROFESSIONAL SERVICE	<p><i>Artifact Evaluation Committee:</i></p> <ul style="list-style-type: none"> • Tools and Algorithms for Construction and Analysis of Systems (TACAS) 2018 <p><i>Conference Review:</i></p> <ul style="list-style-type: none"> • Quantitative Evaluation of SysTems (QEST) 2019 • International Conference on Cyber-Physical Systems (ICCPs) 2019 • Design, Automation, and Test in Europe (DATE) Conference 2019 • NASA Formal Methods Symposium (NFM) 2019, 2018, 2016 • Tools and Algorithms for Construction and Analysis of Systems (TACAS) 2018, 2017 <p><i>Journal Review:</i></p> <ul style="list-style-type: none"> • Innovations in Systems and Software Engineering (ISSE) • Journal of Aerospace Information Systems (JAIS)
EXTERNAL TRAINING	<ul style="list-style-type: none"> • Marktoberdorf School on Dependable Software Systems Engineering, 2016. • SRI International Sixth Summer School on Formal Techniques, 2016 • RiSE & LogiCS Spring School on Logic and Verification, 2016
AWARDS AND HONORS	<ul style="list-style-type: none"> • National Science Foundation travel grant to Verification Mentoring Workshop (VMW) and Computer Aided Verification (CAV) Conference 2016, 2018. • Travel grant to Formal Methods in Computer Aided Design (FMCAD) Conference 2016, 2017. • Travel grant and registration waiver to Marktoberdorf School. • Carnegie Mellon University travel grant to CPS V&V Workshop 2016. • National Science Foundation travel grant to CPS Week 2016. • <i>Best Design</i> and <i>Top 10 hack</i> at HackPrinceton 2013. • University of Delhi academic scholarship, 2009–2013.