

# Kristin Yvonne Rozier

## Curriculum Vitæ

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<http://laboratory.temporallogic.org/kyr>

### Research Interests

- Formal methods, verification and validation of safety-critical systems
- Design-time checking of system logic and system requirements with applications in air traffic management, aerospace systems, automated control, biomedical privacy, secure protocols
- System and safety health management for intelligent, autonomous Unmanned Aerial Systems
- Model checking, property-based design, model-based design
- Linear Temporal Logic satisfiability checking, specification debugging techniques and theory
- Automated reasoning, runtime monitoring, fault tolerance, safety analysis

### Education

- 2012 Rice University Ph.D. in Computer Science  
Thesis: *Explicit or Symbolic Translation of Linear Temporal Logic to Automata*  
Advisor: Moshe Y. Vardi
- 2001 College of William and Mary M.S. in Computer Science  
Thesis: *Black-Box Testing of Deterministic Finite Automata*  
Advisor: Paul K. Stockmeyer
- 2000 College of William and Mary B.S. in Computer Science, *Magna Cum Laude*  
Advisor: Deborah S. Noonan

### Employment

- 08/16– Assistant Professor, Iowa State University, College of Engineering, Department of Aerospace Engineering (AERE), with courtesy appointments in the Departments of Computer Science (COMS), and Electrical and Computer Engineering (ECpE).
- 01/15–08/16 Assistant Professor, University of Cincinnati, College of Engineering and Applied Science, Department of Aerospace Engineering and Engineering Mechanics (AEEM) with a joint appointment in the Department of Electrical Engineering and Computing Systems (EECS).
- 09/08–12/14 Research Scientist, NASA Ames Research Center, Intelligent Systems Division, Discovery and Systems Health (DaSH) and Robust Software Engineering (RSE) research groups.
- 11/03–09/08 Research Scientist, NASA Langley Research Center, Formal Methods Group, Safety Critical Avionics Systems Branch.
- 08/04–12/05 Computer Science Teaching Assistant, Rice University, Department of Computer Science.
- 05/01–11/03 Computer Systems Analyst, NASA Langley Research Center/Lockheed Martin Space Operations, Aeroacoustics Group.
- 08/00–05/01 Computer Science Laboratory Instructor, College of William and Mary, Department of Computer Science.
- 05/00–09/00 Systems Programmer, Pragati Synergetic Research, Inc.

## Awards and Honors

- **NASA Early Career Faculty Award**, “Multi-Platform, Multi-Architecture Runtime Verification of Autonomous Space Systems,” 2016
- **NSF CAREER Award**, “CAREER: Theoretical Foundations of the UAS in the NAS Problem (Unmanned Aerial Systems in the National Air Space),” 2016
- **William H. Middendorf Research Excellence Award**, Department of Electrical Engineering and Computing Systems, College of Engineering and Applied Science, University of Cincinnati, 2015-2016
- **Faculty Fellow**, Eric & Wendy Schmidt Data Science for Social Good Summer Fellowship, Computation Institute, University of Chicago, Chicago, Illinois. (summer, 2015)
- **Darwin T. Turner Scholars Program Breakfast of Champions Faculty Medal** from University of Cincinnati, for work in mentoring and nurturing female and under-represented minority students; nominated by a student “as someone who deserves to be acknowledged for their hard work and dedication” 2015
- **NASA Group Achievement Award** (Prognostics Team) 2014 “For groundbreaking foundational discoveries in the field of Prognostics and Health Management.”
- **Above and Beyond Award** (co-recipient as part of NASA Ames) from the Society for Women Engineers, for outstanding dedication and impact in engineering outreach during the year 2013-2014
- **Initiative-Inspiration-Impact Award** from Women in Aerospace “For exemplary achievement of formal specification, verification, and validation of a NextGen air traffic control system candidate and for dedication as a mentor and role model.” (This prestigious award is presented for an individual in her early career, who consistently surpasses expectations from a technical, interpersonal, and management perspective, commitment to professional growth, and service as a role model or mentor that shows dedication to the advancement of women in aerospace.) 2013
- **Distinguished Service Award** from the American Institute of Aeronautics and Astronautics Intelligent Systems Technical Committee “For Significant Contributions to the Activities of the ISTC and AIAA.” 2008-2013
- **NASA Superior Accomplishment Award** for “Outstanding leadership in planning and executing the Sixth NASA Langley Formal Methods Workshop” 2008
- **NASA Superior Accomplishment Award** from the Contractors Steering Council for contributions to NASA’s Aerospace Careers Program for Middle Schools, Spring, 2003
- **Howard Hughes Award** from the American Helicopter Society “For contributions to the automation, capability for version control, and flight data organization for validation of the NASA TiltRotor Aeroacoustics Code (TRAC) as a part of the development team.” 2002
- **NASA Group Achievement Award** (TRAC System and Analysis Team) 2002
- Lockheed Martin Space Operations **Lightning Award** 2002
- **Phi Beta Kappa** inducted 05/2000
- **James Monroe Scholar**, College of William and Mary. 1996-2000

## Research Funding

- 2017 Schloss Dagstuhl - NSF Support Grant for Junior Researchers in the form of a fee waiver to cover the full costs of room and board at Schloss Dagstuhl during the Dagstuhl Seminar 17462, “A Shared Challenge in Behavioural Specification,” November 12-15, 2017, and a travel stipend of \$1,500 US to reimburse the cost of a plane ticket to Dagstuhl. **PI**
- 2017-2020 NSF (PFI:BIC) “A Smart Service System for UAS Traffic Management in Low-Altitude Airspace.” \$1,000,000; **Co-I** portion of funds \$141,660.
- 2017 Schloss Dagstuhl - NSF Support Grant for Junior Researchers in the form of a fee waiver to cover the full costs of room and board at Schloss Dagstuhl during the Dagstuhl Seminar 17071, “Computer-Assisted Engineering for Robotics and Autonomous Systems,” February 12-27, 2017, and a travel stipend of \$1,500 US to reimburse the cost of a plane ticket to Dagstuhl. **PI**
- 2016 NSF grant for “Midwest Verification Day” \$9,994; **Co-I**

- 2016-2019 NASA Early Career Faculty Award “Multi-Platform, Multi-Architecture Runtime Verification of Autonomous Space Systems” \$596,630 **PI**
- 2016-2021 NSF “CAREER: Theoretical Foundations of the UAS in the NAS Problem (Unmanned Aerial Systems in the National Air Space)” \$523,772 **PI**
- 2015-2017 NASA Autonomy Operating System (AOS) for UAVs Grant. \$135,058 **PI**
- 2015 2015-16 UC-LEAF/NSF Branch proposal “New Directions in Research and Faculty Development: Working at Grace Hopper Celebration and Rice University.” \$3K **PI**
- 2015 Schloss Dagstuhl - NSF Support Grant for Junior Researchers in the form of a fee waiver to cover the full costs of room and board at Schloss Dagstuhl during the Dagstuhl Seminar 15171, “Theory and Practice of SAT Solving,” April 19-24, 2015, and a travel stipend of \$750 US to partially reimburse the cost of a plane ticket to Dagstuhl. **PI**
- 2015-2016 Aeronautics Research Mission Directorate (ARMD) Seedling Fund Phase I Award, “Efficient Reconfigurable Cockpit Design and Fleet Operations using Software Intensive, Networked and Wireless Enabled Architecture (ECON).” \$750K; **Co-I** portion of funds \$29,550.
- 2014 Travel Support Grant, Committee on the Status of Women in Computing Research (CRA-W), \$1700. **PI**
- 2013-2014 Aeronautics Research Mission Directorate (ARMD) Seedling Fund Phase I Award, “Intelligent Hardware-Enabled Sensor and Software Safety and Health Management for Autonomous UAS.” \$600K, **PI**
- 2013-2014 Principle Investigator, NASA project “AG-4 (Air/Ground #4): Formal Methods Analysis for the Functional Allocation of the Next Generation Air Traffic Transportation System” under the Airspace Systems Program. Estimated \$200K
- 2008-2013 Team Leader, NASA project “Verification and Validation for Separation Assurance Algorithms” under the Airspace Systems Program. Funding was 1 FTE per year plus travel and PhD student support budgets.

## Research Publications

### Peer-Reviewed Conferences

- C1 Rohit Dureja and Kristin Yvonne Rozier. “FuseIC3: An Algorithm for Checking Large Design Spaces.” In *Formal Methods in Computer-Aided Design (FMCAD 2017)*, IEEE/ACM, Vienna, Austria, October 2–6, 2017. (acceptance rate 29%; CORE A\*-ranked conference)
- C2 Kristin Yvonne Rozier. “On the Evaluation and Comparison of Runtime Verification Tools for Hardware and Cyber-Physical Systems.” In *International Workshop on Competitions, Usability, Benchmarks, Evaluation, and Standardisation for Runtime Verification Tools (RV-CUBES)*, held in conjunction with the 17th International Conference on Runtime Verification (RV 2017), Springer-Verlag, Seattle, Washington, USA, September 13–16, 2017.
- C3 Kristin Yvonne Rozier, and Johann Schumann. “R2U2: Tool Overview.” In *International Workshop on Competitions, Usability, Benchmarks, Evaluation, and Standardisation for Runtime Verification Tools (RV-CUBES)*, held in conjunction with the 17th International Conference on Runtime Verification (RV 2017), Springer-Verlag, Seattle, Washington, USA, September 13–16, 2017.
- C4 Johann Schumann, Patrick Moosbrugger, and Kristin Y. Rozier. “Runtime Analysis with R2U2: A Tool Exhibition Report.” In *Proceedings of the 16th International Conference on Runtime Verification (RV16)*, Springer-Verlag, Madrid, Spain, September 23–30, 2016. (acceptance rate < 44%)
- C5 Marco Gario, Alessandro Cimatti, Cristian Mattarei, Stefano Tonetta, and Kristin Yvonne Rozier. “Model Checking at Scale: Automated Air Traffic Control Design Space Exploration.” In *Proceedings of the 28th International Conference on Computer Aided Verification (CAV)*, Springer-Verlag, Toronto, Ontario, Canada, July 17–23, 2016. (acceptance rate < 27%; received the “Artifact Evaluated Stamp” (highest mark from Artifact Evaluation Review Committee <http://barghouthi.github.io/cav16-aec/>); CORE A\*-ranked conference)

- C6 Kristin Yvonne Rozier. “Specification: The Biggest Bottleneck in Formal Methods and Autonomy.” In *Proceedings of the 8th Working Conference on Verified Software: Theories, Tools, and Experiments (VSTTE)*, volume 9971 of *Lecture Notes in Computer Science (LNCS)*, pages 1–19, Springer-Verlag, Toronto, Canada, July 17–18, 2016. (Invited)
- C7 Eric W.D. Rozier and Kristin Yvonne Rozier. “Cascading Solution of Data Dependency Constraints in Z3.” In *International Symposium on Artificial Intelligence and Mathematics (ISAIM)*, AAAI, Ft. Lauderdale, Florida, January 4–6, 2016. (Invited)
- C8 Eric W.D. Rozier and Kristin Yvonne Rozier. “SMT-Driven Intelligent Storage for Big Data.” In *Proceedings of the Ninth International Workshop on Constraints in Formal Verification (CFV)*, IEEE, Austin, Texas, USA, November 5, 2015. (Invited)
- C9 Cristian Mattarei, Alessandro Cimatti, Marco Gario, Stefano Tonetta and Kristin Y. Rozier. “Comparing Different Functional Allocations in Automated Air Traffic Control Design.” In *Formal Methods in Computer-Aided Design (FMCAD 2015)*, IEEE/ACM, Austin, Texas, USA, September 27–30, 2015. (acceptance rate < 39%; CORE A\*-ranked conference)
- C10 Johann Schumann, Patrick Moosbrugger, and Kristin Y. Rozier. “R2U2: Monitoring and Diagnosis of Security Threats for Unmanned Aerial Systems.” In *Proceedings of the 15th International Conference on Runtime Verification (RV15)*, Springer-Verlag, Vienna, Austria, September 22–25, 2015. (acceptance rate < 35%)
- C11 Ulya Bayram, Kristin Yvonne Rozier, and Eric W. D. Rozier. “Characterizing Data Dependence Constraints for Dynamic Reliability Using  $N$ -Queens Attack Domains.” In *Proceedings of the 12th International Conference on Quantitative Evaluation of Systems (QEST 2015)*, Madrid, Spain, September 1–3, 2015. (acceptance rate < 29%)
- C12 Zhao, Yang and Rozier, Kristin Y. “Probabilistic Model Checking for Comparative Analysis of Automated Air Traffic Control Systems.” In *Proceedings of the 33rd International Conference On Computer-Aided Design (ICCAD’2014)*, IEEE/ACM, San Jose, CA, U.S.A., November 3–6, 2014. (Invited; CORE A\*-ranked conference)
- C13 Johannes Geist, Kristin Yvonne Rozier, and Johann Schumann. “Runtime Observer Pairs and Bayesian Network Reasoners On-board FPGAs: Flight-Certifiable System Health Management for Embedded Systems.” In *Proceedings of the 14th International Conference on Runtime Verification (RV14)*, Springer-Verlag, Toronto, Canada, September 22–25, 2014. (acceptance rate < 29%)
- C14 Rozier, Kristin Yvonne, Rozier, Eric. “Reproducibility, Correctness, and Buildability: the Three Principles for Ethical Public Dissemination of Computer Science and Engineering Research,” In *IEEE International Symposium on Ethics in Engineering, Science, and Technology, Ethics2014*, May 23–24, 2014. (acceptance rate < 50%)
- C15 Badger, Julia, and Rozier, Kristin Yvonne, (Eds.): *Proceedings of the Sixth NASA Formal Methods Symposium (NFM 2014)*, Houston, Texas, U.S.A., April 29–May 1, 2014. *Lecture Notes in Computer Science (LNCS)*, volume 8430, Springer 2014.
- C16 Thomas Reinbacher, Kristin Y. Rozier, and Johann Schumann. “Temporal-Logic Based Runtime Observer Pairs for System Health Management of Real-Time Systems.” In *20th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS)*, volume 8413 of *Lecture Notes in Computer Science (LNCS)*, pages 357–372, Springer-Verlag, Grenoble, France, 5–13 April 2014. (acceptance rate < 22%; CORE A\*-ranked conference)
- C17 Johann Schumann, Kristin Y. Rozier, Thomas Reinbacher, Ole J. Mengshoel, Timmy Mbaya, and Corey Ippolito. “Towards Real-time, On-board, Hardware-supported Sensor and Software Health Management for Unmanned Aerial Systems.” In *2013 Annual Conference of the Prognostics and Health Management Society (PHM2013)*, pages 381–401. October, 2013. ISBN: 978-1-936263-06-6, ISSN: 2325-0178.
- C18 Rozier, Kristin Y., and Vardi, Moshe Y. “Deterministic Compilation of Temporal Safety Properties in Explicit State Model Checking.” In *8th Haifa Verification Conference (HVC2012)*, volume 7857 of *Lecture Notes in Computer Science (LNCS)*, pages 243–259, Springer-Verlag, November, 2012. (acceptance rate < 50%)
- C19 Zhao, Yang and Rozier, Kristin Y. “Formal Specification and Verification of a Coordination Protocol for an Automated Air Traffic Control System.” In *12th International Workshop on Automated Verifi-*

ation of Critical Systems (AVoCS), volume 53 of *Electronic Communications of the EASST*, Bamberg, Germany, September 2012. (acceptance rate < 38%)

- C20 Rozier, Kristin Y., and Vardi, Moshe Y. “A Multi-Encoding Approach for LTL Symbolic Satisfiability Checking.” In *17th International Symposium on Formal Methods (FM2011)*, volume 6664 of *Lecture Notes in Computer Science (LNCS)*, pages 417–431. Springer-Verlag, 2011. (acceptance rate < 29%; CORE A\*-ranked conference)
- C21 Rozier, Kristin Yvonne, (Ed.): *Proceedings of the Sixth NASA Langley Formal Methods Workshop (LFM 2008)*, Newport News, Virginia, U.S.A., April 30 - May 2, 2008. NASA/CP-2008-215309, May 2008.
- C22 Rozier, Kristin Y., and Vardi, Moshe Y. “LTL Satisfiability Checking.” In *14th Workshop on Model Checking Software (SPIN '07)*, volume 4595 of *Lecture Notes in Computer Science (LNCS)*, pages 149-167. Springer-Verlag, 2007. (acceptance rate < 43%)

## Journals

- J23 Johann Schumann, Patrick Moosbrugger, and Kristin Y. Rozier. “R2U2: Monitoring and Diagnosis of Security Threats for Unmanned Aerial Systems.” In *Formal Methods in System Design*, pages 131, Springer-Verlag, April, 2017. DOI:10.1007/s10703-017-0275-x.
- J24 Eric W. D. Rozier, Ulya Bayram, and Kristin Yvonne Rozier. “Characterizing Data Dependence Constraints for Dynamic Reliability Using  $n$ -Queens Attack Domains.” *Leibniz Transactions on Embedded Systems (LITES) Special Issue on Quantitative Evaluation of Systems (QEST)*, volume 4, issue 1, article number 5, pg. 05:105:26, February, 2017. DOI: 10.4230/LITES-v004-i001-a005.
- J25 Johann Schumann, Kristin Y. Rozier, Thomas Reinbacher, Ole J. Mengshoel, Timmy Mbaya, and Corey Ippolito. “Towards Real-time, On-board, Hardware-supported Sensor and Software Health Management for Unmanned Aerial Systems.” In *International Journal of Prognostics and Health Management (IJPHM)*, volume 6, number 1, pages 1–27, PHM Society, June, 2015.
- J26 Zhao, Yang and Rozier, Kristin Y. “Formal Specification and Verification of a Coordination Protocol for an Automated Air Traffic Control System” In *Science of Computer Programming Journal*, volume 96, number 3, pages 337-353, Elsevier, December, 2014.
- J27 Tabakov, Deian, Rozier, Kristin Y., and Vardi, Moshe Y. “Optimized Temporal Monitors for SystemC.” In *Formal Methods in System Design Journal*, volume 41, number 3, pages 236-268, Springer, January, 2012.
- J28 Rozier, Kristin Y. “Linear Temporal Logic Symbolic Model Checking.” In *Computer Science Review Journal*, volume 5, number 2, pages 163-203, Elsevier, May, 2011.
- J29 Rozier, Kristin Y., and Vardi, Moshe Y. “LTL Satisfiability Checking.” In *International Journal on Software Tools for Technology Transfer (STTT)*, pages 123–137, Springer-Verlag, March, 2010.
- J30 Burley, Casey L., Brooks, Thomas F., Rozier, Kristin Y., et al. “Rotor wake vortex definition evaluation of 3-C PIV results of the HART-II study,” *International Journal of Aeroacoustics*, volume 5, pages 1-38, January, 2006.

## Miscellanea

- M31 Rohit Dureja, Eric Rozier, Kristin Yvonne Rozier. “A Case Study in Safety, Security, and Availability of Wireless-Enabled Aircraft Communication Networks.” *AIAA AVIATION*, June 5–9, 2017.
- M32 Rozier, Kristin Yvonne. “Year In Review: Intelligent Systems,” *Aerospace America*, volume 52, number 11, page 45, December 2014.
- M33 Rozier, Kristin Yvonne. “Year In Review: Intelligent Systems,” *Aerospace America*, volume 51, number 11, page 43, December 2013.
- M34 Rozier, Kristin Yvonne. “Year In Review: Intelligent Systems,” *Aerospace America*, volume 50, number 11, page 42, December 2012.
- M35 Rozier, Kristin Yvonne. “Year In Review: Intelligent Systems,” *Aerospace America*, volume 49, number 11, page 39, December 2011.
- M36 Harvey, Seth, Ingham, Michel, Rozier, Kristin Yvonne. “Year In Review: Intelligent Systems,” *Aerospace America*, volume 48, number 11, page 41, December 2010.

## Under Submission

- C37 “Combinatorial Model Checking Reduction” with Rohit Dureja.
- C38 “A Mechanized Core Calculus for Message Passing Concurrency” with Swarn Priya and Hridesh Rajan.
- C39 “SAT-based Explicit  $LTL_f$  Satisfiability Checking” with Jianwen Li, Yueling Zhang, Geguang Pu, and Moshe Y. Vardi.

## In Preparation

- J40 “A Case Study in Safety, Security, and Availability of Wireless-Enabled Aircraft Communication Networks.” (extended journal version) with Rohit Dureja and Eric Rozier
- C41 “From R2U2 to PLEXIL: System Health-Aware Plan Execution” with Jeremy Frank, Patrick Moosbrugger, and Johann Schumann.
- J42 “Temporal-Logic Based Runtime Observer Pairs for System Health Management of Real-Time Systems.” (extended journal version) with Thomas Reinbacher and Johann Schumann.
- C43 “An SMT-Based Algorithm for Ensuring Autonomous Aircraft Adhere to Human Air Traffic Control” with Eric Rozier
- J44 “And Then There Was One: Analysis of Ten Model-Checking Counterexamples to Inform Functional Allocation for Separation Assurance” with Alessandro Cimatti, Marco Gario, Cristian Mattarei, and Stefano Tonetta.

## Technical Reports

- T45 Kristin Yvonne Rozier, Johann Schumann, and Corey Ippolito. “Intelligent Hardware-Enabled Sensor and Software Safety and Health Management for Autonomous UAS.” Technical Memorandum NASA/TM-2015-218817, May, 2015.

## Current Research Projects

- 9/2007-present **Enabling Model Checking of More Complex Systems via PANDA**
- 9/2008-present **Safety Analysis for the Future of Air Traffic Control**
- 1/2011-present **More Scalable Symbolic Model Checking of Safety Properties**
- 2/2012-present **Run-time Monitoring for Fault Tolerance in Space**

## Conference Organizations

- 11/2018 *Co-Organiser* (with Wolfgang Ahrendt, Marieke Huisman, and Giles Reger), The Eighth International Symposium on Leveraging Applications of Formal Methods, Verification, and Validation (ISoLA) Track on Static and Runtime Verification, Cyprus.
- 4/17-19/2018 *Steering Committee, Program Committee*, The Tenth NASA Formal Methods Symposium (NFM 2018), Newport News, VA, USA.
- 4/16–19/2018 *Programme Committee*, The 24th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS 2018), Thessaloniki, Greece.
- 3/19–23/2018 *Programme Committee*, The 21st International Conference on Design, Automation, and Test in Europe (DATE) of microelectronics and embedded systems, E3: “Model-based Design and Verification for Embedded Systems” Subcommittee, Dresden, Germany.
- 9/17–21/2017 *Technical Programme Committee*, The 36th IEEE/AIAA Digital Avionics Systems Conference (DASC) Cyber, Systems, and Software Track, St. Petersburg, FL, USA.
- 9/13–15/2017 *Programme Committee*, The 36th International Conference on Computer Safety, Reliability and Security (SAFECOMP 2017), Trento, Italy.
- 9/4–8/2017 *Programme Committee*, European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE) Industry Track, Paderborn, Germany.

- 8/4-6/2017 *Programme Committee*, The Fifth IEEE International Workshop on Formal Methods Integration (FMi 2017), held in conjunction with the 18th IEEE International Conference on Information Reuse and Integration (IRI 2017), San Diego, CA, USA.
- 5/19/2017 *Programme Committee*, The Sixth Automated Formal Methods (AFM) Workshop, Moffett Field, CA, USA.
- 5/16-18/2017 *Steering Committee, Program Committee*, The Ninth NASA Formal Methods Symposium (NFM 2017), Moffett Field, CA, USA.
- 4/25-28/2017 *Programme Committee*, The 23th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS 2017), Uppsala, Sweden.
- 4/21/2017 *Programme Committee*, The Second Workshop on the Monitoring and Testing of CPS (MT-CPS-2), held in conjunction with CPSWeek 2017 in Pittsburgh, Pennsylvania.
- 4/19/2017 *Programme Committee*, The 2nd Workshop on Safety & Security aSSurance for Critical Infrastructures Protection (S4CIP17), in conjunction with the 2nd International Symposium on Security and Privacy (EuroS&P), Paris, France.
- 11/13-19/2016 *Programme Committee*, ACM SIGSOFT International Symposium on the Foundations of Software Engineering - Industry Papers Track (FSE 2016), Seattle, Washington, U.S.A.
- 10/21-22/2016 *Chair* The Eighth Midwest Verification Day Workshop (MVD), Ames, Iowa, U.S.A.
- 9/11-14/2016 *Programme Committee*, The 37th Annual Software Engineering Workshop (SEW-37), Gdansk, Poland.
- 07/27-30/2016 *Programme Committee*, The Fourth IEEE International Workshop on Formal Methods Integration (FMi 2016), Pittsburgh, USA.
- 07/17-18/2016 *Programme Committee, Session Chair*, The 8th Working Conference on Verified Software: Theories, Tools, and Experiments (VSTTE 2016), Toronto, Canada.
- 6/7-9/2016 *Steering Committee, Program Committee, Session Chair*, The Eighth NASA Formal Methods Symposium (NFM 2016), Minneapolis, MN, USA.
- 5/23-26/2016 *Programme Committee*, The First International Safety & Security aSSurance for Critical Infrastructures Protection (S4CIP), in conjunction with the 7th International Conference on Ambient Systems, Networks and Technologies (ANT), Madrid, Spain.
- 11/05/2015 *Publicity Chair, Programme Committee*, The Ninth International Workshop on Constraints in Formal Verification (CFV), Austin, Texas, U.S.A. A workshop affiliated with the IEEE/ACM International Conference on Computer-Aided Design 2015.
- 10/12-15/2015 *Programme Committee*, The 13th International Symposium on Automated Technology for Verification and Analysis (ATVA 2015), Shanghai, China.
- 8/12-14/2015 *Programme Committee*, The Third IEEE International Workshop on Formal Methods Integration (FMi 2015), San Francisco, California, USA.
- 07/18-24/2015 *Programme Committee*, Seventh Working Conference on Verified Software: Theories, Tools, and Experiments.(VSTTE 2015), San Francisco, California, USA.
- 6/22-26/2015 *Programme Committee*, The 20th International Symposium on Formal Methods (FM 2015), University of Oslo, Department of Informatics, Oslo, Norway.
- 6/22/2015 *Programme Committee*, The 4th International Workshop on Engineering Safety and Security Systems (ESSS 2015), a workshop affiliated with FM2015, Oslo, Norway.  
*Programme Committee*, The 2nd International Workshop on Safety and Formal Methods (SaFoMe 2015).
- 5/4-6/2015 *Steering Committee, Program Committee, Session Chair*, The Seventh NASA Formal Methods Symposium (NFM 2015), Pasadena, CA, USA.
- 11/2-6/2014 *Technical Program Committee*, ACM Student Research Competition at the IEEE/ACM International Conference on Computer-Aided Design (SRC@ICCAD'14), San Jose, California, USA.
- 8/19-20/2014 *Programme Committee*, The 36th NASA Software Engineering Workshop (SEW-36), NASA Ames Research Center, Moffett Field, California, USA.

- 8/13-15/2014 *Programme Committee*, The Second IEEE International Workshop on Formal Methods Integration (FMi 2014), San Francisco, California, USA.
- 4/29-5/1/2014 *Programme Committee Chair* (with Julia Badger), *Steering Committee*, The Sixth NASA Formal Methods Symposium (NFM 2014), Houston, Texas, USA.
- 11/18-21/2013 *Technical Program Committee*, ACM Student Research Competition at the IEEE/ACM International Conference on Computer-Aided Design (SRC@ICCAD'13), San Jose, California, USA.
- 9/11-13/2013 *Programme Committee*, The 13th International Workshop on Automated Verification of Critical Systems (AVoCS 2013), Surrey, UK.
- 8/14-16/2013 *Programme Committee*, The IEEE International Workshop on Formal Methods Integration (FMi 2013), San Francisco, California, USA.
- 6/12-14/2013 *Programme Committee*, The 10th International Conference on Integrating Formal Methods (iFM 2013), Turku, Finland.
- 5/14-16/2013 *Steering Committee, Program Committee*, The Fifth NASA Formal Methods Symposium (NFM 2013), Moffett Field, CA, USA.
- 1/8/2013 *Steering Committee, Program Committee*, Software Challenges in Aerospace (SCIA), Grapevine, Texas, USA.
- 10/12-13/2012 *Program Committee*, 35th Annual IEEE Software Engineering Workshop (SEW-35), Heraclion, Crete, Greece.
- 4/3-5/2012 *Steering Committee, Program Committee, Session Chair*, The Forth NASA Formal Methods Symposium (NFM 2012), Norfolk, Virginia, USA.
- 6/20-21/2011 *Program Committee*, 34th Annual IEEE Software Engineering Workshop (SEW-34), Limerick, Ireland.
- 4/18-20/2011 *Steering Committee, Program Committee, Session Chair*, The Third NASA Formal Methods Symposium (NFM 2011), Pasadena, California, USA.
- 3/29-31/2011 *Program Co-chair* (with Ufuk Topcu and Nok Wongpiromsarn) Verification and Validation of Aerospace Systems Focused Session, AIAA Infotech@Aerospace, St. Louis, Missouri, USA.
- 4/20-22/2010 *Program Co-chair* (with Stephen A. Jacklin) Verification and Validation of Aerospace Systems Focused Session, AIAA Infotech@Aerospace, Atlanta, Georgia, USA.
- 2010 *PC/Review committee* for NFM 2010 special issue of the NASA Journal, Innovations in Systems and Software Engineering( ISSE)
- 4/13-15/2010 *Organizing Committee, Program Committee, Session Chair*, The Second NASA Formal Methods Symposium (NFM 2010), Washington, DC, USA.
- 2009 *PC/Review committee* for NFM 2009 special issue of the NASA Journal, Innovations in Systems and Software Engineering (ISSE)
- 4/6-8/2009 *Organizing Committee, Program Committee, Session Chair*, The First NASA Formal Methods Symposium (NFM 2009), Moffett Field, CA, USA.
- 4/17/2008 *Co-chair* (with Amit Sahai) of the breakout group on Security, Privacy, and Reliability at the Visions for Theoretical Computer Science (TCS) Workshop, Seattle, Washington, USA.
- 4/30-5/2/2008 *General Chair*, The Sixth NASA Langley Formal Methods Workshop (LFM 2008), Newport News, VA, USA.

## Selected Technical Presentations

- TBD, Distinguished Speakers Seminar Series, hosted by Oxford Women in Computer Science Society, Oxford University, UK, 2017.
- “R2U2: Formal On-board System Health Management.” DLR, Braunschweig, Germany, November 17, 2017.
- TBD. Dagstuhl Seminar 17462, “A Shared Challenge in Behavioural Specification,” November 12-15, 2017.



- “R2U2: Formal System Health Management for Autonomous Systems.” Rockwell Collins Trusted Systems/Autonomous Systems Research Seminar, Cedar Rapids, Iowa, September 25, 2017.
- **Invited:** “Safe CPS Implementation: How Do We Measure That?,” *NSF Workshop on Cyber-Physical System (CPS) Verification & Validation Industrial Challenges & Foundations (I&F): CPS and AI Safety*, Carnegie Mellon University, May 12, 2017.
- “Specification: the Biggest Bottleneck in Formal Methods and Autonomy.” CS LAPIS Research Seminar, Rice University, Houston, TX, May 4, 2017.
- “R2U2: Formal System Health Management for Autonomous Systems.” NASA STMD ECF: “Verification and Validation of Autonomous Systems” Seminar, Johnson Space Center, Houston, TX, May 3, 2017.
- “R2U2: Formal System Health Management for Autonomous Systems.” Electrical and Computer Engineering Seminar, Iowa State University, Ames, IA, April 13, 2017.
- “What is Autonomy?” Spring 2017 Aerospace Industrial Advisory Council (IAC) Meeting, Iowa State University, Ames, IA, April 4, 2017.
- “What is Autonomy?” DARPA Information Science and Technology (ISAT) “Communicating Intent for Autonomy” Workshop, Arlington, VA, March 16–17, 2017.
- “R2U2: On-Board System and Safety Health Management of Unmanned Aerial Systems (UAS),” Boeing and Rockwell Collins Seminar, March 1, 2017.
- “Specification: the Biggest Bottleneck in Formal Methods and Autonomy.” Dagstuhl Seminar 17071, “Computer-Assisted Engineering for Robotics and Autonomous Systems,” February 12-17, 2017.
- “Adding Runtime Verification without Losing Certification.” Software Challenges in Aerospace, AIAA SciTech, Grapevine, Texas, January 9, 2017.
- “R2U2: Formal System Health Management for Autonomous Systems.” NASA JPL Mobility and Robotics Section Seminar@198-102, Pasadena, CA, December 16, 2016.
- “R2U2 in Space: System and Software Health Management for Small Satellites.” Spacecraft Flight Software Workshop (FSW), California Institute of Technology, Pasadena, CA, December 13–15, 2016.
- Poster: “An Airspace Abundant with Automation.” De Lange Conference X on Humans, Machines, and the Future of Work, Rice University, Houston, TX, December 5–6, 2016.
- Poster: “CAREER: Theoretical Foundations of the UAS in the NAS Problem (Unmanned Aerial Systems in the National Air Space).” NSF CPS PI Meeting, Arlington, VA, October 31–November 1, 2016.
- “Runtime Verification for System Health Management: the R2U2 Framework.” Computer-Aided Verification and Reasoning (CAVR) Seminar, Rice University, Houston, TX, October 19, 2016.
- “Linear Temporal Logic Satisfiability Checking.” Invitation-only workshop on the *Theoretical Foundations of SAT Solving*, Fields Institute, Toronto, Canada, August 15-19, 2016.
- **Keynote:** “Specification: The Biggest Bottleneck in Formal Methods and Autonomy.” Conference on Verified Software: Theories, Tools, and Experiments (VSTTE), Toronto, Canada, July 18, 2016.
- **Invited:** “Specification: The Biggest Bottleneck in Aerospace V&V and Autonomy.” *NSF Workshop on Cyber-Physical System (CPS) Verification & Validation Industrial Challenges & Foundations (I&F): CPS and AI Safety*. The purpose of this NSF-sponsored workshop is to make academic solutions meet industrial challenges with the goal of identifying the most important present and future foundational challenges in cyber-physical systems verification and validation (CPS V&V) in the advent of increasingly AI-enhanced control in autonomous systems. Carnegie Mellon University, May 6, 2016.
- “From Design Time To Run Time: Formal Methods for Ensuring the Safety of Safety-Critical Autonomous Systems.” Northeastern University ECE Department Cyber-Human Systems and Robotics Seminar, April 4, 2016.
- “Design-Time Formal Verification for Full-Scale Automated Air Traffic Control.” Galois Seminar, Portland, OR, March 24, 2016.
- “R2U2: System Health Management for Intelligent Autonomous Unmanned Aerial Systems (UAS).” Microsoft Research Seminar, Redmond, WA, March 22, 2016.
- “From Design Time To Run Time: Formal Methods for Ensuring the Safety of Safety-Critical Aerospace Systems.” Iowa State University Aerospace Engineering Seminar, Ames, IA, March 4, 2016.

- “R2U2: System Health Management for Intelligent Autonomous Unmanned Aerial Systems (UAS).” Embry-Riddle Aeronautical University IEEE Daytona Section/ECSSE Department Colloquium, Daytona Beach, FL, February 29, 2016.
- “Verification” University of Cincinnati, AEEM 5023-Spacecraft Design II course invited lecture, February 5, 2016.
- “From Design Time To Run Time: Formal Methods for Ensuring the Safety of Safety-Critical Aerospace Systems.” University of Michigan Aerospace Engineering Seminar, Ann Arbor, MI, February 2, 2016.
- **Seminar, Tutorial, and Short-term visit:** “Linear Temporal Logic Satisfiability Checking,” Theory Reading Group, KTH Royal Institute of Technology, Stockholm, Sweden, December 14–18, 2015.
- **Keynote:** “Layers of Formal Verification for Full-Scale NextGen Automated Air Traffic Control,” Layered Assurance Workshop (LAW). Los Angeles, California, December 7–8, 2015.
- EECS Department Research Seminar, University of Cincinnati, November 30, 2015.
- “Formal Methods!” University of Cincinnati, EECE 6032-Software Testing and Quality Assurance course invited lecture, November 20, 2015.
- “From Planes to UAS: Safe, Automated Air Traffic Control.” Grace Hopper Celebration (GHC) October 15, 2015.
- “Symbolic Model Checking for Full-Scale Design Space Exploration of NextGen Automated Air Traffic Control.” Computer-Aided Verification and Reasoning (CAVR) Seminar, Rice University, October 14, 2015.
- “Intelligent Autonomous Unmanned Aerial Systems (UAS) and R2U2: a System Health Management Framework.” University of Cincinnati Seminar, October 8, 2015.
- **Keynote:** “Intelligent Autonomous Unmanned Aerial Systems.” Safe and Secure Systems and Software Symposium (S5), sponsored by the Air Force Research Laboratory (AFRL), June 10, 2015. <http://www.mys5.org/>
- “Linear Temporal Logic Satisfiability Checking.” Dagstuhl Seminar 15171, “Theory and Practice of SAT Solving” April 19-24, 2015.
- “Formal Methods: Designing Safety-Critical Aerospace Systems at the University of Cincinnati.” Presentation at UC AEEM Advisory Board Meeting, April 17, 2015.
- “Intelligent Hardware-Enabled Sensor and Software Safety and Health Management for Autonomous UAS.” Poster and Presentation at College Advisory Council Meeting, April 10, 2015.
- “Formal Methods!” University of Cincinnati, EECE 6032-Software Testing and Quality Assurance course invited lecture, March 31, 2015.
- “Crazy Idea: Net-Enabled Aircraft!” Invited Symposium at SRI’s Crazy Idea Friday, March 20, 2015.
- Research presentation at AEEM graduate student recruitment weekend, University of Cincinnati, March 7, 2015.
- “Formal Methods! Designing Safety-Critical Systems at University of Cincinnati.” Invited Symposium at University of Victoria’s “Women in Engineering and Computer Science” Symposium series, February 27, 2015. <https://wecs.csc.uvic.ca/>
- “Formal Methods Challenge: Efficient Reconfigurable Cockpit Design and Fleet Operations using Software Intensive, Networked, and Wireless-Enabled Architecture (ECON).” Dagstuhl Seminar 15071, “Formal Foundations for Networking,” February 8-13, 2015.
- “Formal Methods! Join the Laboratory for Temporal Logic at UC.” Featured faculty speaker at joint AIAA/ACM-W student chapters meeting, February 3, 2015.
- “Intelligent Hardware-Enabled Sensor and Software Safety and Health Management for Autonomous UAS” with Johann Schumann and Corey Ippolito. 2015 NARI LEARN/Seedling Technical Seminar, January 13, 2015. <https://ac.arc.nasa.gov/p8rh8dsei1p/?launcher=false&fcsContent=true&pbMode=normal>
- **Invited:** “Integration of Formal Methods into Design and Implementation of Aerospace Systems.” Cyber-Physical Systems (CPS) Verification & Validation: Industrial Challenges & Foundations, Carnegie Mellon University, December 11-12, 2014.
- “Women in STEM Career Talk” Santa Clara University Women in STEM club, November 20, 2014.

- “Probabilistic Model Checking for Comparative Analysis of Automated Air Traffic Control Systems.” AFT Seminar, *NASA Ames Research Center*, October 27, 2014. (A = Aeronautics Directorate; F = Aviation Systems Division; T = Flight Trajectory Dynamics and Controls Branch)
- **Keynote:** Systems Lunch, an event affiliated with the Grace Hopper Celebration of Women in Computing (GHC 2014), Phoenix, Arizona, October 10, 2014.
- **Featured PI Presentation:** “Intelligent Hardware-Enabled Sensor and Software Safety and Health Management for Autonomous UAS.” One of three NASA Aeronautics Research Institute (NARI) PIs featured as the ‘best of’ funded research for the 2012-2014 funding periods, presenting to over 150K members of the public at NASA Ames Open House, Moffett Field, California, October 18, 2014.
- **Panelist:** “Ask a NASA Expert.” Served on two panels of six experts (11am & 3pm), NASA Ames Open House, Moffett Field, California, October 18, 2014.
- **Featured Speaker:** “No More Helicopter Parenting: Intelligent Autonomous Unmanned Aerial Systems.” NASA Ames’ premier seminar series, the Directors Colloquium, special edition in honor of NASA Ames’ 75th Anniversary celebration, by special invitation of the Office of the Chief Scientist. NASA Ames Research Center, Moffett Field, California, June 10, 2014. (See this talk on NASA’s YouTube channel: <https://www.youtube.com/watch?v=FTxT-fbCleA&list=UUggQcRNVNRaH3uEb4nqf0zg>)
- “From Design Time To Run Time: Formal Methods for Ensuring the Safety of Safety-Critical Aerospace Systems.” University of Cincinnati Aerospace Engineering Seminar, Cincinnati, Ohio, May 19, 2014.
- “From Design Time To Run Time: Formal Methods for Ensuring the Safety of Safety-Critical Aeronautics Systems.” Tulane Computer Science Seminar, New Orleans, Louisiana, April 23, 2014.
- “From Design Time To Run Time: Formal Methods for Ensuring the Safety of Safety-Critical Aeronautics Systems.” Arizona State University Computer Science Seminar, Tucson, Arizona, April 17, 2014.
- “Advances in Linear Temporal Logic Translation: Ensuring the Safety of Safety-Critical Aeronautics Systems.” Montana State University Computer Science Department Seminar, Bozeman, Montana, March 28, 2014.
- **Keynote:** “LTL Satisfiability Checking.” Eighth International Workshop on Constraints in Formal Verification, a workshop affiliated with the IEEE/ACM International Conference on Computer-Aided Design, San Jose, California, November 21, 2013.
- “Formal Specification: Linear Temporal Logic and Applications in Runtime Monitoring.” University of Miami, Department of Electrical and Computer Engineering EEN 417: Embedded Microprocessor System Design course invited lectures, September 25, 2013.
- “Formal Specification: Linear Temporal Logic and Applications” and “Model Checking and Applications of Formal Methods at NASA.” Invited lectures for graduate course EEN 513 - Software Design and Verification (a course based in part on paper Roz11), University of Miami, Department of Electrical and Computer Engineering, September 24-26, 2013.
- “Formal Methods and Other Awesome Applications in Engineering.” University of Miami, Department of Electrical and Computer Engineering EEN 112: Introduction to Engineering course invited lecture, March 6, 2013.
- “Formal Specification and Verification: Linear Temporal Logic, State Machines, and Their Applications.” University of Miami, Department of Electrical and Computer Engineering EEN 417: Embedded Microprocessor System Design course invited lectures, October 12, 2012.
- “Formal Specification and Verification of a Coordination Protocol for an Automated Air Traffic Control System at NASA.” University of Miami, Invited College of Engineering Colloquium, Miami, Florida, October 10, 2012.
- “Probabilistic Formal Verification of the Automated Airspace Concept High-Level Architecture.” AFT/RSE Seminar, *NASA Ames Research Center*, June 25, 2012. (A = Aeronautics Directorate; F = Aviation Systems Division; T = Flight Trajectory Dynamics and Controls Branch)
- “Explicit and Symbolic Compilation of Linear Temporal Logic to Automata for Verification.” PERFORM Performability Engineering Research Group Seminar Series, *University of Illinois at Urbana-Champaign* Coordinated Science Laboratory, Urbana, Illinois, February 17, 2012.
- “A Multi-Encoding Approach for LTL Symbolic Satisfiability Checking,” Invited symposium at *Galois, Inc.*, Portland, OR, August 10, 2011, <http://corp.galois.com/blog/>.

- “Formal Verification of the Automated Airspace Concept High-Level Architecture,” AFT Seminar, *NASA Ames Research Center*, May 9, 2011. (A = Aeronautics Directorate; F = Aviation Systems Division; T = Flight Trajectory Dynamics and Controls Branch)
- “Formal Methods for NGATS System Verification Explained,” NGATS Airspace AFT Seminar, *NASA Ames Research Center*, November 2, 2009. (A = Aeronautics Directorate; F = Aviation Systems Division; T = Flight Trajectory Dynamics and Controls Branch)
- “Formal Methods Explained,” *University of Nevada at Reno* Computer Science & Engineering Colloquium Series, Reno, Nevada, October 29, 2009.
- “Solving the Two Body Problem,” Panel organizer and panelist with Katy Dickinson (Sun Microsystems), Amarda Shehu (George Mason University), Evgenia Smirni (College of William and Mary). *Grace Hopper Celebration (GHC) of Women in Computing Conference*, Tucson, Arizona, September 30-October 3, 2009. (Presentation 1:45PM - 2:45PM on Oct. 2.)
- “Women and the Flat Connected World,” Panel with Meenakshi Kaul-Basu (Sun Microsystems), Bev Crair (Quantum Corporation), Claudia Galvn (Microsoft Corporation), Lydia Ash (Google), Radha Ratnaparkhi (IBM), Sumitha Prashanth (Sun Microsystems). *Grace Hopper Celebration (GHC) of Women in Computing Conference*, Tucson, Arizona, September 29-October 3, 2009. (Presentation 11:15AM - 12:15PM on Oct. 1.)
- “MAGIC: Setting Up An Effective Organization To Support Girls,” Birds of a Feather (BOF) with Ira Pramanick, Fauzia Saeed, Katy Dickinson, Meenakshi Kaul-Basu, and Robin Wilensky. *Grace Hopper Celebration (GHC) of Women in Computing Conference*, Keystone Resort, Colorado, October 1-4, 2008. (Presentation 5:10PM - 6:10PM on Oct. 3.)
- “Choosing Your Building Bricks: How to Find Your Research Direction,” Presentation with Kristen R. Walcott and Katie Panciera. *Grace Hopper Celebration (GHC) of Women in Computing Conference*, Keystone Resort, Colorado, October 1-4, 2008. (Presentation 2:50PM - 3:50PM on Oct. 3.)
- “On Formal Methods.” *Longwood University* Mathematics & Computer Science Colloquium Series, Farmville, Virginia, September 4, 2008.
- “Life-Critical System Verification.” *Visions for Theoretical Computer Science Workshop (TCS Visions)*, Seattle, Washington, May 17, 2008. Contributed to several nuggets; see Life-Critical System Verification in particular.
- “Career Life Balance.” *Committee on the Status of Women in Computing Research (CRA-W)* 2008 Grad Cohort Program for Women, Seattle, WA, March 13-14, 2008.
- “Symbolic LTL Compilation for Model Checking.” *Grace Hopper Celebration (GHC) of Women in Computing Conference*, Orlando, Florida, October 17-20, 2007.
- NGATS Airspace API/Researcher Meeting Featured Presentation, *NASA Langley Research Center*, June 27, 2007.
- Safety Critical Avionics Systems Branch Talk, *NASA Langley Research Center*, September 20, 2006.
- “Algorithms for Automata-Theoretic Linear Temporal Logic Model Checking.” *Games and Verification (GAMES 2006)*, July 3-7, 2006.
- “Algorithms for Automata-Theoretic LTL Model Checking.” *Cambridge University Automated Reasoning Group (ARG) Lunch Lecture Series*, June 28, 2006.

## Training

- Private Pilot Ground School, Trade Winds Aviation, Reid-Hillview Airport, San Jose, CA (6/13–9/19/2013)
- Long-term participant in the Programme on Logic and Algorithms at the Isaac Newton Institute for Mathematical Sciences (INI) at Cambridge University, and Unclassified Graduate Student, Pembroke College (01/06 - 07/06);
- Marktoberdorf formal methods school on Logical Aspects of Secure Computer Systems (8/2-14/05)
- Lipari School on Formal Methods: Theory and Practice (7/10-23/05)
- NASA Langley PVS Class (2003, 2007)
- NASA Airframe Noise Workshop (10/22-23/02)
- NASA Engineering Training (NET) Aeronautics Workshop (6/10-13/02)

## Teaching Experience

### Iowa State University

|             |   |                                    |
|-------------|---|------------------------------------|
| Spring 2018 | 361/Computational Techniques for Aerospace Design | <i>New Curriculum Development</i>  |
| Fall 2017   | 160/Aerospace Engineering Problems (1/4 semester) | <i>New Curriculum Development</i>  |
| Fall 2017   | 407X/507X/Applied Formal Methods                  |                                    |
| Spring 2017 | 407X/507X/Applied Formal Methods                  | <i>New Course Development; 5/5</i> |

### University of Cincinnati

|             |   |                                      |
|-------------|---|--------------------------------------|
| Spring 2016 | Formal Methods for Aerospace Engineering          | <i>5/5</i>                           |
| Fall 2015   | Mathematical Logic and Requirements Specification | <i>New Course Development; 4.5/5</i> |
| Spring 2015 | Formal Methods for Aerospace Engineering          | <i>New Course Development</i>        |

### Rice University

|             |                        |                           |
|-------------|------------------------|---------------------------|
| Fall 2005   | Analysis of Algorithms | <i>Teaching Assistant</i> |
| Spring 2005 | Discrete Mathematics   | <i>Teaching Assistant</i> |
| Fall 2004   | Analysis of Algorithms | <i>Teaching Assistant</i> |

### College of William and Mary

|             |  |                     |
|-------------|--|---------------------|
| Spring 2001 | Computer Science for Non-Majors Laboratory | <i>Two Sections</i> |
| Fall 2000   | Computer Science for Non-Majors Laboratory | <i>Two Sections</i> |

## Advising Experience

|                     |  |
|---------------------|--|
| <i>2017-present</i> | Postdoctoral advisor, Jianwen Li   |
| <i>2017-present</i> | Ph.D. co-advisor (with Phillip Jones), Pei Zhang (ECpE)  |
| <i>2017-present</i> | B.S. research co-advisor (with Joseph Zambreno), Bijan Choobineh (ECpE)  |
| <i>2017-present</i> | OpenUAS research advisor to undergraduates: Abigail Gries (AERE), Logan Gross (AERE), Alex Harpenau (AERE), Madison Harrington (AERE), Mandy Kewitsch (AERE), Catherine Sener (AERE), Josh Wallin (COMS)   |
| <i>2017-present</i> | M.S. research advisor, Brian Kempa (AERE)  |
| <i>2016-2017</i>    | Freshman honors advisor to: Jason Cheng (EE), Joseph Gurin (AERE)  |
| <i>2016-2017</i>    | Mentor, advising Stefan Jaksic, PhD student at Technikum Wien, Vienna, on NASA Autonomy Operating System project   |
| <i>2016-2017</i>    | M.S. research advisor, Shravan Krishnamurthy (AERE)  |
| <i>2016-2017</i>    | M.S. research advisor, Michael Dembinski (AERE)  |
| <i>2016-present</i> | B.S. research advisor (UC) to: Codi Burley (EECS)  |
| <i>2016</i>         | B.S. research advisor (UC) to: Christopher Crowell (EECS), Douglas Flick (EECS), McKenzie Kinzbach (AEEM)  |
| <i>2015-present</i> | PhD advisor, Rohit Dureja, PhD student in Computer Science   |
| <i>2015</i>         | PhD advisor, Siddharth Sridhar, UC PhD student in AEEM   |
| <i>2015-2016</i>    | B.S. research advisor, Jessica Glass, UC undergraduate in AEEM   |
| <i>2014-2015</i>    | Mentor, co-advising (with Johann Schumann) Quoc-Sang Phan, PhD student at Queen Mary University of London on <i>Unobtrusive On-board Software Health and Security Monitoring for Autonomous UAS</i> under Aeronautics Research Mission Directorate (ARMD) Seedling Fund Phase I Award, “Intelligent Hardware-Enabled Sensor and Software Safety and Health Management for Autonomous UAS.”                           |
| <i>2014-present</i> | Mentor, co-advising (with Johann Schumann) Patrick Moosbrugger, PhD student at Technikum Wien, Vienna on <i>Unobtrusive On-board Software Health Monitoring for Autonomous UAS</i> under Aeronautics Research Mission Directorate (ARMD) Seedling Fund Phase I Award, “Intelligent Hardware-Enabled Sensor and Software Safety and Health Management for Autonomous UAS,” [2014]; PhD thesis research [2015–present] |
| <i>2013-2015</i>    | Mentor, advising Marco Gario, PhD student at Universit degli Studi di Trento and Fondazione Bruno Kessler on <i>Formal Analysis for Functional Allocation of the Automated</i>   |

|           |   |
|-----------|---|
|           | <i>Airspace Concept Air Traffic Control Technologies</i> in coordination with NASA's Airspace Systems Program   |
| 2013-2015 | Mentor, advising Cristian Mattarei, PhD student at ICT Doctoral School, University of Trento on <i>Formal Analysis for Functional Allocation of the Automated Airspace Concept Air Traffic Control Technologies</i> in coordination with NASA's Airspace Systems Program  |
| 2013-2014 | Mentor, co-advising (with Johann Schumann) Johannes Geist, Masters student at Vienna University of Technology on hardware implementation of a real-time, realizable, responsive, unobtrusive unit   |
| 2013      | Mentor, advising Jordi Navarrette, PhD student at CUNY on <i>Model Checking High-Level Architectures for Future Autonomous Systems</i> in coordination with NASA's ARMD (Aeronautics Research Mission Directorate) PDM (Prognostics and Decision Making) program  |
| 2012-2013 | Mentor, advising Jose Quaresma, PhD Candidate at DTU Denmark on <i>Safety and Security Analysis of Communications Under the ADS-B Protocol</i> in coordination with NASA's Airspace Systems Program   |
| 2012-2013 | Mentor, co-advising (with Johann Schumann) Thomas Reinbacher, PhD Candidate at Vienna University of Technology on <i>Combining Real-Time Runtime Verification with Software Health Management</i>   |
| 2011-2013 | Mentor, advising Yang Zhao, PhD Candidate at UC-Riverside, on <i>Model-based Design and Verification of the Automated Airspace Concept High-Level Architecture and Probabilistic Model Checking of a Coordination Protocol for an Automated Air Traffic Control System</i> in coordination with NASA's Airspace Systems Program |
| 2008-2010 | Mentor, advising Alexandra Johnson, high school student (later CMU undergraduate majoring in computer science) under MAGIC (More Active Girls In Computing)   |
| 2004      | Mentor, with Ben Di Vito, of the Hypatheon Group summer interns. Responsible for co-advising a group of four undergraduates contributing to the Hypatheon database for deductive knowledge in coordination with the PVS theorem prover. Assessment Technology Branch, NASA Langley Research Center.                             |
| 2002      | Gloucester High School Senior Project advisor. Advised student on introductory computer engineering project including researching and building a custom computer  |

### Thesis Committees (by graduation date)

|      |   |
|------|---|
| 2020 | Ph.D. Thesis, Iowa State University, Computer Science: Swarn Priya              |
| 2017 | M.S. Thesis, Iowa State University, Computer Science: Swarn Priya               |
| 2016 | Ph.D. Thesis, Aalto University (Finland), School of Science: Jussi Lahtinen     |
| 2016 | M.S. Thesis, University of Cincinnati, Aerospace Engineering: Owen Macmann      |
| 2015 | M.S. Thesis, University of Cincinnati, Aerospace Engineering: Brandon Brown     |
| 2015 | M.S. Thesis, University of Cincinnati, Aerospace Engineering: Siddharth Sridhar |

### Selected Professional Service

#### Grant proposal evaluation and administration for NASA

- Contracting Officer's Technical Representative (COTR): civil servant technical expert with specific authority granted by the Contracting Officer to fulfill responsibilities associated with managing research contracts for NASA
 

|           |   |
|-----------|---|
| 2010-2014 | NRA Contract for subtopic B.6 Verification and Validation of Flight Critical Systems (VVFCS1) |
| 2011-2012 | SBIR 2011 Phase 1 & 2 proposals   |
- Proposal Reviewer, NASA Solicitation and Proposal Integrated Review and Evaluation System (NSPIRES)

06/2012      *Solicitation Announcement: NNH11ZEA001N-SSAT2 - B.2 System-Wide Safety Assurance Technologies (SSAT2)*

12/2013      *Solicitation Announcement: NNH13ZEA001N-SSAT - B.2 System-Wide Safety Assurance Technologies (SSAT)*

- Proposal Reviewer, NASA Minority-Serving Institution Faculty Engagement Competition (11/2011)
- Proposal Reviewer, NASA Small Business Innovation Research (SBIR), Phase I and Phase II proposals, <http://sbir.gsfc.nasa.gov/SBIR/SBIR.html>

10/2011      *subtopic: A1.20 - Verification and Validation of Flight-Critical Systems*

10/2012      *subtopic: A1.20 - Verification and Validation of Flight-Critical Systems; Phase II*

01/2013      *subtopic: H10.01 - Ground Processing Optimization and Technology Infusion*

01/2013      *subtopic: S5.05 - Fault Management Technologies*

02/2013      *subtopic: A1.06 - Assurance of Flight-Critical Systems*

01/2014      *subtopic: A1.06 - Assurance of Flight-Critical Systems; Phase II*

03/2014      *subtopic: S5.05 - Fault Management Technologies*

### Other Professional Service

- NSF Cyber-Physical Systems (CPS) Panel Reviewer, Fall 2017.
- Des Moines Investing In My Future's (IIMF) Bridging the Gap to College Day, STEM Careers presentation to middle school children and their parents, Grandview University (10/28/2017)
- Iowa Space Grant Consortium application reviewer (8/2017)
- Geek Girl Interview project helping to support women in STEM (8/10/2017)
- Mentor, ISU's Electrical, Computer, and Software Engineers as Leaders (ECSEL) program for undergraduate woman students, funded by an NSF SSTEM grant; <https://ecsel.ece.iastate.edu/students/ecsel-scholars/> (2017–present)
- Curriculum Committee, Department of Aerospace Engineering, ISU (2017–2018)
- Reviewer, Journal of Artificial Intelligence Research (JAIR) (6/2017)
- Presenter, Galaxy Girls 3-2-1 Blast Off, Girl Scout Day Camp, Izaak Walton League Park, two presentations to 60 7–10 year old girls (6/28/2017)
- NSF Cyber-Physical Systems (CPS) Panel Reviewer, Summer 2017.
- Featured Presentation, ISU Digital Women Code Camp (4/8/2017)
- Faculty Advisor, ISU Women in Aviation International Chapter (<https://www.wai.org/>), (2/2017–present)
- Reviewer, IEEE Transactions on Software Engineering (TSE) (2/2017)
- Reviewer, Journal of Automated Reasoning (JAR) (2/2017)
- Reviewer, Formal Aspects of Computing Journal, Special Issue on FASE'16 (1/2017, 6/2017)
- Featured faculty member, Professor Poster Project, Sigma Gamma Tau (SGT) National Honor Society in Aerospace Engineering, ISU (Fall, 2016)
- Faculty Search Committee, Department of Aerospace Engineering, ISU (2016–2017, 2017–2018)
- Reviewer, IEEE Transactions on Software Engineering (TSE) (9/2016)
- Reviewer, 24th ACM SIGSOFT International Symposium on the Foundations of Software Engineering (FSE 2016) (4/2016)
- Reviewer, 19th International Conference on Theory and Applications of Satisfiability Testing (SAT 2016) (03/2016)
- Panelist, Graduate School Panel, Tri-State Women in Computing Conference: An ACM-W Celebration (TRIWIC); a regional ACM-W Celebration of Women in Computing. TRIWIC brings together female technical women from Kentucky, Ohio, Indiana, and beyond (2-19-2016)
- NSF Software and Hardware Foundations (SHF) Panel Reviewer, Winter 2015/2016.
- NSF Cyber-Physical Systems (CPS) Panel Reviewer, Summer 2015.
- Founding Author (one of seven), Reproducible Science Blog: <http://reproduciblescience.blogspot.com>. May, 2015 – present

- UC Representative, Ohio Center of Excellence for Advanced Communications, Positioning, Navigation, and Timing (C2PNT), 2015–2016
- UC Representative and Speaker at Women in STEM events including: WomEngineer Welcome [8/25/2015], Women In Engineering High School Tour Day [10/28/2015], Cincinnati Woman's Club Scholarship Program [11/20/2015]
- Faculty Hiring Committee, Department of Aerospace Engineering and Engineering Mechanics, UC, 2015–2016
- Graduate Student Visit Weekend Planning Committee, Department of Electrical Engineering and Computing Systems, UC, 2015–2016
- Graduate Program Committee, Department of Aerospace Engineering and Engineering Mechanics, UC, 2015–2016
- Strategic Planning Committee, Department of Aerospace Engineering and Engineering Mechanics, UC, 2015–2016
- Faculty Advisor, UC Student Chapter of AIAA, 2015–2016
- Faculty Advisor, UC CubeCats (CubeSat Club), 2015–2016
- Faculty Advisor, class of 2019, Department of Aerospace Engineering and Engineering Mechanics, UC, 2015–2016
- Undergraduate Admissions Service, Department of Aerospace Engineering and Engineering Mechanics, UC. Responsible for calling, emailing, and giving tours to admitted female undergraduate students. 2015 – 2016
- Co-organizer, AIAA Intelligent Systems Award, Santa Clara Valley Science and Engineering Fair Synopsys Championship (2015, 2016, 2017)
- Mentor, NASA GIRLS program 2014. NASA GIRLS is a summer mentoring program aimed at inspiring middle school girls interested in STEM that includes instructional material from NASA. (summer, 2014)
- Volunteer Mentor, Data Science for Social Good Summer Fellowship, University of Chicago, Chicago, Illinois. (summer, 2014)
- Reviewer, AIAA Science and Technology Forum and Exposition 2015 (SciTech 2015), 5-9 January 2015 in Kissimmee, Florida. (2014)
- Reviewer, Fifth International Symposium on Games, Automata, Logics and Formal Verification (GandALF 2014) (06/2014)
- Reviewer, IEEE Transactions on Intelligent Transportation Systems (6/2014)
- Reviewer, Communications of the ACM, the leading print and online publication for the computing and information technology fields (05/2014, 01/2015, 04/2015, 06/2015)
- Invited speaker, CSters, the Rice University club for women in computer science. Topics included career path, options for interdisciplinary work, retention rates for women in the field, advertising one's research, choosing a graduate advisor, interviewing concerns, and the two-body problem (4/28/2014)
- Reviewer, Formal Aspects of Computing (FAOC) Journal, Springer (03/2014, 09/2014)
- Workshop Organizer for series of workshops titled "Logic is Magical!" aimed at exposing high school girls to mathematical logic and reasoning about knowledge; also professional panelist on panel for parents of high school girls to learn about opportunities for their daughters, challenges they may face, and ways of aiding their daughters in the pursuit of math and science careers. Society for Women Engineers (SWE) "WOW! That's Engineering!" San Jose State University (02/01/2014)
- Reviewer, Journal of Applied & Computational Mathematics (JACM), (12/2013)
- Reviewer, 17th International Conference on Fundamental Approaches to Software Engineering (FASE) (2014)
- Reviewer, 20th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS) (2014)
- Reviewer, Annals of Mathematics in Artificial Intelligence (AMAI) (11/2013)
- Reviewer, Annual Conference of the Prognostics and Health Management Society (PHM 2013) (2013)
- Mentor, NASA GIRLS program 2013. NASA GIRLS is a summer mentoring program aimed at inspiring middle school girls interested in STEM that includes instructional material from NASA. (summer, 2013)
- Reviewer, Journal of Software Testing, Verification and Reliability (2013)



- Reviewer, 28th IEEE/ACM International Conference on Automated Software Engineering (ASE) (2013)
- Reviewer, Journal of Logic and Algebraic Programming (7/2013)
- Mentor, The Huffington Post's Girls in STEM mentorship program (2013)
- Reviewer, Innovations in Systems and Software Engineering (ISSE): A NASA Journal, Special Issue on Software Health Management (SI: SwHM) (4/2013)
- Reviewer, 9th joint meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE) (2013)
- Reviewer, 25th International Conference on Computer Aided Verification (CAV) (2013)
- Reviewer, 24th International Conference on Automated Deduction (CADE-24) (2013)
- NASA Technical Recruiter for Undergraduate and Graduate Students: 2013 Winter Engineering Career Fair at Santa Clara University (1/16/2013), San Jose State University Expo '13 (2/26/2013)
- Mentor for WitsOn (Women in Technology Sharing Online), a Harvey Mudd College and Piazza pilot mentoring project to connect undergraduates pursuing STEM degrees with female mentors from industry and academia who can speak from personal experience about issues of particular concern to young women (10-11/2012)
- "What is an Intelligent System" Video Contest Judge, AIAA ISTC (10/2012)
- Head Book Reviewer (chair of peer-review committee, invited peer reviewers, coordinated all book chapter reviews, other organizational tasks: Valasek, John (ed), *Advanced Intelligent and Autonomous Aerospace Systems*, American Institute of Aeronautics and Astronautics, October, 2012.
- Reviewer, 19th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS) (2013)
- Reviewer, 14th International Conference on. Verification, Model Checking, and Abstract Interpretation (VMCAI) (2013)
- Reviewer, Science of Computer Programming Journal, Elsevier (9/2012, 11/2013, 10/2014, 11/2014, 6/2015)
- Reviewer, The 19th International SPIN Workshop on Model Checking of Software (SPIN) (2012)
- Reviewer, The 18th International Conference on Logic for Programming, Artificial Intelligence, and Reasoning (LPAR-18) (2012)
- Reviewer, The 3rd International Conference on Verified Software: Theories, Tools and Experiments (VSTTE) (2012)
- NASA speaker at Mountain View High School's College Awareness Day Career Fair (10/12/11)
- Reviewer, 13th International Conference on. Verification, Model Checking, and Abstract Interpretation (VMCAI) (2012)
- Reviewer, Automated Technology for Verification and Analysis (ATVA) (2011)
- Head Judge and award founder, AIAA Intelligent Systems Award, Santa Clara Valley Science and Engineering Fair Synopsys Championship (3/9/11, 4/3/11, 3/7/12, 3/13/13, 3/12/14)
- Santa Clara Valley Science and Engineering Fair 2011 Mentor
- AIAA Intelligent Systems Award Selection Panel: "The Selection Panel will include 4 additional members to be appointed by the ISTC Chair. These appointees shall be nationally recognized experts in areas relevant to ISTC scope, and should be members of AIAA in good standing, but need not be current members of ISTC." (2010)
- Reviewer, Elsevier Computer Science Review Journal (11/2011)
- Reviewer, 23rd International Conference on Computer Aided Verification (CAV) (2011)
- Reviewer, ACM SIGSOFT 19th International Symposium on the Foundations of Software Engineering (FSE) (2011)
- Reviewer, SPIN 2010: 17th International SPIN Workshop on Model Checking of Software (2010)
- Reviewer, AIAA Journal of Aerospace Computing, Information, and Communication (JACIC) (2010)
- NASA speaker at Peninsula Girl Scout Day Camp, Huddart Park, presented to 150 teens aged 12-18 years (7/21/2010)
- NASA speaker for EPATT (East Palo Alto Tennis and Tutoring) Lunchtime Speaker Series event, 3rd-6th grade groups (6/29/10)

- National Center for Women & Information Technology (NCWIT) Award for Aspirations in Computing Judge (April-May/2010, Oct-Nov/2010, Nov/2011)
- NASA Event Staff, 35th Annual Sunnyvale Art and Wine Festival (6/6/2009), 36th Annual (6/6/2010)
- Reviewer, Annals of Mathematics in Artificial Intelligence (AMAI) for the topic area “Formal Methods in Aerospace” (2010)
- AIAA Intelligent Systems Book: chair of peer-review committee, invited peer reviewers, coordinated all book chapter reviews, other organizational tasks
- Reviewer, Intelligent Systems Track, 48th AIAA Aerospace Sciences Meeting (ASM) (2010)
- Reviewer, Formal Methods in Computer Aided Design (FMCAD) (2009)
- Reviewer, AIAA Journal of Aerospace Computing, Information, and Communication (JACIC) (2009)
- Intel International Science and Engineering Fair 2009 Judge, Reno, Nevada (5/12-13/2009)
- Reviewer, ACM Transactions on Software Engineering and Methodology (TOSEM) Journal (2009, 3/2013, 8/2013)
- 16th Annual NASA Ames Student Space Settlement Design Contest Judge (4/23/09), 17th Annual (4/20/10)
- AIAA/NASA Ames Research Center Galileo High School Scholarship Evaluator (April-May/2009, March-May/2010)
- Santa Clara Valley Science and Engineering Fair Synopsys Championship Judge (3/18/09, 3/17/10)
- Girls Achieving in Non-traditional Subjects (GAINS) “Lunch with a NASA Scientist” (2/17/09)
- NASA Combined Federal Campaign (CFC) key worker 2008
- NASA Event Staff, Airship Ventures Dedication/Moffett 75th Diamond Jubilee Ceremony, Moffett Field, CA (11/21/2008)
- NASA representative, Smithsonian Folklife Festival, Washington, DC (7/3/2008)
- Virginia Junior Academy of Science (VJAS) Computer Science Judge (5/21/2008)
- Gildersleeve Science Fair Judge (12/13/2007)
- Reviewer, ISoLA Workshop On Leveraging Applications of Formal Methods, Verification and Validation: Special Workshop Theme: Formal Methods in Avionics, Space and Transport (10/2007)
- MAGIC (More Active Girls In Computing) core team member/mentor (10/2007-8/2010)
- NASA Exhibition Trailer staff at Air Power Over Hampton Roads, Langley AFB (4/28/2007)
- NASA representative at the Virginia Air and Space Center SpaceQuest Opening (4/21/2007)
- eCYBERMISSION Judge (3/2007)
- CHROME Club Speaker at Jones Middle School (2/12/2007), Eaton Middle School (6/07/2007)
- York County Regional Science Fair Judge at Bruton High School (1/31/2007), Grafton High (1/31/2008)
- River Oaks Baptist School of Houston Science Fair Judge (11/17/2005)
- Workshop Leader and Speaker: “Just Plane Wings,” Girl Scout Day (a day for Brownie Girl Scouts to learn about science), Rice University (11/12/2005)
- Tidewater Regional Science Fair Judge (3/20/2004, 3/08/2008)
- Menchville High School Science Fair Judge (12/09/2003, 12/11/2006, 12/06/2007)
- National Space Day presenter, McIntosh Elementary (5/1/2003)
- Newport News All City Science Fair Computer Science Judge (1/25/2003, 1/31/2004, 1/20/2007, 1/12/2008)
- Dozier Middle School Science Fair Engineering Judge (12/5/2002)
- New Horizons Governor’s School for Science and Technology presentation observer (5/2/2002) and judge (5/2/2003, 4/29/2004)
- Virginia State Science and Engineering Fair Computer Science Judge, Randolph-Macon College (4/13/2002, 4/5/2003), George Mason University (CS Chair: 4/12/2008)
- NASA “Careers in Aerospace” Speaker: Dozier Middle School (4/11/2002), Hines Middle School (3/13/03), Jones Magnet School (twice: 4/8/2004), Reservoir Middle School (3/13/2007)

## Memberships

- Associate Fellow of American Institute of Aeronautics and Astronautics (AIAA). Intelligent Systems Technical Committee (ISTC) since 2008. Chair, Publications Subcommittee 2010–2015. Chair, Professional Development, Education, and Outreach subcommittee since 2009.
- Senior Member of IEEE
- Senior Member of Society for Women Engineers (SWE)
- Senior Member of Association for Computing Machinery (ACM)
- Women In Aerospace (WIA)
- Phi Beta Kappa (PBK)
- Systems

## References

Available upon request.