

# Akshay Rajhans

MathWorks  
1 Lakeside Campus Drive, Natick, MA 01760  
✉ arajhans@alumni.cmu.edu  
📄 <https://arajhans.github.io>

## Education

- Ph.D. **Electrical and Computer Engineering**, Carnegie Mellon University, Pittsburgh, PA.  
**Thesis Title:** *Multi-Model Heterogeneous Verification of Cyber-Physical Systems*  
**Advisor:** Bruce H. Krogh. **Thesis Committee:** Ken Butts (Toyota), David Garlan, André Platzer.
- M.S. **Electrical Engineering**, University of Pennsylvania, Philadelphia, PA.  
**Thesis Title:** *Development of a Robust Testing Toolbox for Hybrid Systems*  
**Advisor:** George J. Pappas.
- B.E. **Electronics and Telecommunication**, University of Pune, Pune, India.

## Professional Experience

### MathWorks, Natick, MA

07/2013–

- **Current Role:** Head of the Advanced Research & Technology Office and Lead Research Scientist
- **Responsibilities**
  - Leadership responsibility for the research and innovation enterprise at MathWorks, including the following company-wide programs:
    - Research Collaborations Program
    - MathWorks Research Summits
    - Research Intelligence Program
    - Patent Program and Portfolio
    - Challenge Projects Program
    - Advanced Research & Technology Forum
  - Consultant to executive leadership (reporting to VP of Engineering, skip-level manager is the CEO)
  - Manages the research scientist team with expertise in robotics, control, computer vision, and applied math
  - Cross-disciplinary work in concert with engineering, marketing, finance, customer success, sales, legal, and HR
  - Thought leadership in the research community on various advisory boards, committees, talks, panels, and more
- **Metrics and Impact**
  - **Co-founded** the Advanced Research & Technology Office and led continual growth in the scope of work
  - **90+** collaborative projects established in dozens of countries across four continents
  - matchmaking between **hundreds** of Research Summit participants and MathWorks product teams
  - **dozens** of talks, panels, publications, conference committees, and industry advisory boards
  - accelerated product impact timeline, in some cases from **from years to months**
  - planning and oversight for **dozens** of collaborative research interns each year
  - advising funding agencies (e.g., NSF, NIST, DoD, Dutch NWO) on investment prioritization

### Bosch, Pittsburgh, PA

08/2009–12/2009

- Research intern, energy usage disaggregation
- Co-inventor on U.S. and international patents

### Carnegie Mellon University, Pittsburgh, PA

07/2008–05/2013

- PhD Candidate, collaborative work with Toyota
- Teaching assistant, ECE department

### University of Pennsylvania, Philadelphia, PA

01/2006–06/2008

- Research Staff at GRASP Lab (01–06/2008)
- MS Candidate in EE (01/2006–12/2007)
- Teaching assistant, Math and ESE departments

### Cummins, Pune, India

08/2003–12/2005

- Electronic Controls Application Engineering Manager for industrial business (08/2005–12/2005)
- Operations Management Program participant in R&D and Engineering (08/2003–08/2005)
- **One of only two** controls AE Managers overseeing all of industrial business across India
- **VP of Engineering's Recognition Award** for a test cell instrumentation modernization project

## Technical Community Service

### Invited Expert for Government Funding Agencies

- **Funding Review Panelist**, National Science Foundation (NSF), Technology, Innovation, and Partnerships (TIP) Directorate, 2023.
- **User Advisory Committee Member**, Dutch Research Council (NWO), Veni grant in Applied and Engineering Sciences. *Principal Investigator*: Prof. Sofie Haessaert. 2021–.
- **Invited Panelist**, NSF Formal Methods in the Field (FMiTF) Principal Investigators' Meeting, October 2022.
- **Invited Participant**, NIST/NSF/DoD Workshop on Simulation and Machine Learning in Robotics, 2018.
- **Invited Speaker**, NSF Visioning Workshop on International Networks for Advancing Cyber-Physical Systems (CPS) Research, Development, and Education Worldwide, part of CPS Week 2018, Porto, Portugal. April 2018.
- **Invited Panelist**, NIST CPS Framework Open Source Workshop, National Institute of Standards and Technology (NIST), Gaithersburg, MD, September 2017.
- **Invited Participant**, Exploring the Dimensions of Trustworthiness: Challenges and Opportunities Workshop, National Institute of Standards and Technology (NIST), Gaithersburg, MD, August, 2016.

### Industry Advisory Committees and Boards

- **Industry Advisory Board**, MIT's Climate & Sustainability Consortium, 2021–2023.
- **Industry Challenge Technical Program Committee**, Real-Time Systems Symposium (RTSS) 2022.
- **Industry Advisory Committee on Autonomous Vehicles Curriculum**, Robotics Engineering Program (now a Department) at Worcester Polytechnic Institute, 2017–18.
- **Industry Vice Chair**, IFAC Conference on Analysis and Design of Hybrid Systems (ADHS), 2018.
- **Industry Advisory Board**, International Symposium on Circuits and Systems (ISCAS), 2018.
- **Global Professional Advisory Community**, Association for Computing Machinery (ACM), 2017.

### Conference Program Committee (PC) Leadership

- **General Chair**: • MathWorks Research Summit, 2023–
- **Artifact Evaluation Chair**: • Formal Modeling and Analysis of Timed Systems 2022
- **Program (Co-)Chair**: • International Conference on Assured Autonomy 2024 • MathWorks Research Summit, Boston edition: 2017–2019, Tokyo edition: 2016–2019 • Fourth International Workshop on Monitoring and Testing of CPS 2019 • Spring Simulation Conference 2020 and 2019: CPS Track • Winter Simulation Conference 2017: CPS Track
- **Awards Chair**: • Hybrid Systems: Computation and Control 2018
- **Demo and Poster Chair**: • Hybrid Systems: Computation and Control 2017
- **PC Member**: • Annual Modeling and Simulation Conference 2021– • Formal Methods 2021– • International Conference on Cyber-Physical Systems 2020–, 2015 • Multi-Paradigm Modeling for Cyber-Physical Systems 2020– • Hybrid Systems: Computation and Control 2016–19 • International Conference on Informatics in Control, Automation and Robotics 2020, 2017–18 • Winter Simulation Conference 2017– • Numerical Software Verification Workshop 2018–19 • International Workshop on Formal Co-Simulation of Cyber-Physical Systems 2017– • Summer Simulation Multi-Conference 2014–2020 • Summer Simulation Multi-Conference 2015–2020 • Conference on Analysis and Design of Hybrid Systems 2015
- **Repeatability Evaluation Committee Member**: • Hybrid Systems: Computation and Control 2014

### Editorial Work

- **Associate Editor, Technology Conferences Editorial Board**, IEEE Control System Society, 2020–2022.
- **Editorial Advisory Board Member**, “Resilience in Cyber-Physical Systems: From Risk Modelling to Threat Counteraction,” F. Flammini (Ed.), Springer.

## Talks and Panels

### Keynotes

- K3. “*A Study of Cyber-Physical System Design Activity to Consider Opportunity for AI assistance*”, 25th International Conference on Model Driven Engineering Languages and Systems (MODELS), Montréal, Canada. October 2022.
- K2. “*Challenges and Opportunities in Design and Operation of Intelligent Cyber-Physical Systems*”, 19th International Runtime Verification Conference (RV), 3rd World Congress on Formal Methods, Porto, Portugal. October 2019.
- K1. “*Multi-Paradigm Modeling for Design and Operation of Intelligent Cyber-Physical Systems*”, International Workshop on Multi-Paradigm Modeling for Cyber-Physical Systems (MPM4CPS), Munich, Germany. September 2019.

## Invited Talks

- T19. “*Academic research to industry practice: success stories and open challenges in model-based approaches*”, MODELS Conference Industry Day, Montréal, Canada. October 2022.
- T18. “*Formal Methods for Real-World Cyber-Physical Systems: A Model-Based Design Perspective*”, Invited Talk, Brown University, Providence, RI. May 2022.
- T17. “*Engineering Learning-Enabled Cyber-Physical Systems: Challenges and Opportunities*”, Workshop on Machine Learning in Control (LEAC), part of Cyber-Physical Systems and Internet of Things (CPS-IoT) Week, remotely in Nashville, TN. May 2021.
- T16. “*Formal Methods for Real-World Cyber-Physical Systems: A personal perspective*”, Invited Guest Lecture, Brown University course on Logic for Systems (CS 171), remotely in Providence, RI. March 2021.
- T15. “Cyber-Physical Systems”, Independent Activities Period (IAP), Massachusetts Institute of Technology, remotely in Cambridge, MA. January 2021.
- T14. “*A Model-Based Design Perspective on Challenges and Opportunities in Automated Software Certification*”, 20th Software Certification Consortium (SCC) Steering Committee Meeting, Annapolis, MD. May 2019.
- T13. “*Specification Formalisms for Cyber-Physical Systems: A Tools Perspective*”, Dagstuhl Workshop on Specification Formalisms for Modern Cyber-Physical Systems, Dagstuhl, Germany. February 2019.
- T12. “*Graphical Modeling of Hybrid Systems with Simulink and Stateflow*”, Workshop honoring the retirement of Prof. Bruce Krogh, Carnegie Mellon University, Pittsburgh, PA. May 2018.
- T11. “*A Vision for Application-Focused International Collaboration Networks in Cyber-Physical Systems*”, NSF Visioning Workshop on International Networks for Advancing CPS Research, Development, and Education Worldwide, part of CPS Week 2018, Porto, Portugal. April 2018.
- T10. “*Heterogeneous Model-Based Design of Tomorrow’s Cyber-Physical Systems*”, ECE Department Colloquia, Tufts University, Medford, MA. November 2017.
- T9. “*Model-Based Design of Next Generation Cyber-Physical Systems*”, MIT LIDS, IDSS, MITeI, Lincoln Labs, NSF and IWR Workshop on Rethinking Modeling, Simulations and Control for the Changing Electric Energy Industry, Massachusetts Institute of Technology, Cambridge, MA, September 2017.
- T8. “*Why do we need holistic concern-driven engineering?*”, NIST CPS Framework Open Source Workshop, National Institute of Standards and Technology (NIST), Gaithersburg, MD, September 2017.
- T7. “*Challenges and Opportunities for Intelligent Transportation Systems*”, Robotica 2017, Newton, MA, June 2017.
- T6. “*Model-Based Design of Connected Autonomous Vehicles*”, 2nd IEEE Summer School on Connected and Autonomous Vehicles, Worcester Polytechnic Institute, Worcester, MA, May 2017.
- T5. “*Model-Based Design Challenges for Cyber-Physical Systems*”, NSF Expeditions in Computer Augmented Program Engineering (ExCAPE) Principal Investigators’ Meeting, University of Pennsylvania, Philadelphia, PA, May 2017.
- T4. “*Safety in Freely-Composed Cyber-Physical Systems—Challenges and Opportunities*”, with Pieter Mosterman, Exploring the Dimensions of Trustworthiness: Challenges and Opportunities Workshop, National Institute of Standards and Technology (NIST), Gaithersburg, MD, August, 2016.
- T3. “*Recent Advancements in MathWorks Verification and Validation Tools and Techniques*”, CPS V&V I&F Workshop 2016, May 2016, Carnegie Mellon University.
- T2. “*Verification of Systems Using Robust Temporal Logic Testing*”, Specification and Verification Center, School of Computer Science, Carnegie Mellon University, September 2008.
- T1. “*Robustness of Temporal Logic Specifications for Testing of Signals*”, Specification and Verification Center, School of Computer Science, Carnegie Mellon University, August 2008.

## Panels

- PNL9. “*Formal Methods in the Field*”, National Science Foundation (NSF) Principal Investigators’ (PI) Meeting, online, October 2022.
- PNL8. “*What disruptive technologies are expected to be most influential for the future industrial practice of model-based systems engineering (MBSE)?*”, MODELS Conference Industry Day, Montréal, Canada, October 2022.
- PNL7. “*Challenges in Satisfying the Need and Promotion of Modeling & Simulation Workforce*”, Winter Simulation Conference, online and Phoenix, AZ, December 2021.
- PNL6. “*Control for Climate Change Mitigation and Adaptation*”, IEEE CSS Workshop on Control for Societal Challenges, online, June 2021.
- PNL5. “*Future Challenges for Autonomous & Intelligent Transportation*”, IEEE Situational Awareness for Emerging Transportation Systems (SAFENETS) Workshop, Lowell, MA, October 2019.
- PNL4. “*Hybrid simulation for cyber-physical systems—where are we, and where do we want to go?*”, Spring Simulation Conference (SpringSim), Baltimore, MD, April 2018.
- PNL3. “*What are the Challenges Posed to CPS Theory by Modern Applications?*”, Joint Panel between the Hybrid Systems: Computation and Control Conference (HSCC) and the International Conference on Cyber-Physical Systems (ICCPs), part of CPS Week, Porto, Portugal, April 2018.
- PNL2. “*Why do we Need Holistic Concern-Driven Engineering?*”, CPS Framework Open Source Workshop, National Institute for Standards and Technology (NIST), Rockville, MD, September 2017.
- PNL1. “*Safety of Connected Autonomous Vehicles*”, First International Workshop on the Safety of Connected Autonomous Vehicles (SCAV), part of CPS Week, Pittsburgh, PA, May 2017.

## Patents

- PP1. Burton Andrews, Diego Benitez, Badri Raghunathan, and **Akshay Rajhans**, “*Method for Non-Intrusive Load Monitoring using a Hybrid System State Estimation Approach*”, U.S., European, and International Patents, 2012.

## Publications

Preprints available from <https://arajhans.github.io/publications.html>.

### Visioning Work

- V8. Pramod Khargonekar, Tariq Samad, Saurabh Amin, Aranya Chakraborty, Fabrizio Dabbene, Amritam Das, Masayuki Fujita, Mario Garcia-Sanz, Dennice Gayme, Marija Ilic, Iven Mareels, Kevin L. Moore, Lucy Y. Pao, **Akshay Rajhans**, Jakob Stoustrup, Juanid Zafar, and Margret Bauer, “*Climate Change Mitigation, Adaptation, and Resilience: Challenges and Opportunities for the Control Systems Community*”, IEEE Control Systems Magazine, Volume: 44, Issue: 3, Pages: 33–51, June 2024.
- V7. Andrew Alleyne, et al., “*Control for Societal-scale Challenges: Road Map 2030*”, A. M. Annaswamy, K. H. Johansson, and G. J. Pappas, eds, IEEE Control Systems Society Publication, 2023.  
<https://ieeecss.org/control-societal-scale-challenges-roadmap-2030>.
- V6. Hessam S. Sarjoughian, Edward J. Yellig, James J. Nutaro, and **Akshay Rajhans**, “*Challenges in Satisfying the Need and Promotion of Modeling & Simulation Workforce*”, S. Kim, B. Feng, K. Smith, S. Masoud, Z. Zheng, C. Szabo, and M. Loper, eds, Proceedings of the 2021 Winter Simulation Conference, December 2021.
- V5. Frank Allgöwer, João Borges de Sousa, James Kapinski, Pieter Mosterman, Jens Oehlerking, Patrick Panciatici, Maria Prandini, **Akshay Rajhans**, Paulo Tabuada, and Philipp Wenzelburger, “*Position Paper on the Challenges Posed by Modern Applications to Cyber-Physical Systems Theory*”, Nonlinear Analysis: Hybrid Systems, Volume 34, Pages 147–165, November 2019.
- V4. Alexandre Donzé and **Akshay Rajhans**, “*Tools Perspective*”, J. V. Deshmukh, O. Maler, and D. Nickovic, eds., Dagstuhl Seminar 19071: Specification Formalisms for Modern Cyber-Physical Systems, Dagstuhl, Germany. <https://doi.org/10.4230/DagRep.9.2.48>

- V3. **Akshay Rajhans** and Pieter J. Mosterman, “*A Vision for Application-Focused International Collaboration Networks in Cyber-Physical Systems*”, NSF Visioning Workshop for International Collaborations for Advancing CPS Research, Development, and Education Worldwide, part of CPS Week 2018.
- V2. Stuart Anderson, et al., “*On the Use of Modeling and Simulation in Robotics*”, Workshop Report, NIST/NSF/DoD Workshop on Simulation and Machine Learning in Robotics, 2018.  
<https://www.nist.gov/news-events/events/2018/04/simulation-and-machine-learning-robotics>
- V1. Andreas Tolk, Fernando Barros, Andrea D’Ambrogio, **Akshay Rajhans**, Pieter J. Mosterman, Sachin S. Shetty, Mamadou K. Traoré, Hans Vangheluwe, and Levent Yilmaz, “*Hybrid Simulation for Cyber-Physical Systems—A Panel on Where we are Going Regarding Complexity, Intelligence, and Adaptability of CPS Using Simulation*”, Spring Simulation Multi-Conference (SpringSim) 2018.

### Technical Publications

- P28. Claudio Menghi, Eugene Balai, Darren Valovcin, Christoph Sticksel, **Akshay Rajhans**, “*Completeness and Consistency of Tabular Requirements: an SMT-Based Verification Approach*”, under review.
- P27. Abenezer Taye, Roberto Valenti, **Akshay Rajhans**, Anastasia Mavrommati, Pieter Mosterman, and Peng Wei, “*Safe and Scalable Real-Time Trajectory Planning Framework for Urban Air Mobility*”, AIAA Journal of Aerospace Information Systems, April 2024.
- P26. Federico Formica, Tony Fan, **Akshay Rajhans**, Vera Pantelic, Mark Lawford, and Claudio Menghi, “*Simulation-based Testing of Simulink Models with Test Sequence and Test Assessment Blocks*”, IEEE Transactions on Software Engineering, Volume: 50, Issue: 2, Pages: 239–257, February 2024. To be also presented at the ACM International Conference on the Foundations of Software Engineering (FSE) 2024 in the Journal First track.
- P25. Mattia Di Florio, Vijay Iyer, **Akshay Rajhans**, Stefano Buccelli, Michela Chiappalone, “*Model-based Online Implementation of Spike Detection Algorithms for Neuroengineering Applications*”, 44th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBS) 2022.
- P24. **Akshay Rajhans**, Anastasia Mavrommati, Pieter J. Mosterman, and Roberto G. Valenti, “*Specification and Runtime Verification of Temporal Assessments in Simulink*”, 21st International Conference on Runtime Verification (RV) 2021.
- P23. Anastasia Mavrommati, Carlos Osario, Roberto G. Valenti, **Akshay Rajhans**, and Pieter J. Mosterman, “*An Application of Model Predictive Control to Reactive Motion Planning of Robot Manipulators*”, 17th IEEE International Conference on Automation Science and Engineering (CASE) 2021.
- P22. Manuel Rodriguez, Xiangxue Zhao, Hayley Song, Anastasia Mavrommati, Roberto G. Valenti, **Akshay Rajhans**, Pieter J. Mosterman, Yancy Diaz-Mercado, and Hosam Fathy, “*A Gradient-Based Approach for Coordinating Smart Vehicles and Traffic Lights at Intersections*”, IEEE Control Systems Letters (L-CSS), Volume: 5, Issue: 6, Dec. 2021.
- P21. Manuel Rodriguez, Xiangxue Zhao, Hayley Song, Anastasia Mavrommati, Roberto G. Valenti, **Akshay Rajhans**, Pieter J. Mosterman, Yancy Diaz-Mercado, and Hosam Fathy, “*A Gradient-Based Approach for Coordinating Smart Vehicles and Traffic Lights at Intersections*”, American Control Conference (ACC) 2021.
- P20. Nikita Visnevski, Teresa Hubscher-Younger, **Akshay Rajhans**, and Baoluo Meng, “*Automatic Synthesis of Information Flow Driven Execution Managers for Embedded Software Applications*”, AIAA/IEEE Digital Avionics Systems Conference (DASC) 2020. **Best in Session Award**.
- P19. Pieter J. Mosterman, **Akshay Rajhans**, Anastasia Mavrommati, Roberto G. Valenti, “*Simulation of Hybrid Dynamic Systems*”, in John Baillieul, Tariq Samad, editors, Encyclopedia of Systems and Control, Springer, Living Edition. First online: August 2020.
- P18. Zhan Tu, Anastasios Dimas, Mehmet N. Kurt, Anastasia Mavrommati, Pieter J. Mosterman, **Akshay Rajhans**, and Roberto G. Valenti, “*A Simulator for Trading Traffic Privileges by Selfish Driving Cars*”, Spring Simulation Conference (SpringSim) 2020.
- P17. Sebastian Castro, Pieter J. Mosterman, **Akshay Rajhans**, and Roberto G. Valenti, “*Challenges in the Operation and Design of Intelligent Cyber-Physical Systems*”, in Saurabh Mittal and Andreas Tolk, editors, Complexity Challenges in Cyber Physical Systems: Using Modeling and Simulation (M&S) to Support Intelligence, Wiley, January 2020.



- P16. Jean-Francois Kempf, Khoo Yit Phang, and **Akshay Rajhans**, “*Specification and Assessment of Temporal Requirements using Simulink Test*”, Fourth International Workshop on Monitoring and Testing of Cyber-Physical Systems (MT-CPS 2019), part of CPS-IoT Week 2019.
- P15. Akshay Rajhans and Dan Lluch, “A Digital Twin Approach to Online Monitoring in Industrial Internet of Things Applications”, Fourth International Workshop on Monitoring and Testing of Cyber-Physical Systems (MT-CPS 2019), part of CPS-IoT Week 2019.
- P14. **Akshay Rajhans**, Srinath Avadhanula, Alongkrit Chutinan, Pieter J. Mosterman, and Fu Zhang, “*Graphical Hybrid Automata with Simulink and Stateflow*”, 21st ACM International Conference on Hybrid Systems: Computation and Control (HSCC) 2018.
- P13. **Akshay Rajhans**, Srinath Avadhanula, Alongkrit Chutinan, Pieter J. Mosterman, and Fu Zhang, “*Graphical Modeling of Hybrid Dynamics with Simulink and Stateflow*”, 21st ACM International Conference on Hybrid Systems: Computation and Control (HSCC) 2018. **Best Repeatability Evaluation Award Finalist.**
- P12. **Akshay Rajhans**, Ajinkya Bhave, Ivan Ruchkin, Bruce H. Krogh, David Garlan, André Platzer and Bradley Schmerl, “*Supporting Heterogeneity in Cyber-Physical System Architectures*”, IEEE Transactions on Automatic Control, Special issue on Cyber-Physical Systems, Volume 59, Issue 12, Pages 3178-3193.
- P11. Matthias Althoff, **Akshay Rajhans**, Bruce H. Krogh, Soner Yaldiz, Xin Li and Larry Pileggi, “*Formal Verification of Phase-Locked Loops Using Reachability Analysis and Continuization*”, Communications of the ACM, Volume 56, Issue 10, Pages 97-104. **Research Highlight.**
- P10. Yi Deng, **Akshay Rajhans**, and A. Agung Julius, “*STRONG: A Trajectory-Based Verification Toolbox for Hybrid Systems*”, 10th International Conference on Quantitative Evaluation of SysTems (QEST) 2013.
- P9. **Akshay Rajhans** and Bruce H. Krogh, “*Compositional Heterogeneous Abstraction*”, 16th ACM International Conference on Hybrid Systems: Computation and Control (HSCC) 2013.
- P8. **Akshay Rajhans** and Bruce H. Krogh, “*Heterogeneous Verification of Cyber-Physical Systems Using Behavior Relations*”, 15th ACM International Conference on Hybrid Systems: Computation and Control (HSCC) 2012.
- P7. **Akshay Rajhans**, Ajinkya Bhave, Sarah Loos, Bruce H. Krogh, André Platzer, and David Garlan, “*Using Parameters in Architectural Views to Support Heterogeneous Design and Verification*”, IEEE Conference on Decision and Control (CDC) 2011.
- P6. Matthias Althoff, **Akshay Rajhans**, Bruce H. Krogh, Soner Yaldiz, Xin Li, and Larry Pileggi, “*Formal Verification of Phase-Locked Loops Using Reachability Analysis and Continuization*”, IEEE/ACM International Conference on Computer-Aided Design (ICCAD) 2011. **William J. McCalla Best Paper Award.**
- P5. Matthias Althoff, **Akshay Rajhans**, Bruce H. Krogh, Soner Yaldiz, Xin Li, and Larry Pileggi, “*Using Continuization in Reachability Analysis for the Verification of a Phase-Locked Loop*”, Frontiers in Analog Circuit Synthesis and Verification, co-located with Computer-Aided Verification (CAV) 2011.
- P4. Ajinkya Bhave, David Garlan, Bruce H. Krogh, Sarah Loos, André Platzer, **Akshay Rajhans**, and Bradley Schmerl, “*Multi-View Consistency in Architectures for Cyber-Physical Systems*”, Safe and Secure Systems & Software Symposium (S5) 2011.
- P3. Ajinkya Bhave, David Garlan, Bruce H. Krogh, **Akshay Rajhans**, and Bradley Schmerl, “*Augmenting Software Architectures with Physical Components*”, Embedded Real Time Software and Systems Conference (ERTS<sup>2</sup>) 2010.
- P2. **Akshay Rajhans**, Shang-Wen Cheng, Bradley Schmerl, David Garlan, Bruce H. Krogh, Clarence Agbi, and Ajinkya Bhave, “*An Architectural Approach to the Design and Analysis of Cyber-Physical Systems*”, Electronic Communications of the EASST, Volume 21, 2009.
- P1. Alexandre Donzé, Bruce H. Krogh, and **Akshay Rajhans**, “*Parameter Synthesis for Hybrid Systems with an Application to Simulink Models*”, 12th International Conference on Hybrid Systems: Computation and Control (HSCC) 2009.

## Theses

- Th2. **Akshay Rajhans**, “*Multi-Model Heterogeneous Verification of Cyber-Physical Systems*”, Ph.D. Thesis, Department of Electrical and Computer Engineering, Carnegie Mellon University, 2013. **Advisor:** Prof. Bruce H. Krogh.

Th1. **Akshay Rajhans**, “*Development of a Robust Testing Toolbox for Hybrid Systems*”, M.S. Thesis, Department of Electrical and Systems Engineering, University of Pennsylvania, 2007. **Advisor:** Prof. George J. Pappas.

## Student Mentoring

### External Thesis Committee Member

- Rizwan Parveen, BITS Pilani, Goa, India. **Advisor:** Prof. Neena Goveas.  
**Ph.D. Thesis Title:** “*Model Driven Approach For Healthcare Cyber Physical Systems*”. 2023.
- Yi Deng, Rensselaer Polytechnic Institute. **Advisor:** Prof. A. Agung Julius.  
**Ph.D. Thesis Title:** “*The Application of Trajectory-Based Analysis for Hybrid Systems*”. 2015.
- Amruta Namjoshi, M.Sc. Candidate, University of Pune. Project trainee at Cummins India. Spring 2004.

### Teaching Assistantships

- **18-474: Embedded Control Systems**, ECE Department, Carnegie Mellon University, Spring 2011, 2010.
- **MATH 114: Calculus II**, Mathematics Department, University of Pennsylvania, Spring 2008, Fall 2007.
- **ESE 210: Introduction to Dynamic Systems**, ESE Department, University of Pennsylvania, Spring 2007.
- **ESE 301: Introduction to Probability**, ESE Department, University of Pennsylvania, Fall 2006.

### Student Competitions

- **MathWorks Technical Lead**, *CAT Vehicle Challenge*, online qualification rounds in a simulation environment and a final in-person round at the University of Arizona. **Instructor:** Prof. Jonathan Sprinkle, 2017.
- **Judge**, *CPS V&V Grand Prix*, 15-424/15-624/15-824: Foundations of Cyber-Physical Systems, Carnegie Mellon University. **Instructor:** Prof. André Platzer, 2017, 2016.

### STEM Outreach

- **Panelist**, *New England Innovation Day*, New England FIRST Robotics. **Topic:** *STEM@Work*. March 2021.
- **Laboratory Instructor**, *Summer Engineering Experience for Girls (SEE)*, a day-long summer camp for female high-school students at Carnegie Mellon University. **Primary Instructor:** Prof. Bruno Sinopoli. Summer 2009.
- **Instructor**, *Social Educational Activity*, organized by the IEEE Bombay Section Region 10 to create awareness amongst high-school students. **Topic:** *Mobile Communications*. Spring 2002.

## Software Skills

Developer Simulink, Stateflow, SimEvents (at MathWorks), STRONG (at University of Pennsylvania)  
Advanced User Formal methods tools SpaceEx, PHAVer, Breach, KeYmaera (at Carnegie Mellon University)  
Languages MATLAB and C++ (professional), C and Java (graduate coursework), Python (beginner).

## Professional Society Memberships

- Senior Member, Association for Computing Machinery (ACM), 2019—
- Senior Member, Institute of Electrical and Electronics Engineers (IEEE), 2019—