

Akshay Rajhans

MathWorks
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🌐 <https://arajhans.github.io>

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

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.

Thought Leadership

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.

Featured Interviews, Perspective, and Quotes

- MIT Climate & Sustainability Consortium Impact Report, 2023. <https://impactclimate.mit.edu/2024/05/16/now-published-mcsc-impact-report-2023/>
- Formal Methods (FM) Keynote Speaker Interviews, 2019. <https://www.youtube.com/watch?v=BnANyL4H8i4>

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

Keynote Talks

- 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 Stickse, **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 (ERTS²) 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—